

CHAPTER 1

U.S.-CHINA TRADE AND ECONOMIC RELATIONS

SECTION 1: YEAR IN REVIEW: ECONOMICS AND TRADE

Introduction

Supported by government stimulus, China sustained economic growth at or near its official target rate of 7.5 percent through the first three quarters of 2014. China's gross domestic product (GDP) growth has been under 8 percent for ten consecutive quarters, with Chinese government leaders calling current growth rates the "new normal" for China.¹ Responding to signs of an imminent economic slowdown, China's government used various policy tools to intervene in the economy and try to achieve its official growth target for 2014.² Branded as a "mini-stimulus," fiscal spending increased by 25 percent year-on-year in May as the government accelerated subsidization of large infrastructure and housing projects.³ A continuing policy of Chinese government intervention in international currency markets supported China's exports in the first half of the year by maintaining an undervalued renminbi (RMB).

Chinese President Xi Jinping laid out a sweeping economic reform agenda during the 2013 Third Plenum of the Chinese Communist Party (CCP) to address many of China's underlying economic problems. Xi's proposed reforms range from a revised tax system, to financial liberalization, to partial reform of restrictions on imports and inbound foreign investment.* However, President Xi's government made minimal progress in implementing these reforms in 2014. Instead, President Xi and his leadership team focused on a broad anticorruption campaign while using the stimulus to avoid further economic slowdown. It remains unclear if the Xi-led government will accelerate reform in 2015.

Although China prevented further deceleration of growth in 2014 through stimulus, the government failed to address underlying structural problems, such as oversupply, overcapacity, mounting local government debt, and asset bubbles that put its economy at

*China has traditionally used catalogs to denote which products, services, and investments are approved for market access. Sectors not specifically listed in the catalogs are restricted from foreign competition. The system more widely used globally is a "negative list" approach which denotes only those sectors which face market access restrictions; sectors not listed are considered open.

risk of a sharp slowdown or “hard landing.”* Excessive levels of investment in property and heavy industries such as steel, which fueled China’s growth since the 1990s, have caused these underlying structural problems. Although market forces have been forcing prices downward, China’s government continues to use subsidized fixed investment and exports to bolster its economy to levels of growth that ensure low unemployment and reduce the risk of social unrest. While disposable income and consumption have increased relative to savings, China has not yet weaned itself from its traditional investment and export-based growth model, and thus continues to struggle with large internal imbalances.⁴

Imbalances in China’s trade and investment relationship with the United States and other countries worsened in 2014. In the first eight months of 2014, the U.S.-China trade deficit increased by 4.1 percent year-on-year to a total of \$216 billion. Despite its economic slowdown, China’s exports continued to grow and it sustained a global trade surplus. Chinese direct investment into the United States exceeded U.S. investment into China in 2014 for the first time as foreign firms faced an increasingly hostile investment climate in China. China accelerated its 2001 “Go Out” policy, which encourages Chinese firms to expand their global presence.⁵ China’s nontransparent policy-making processes frustrated trading partners and obstructed progress in key trade negotiations, such as the Information Technology Agreement (ITA). China’s confrontational behavior in addressing contentious territorial disputes with neighboring countries has also harmed economic and trade relations in the Asia Pacific. Such behavior has economic implications for the United States because of the large volumes of U.S. trade that flow through these disputed waters as well as the presence of potentially vast natural resources, including oil, natural gas, and other mineral deposits.

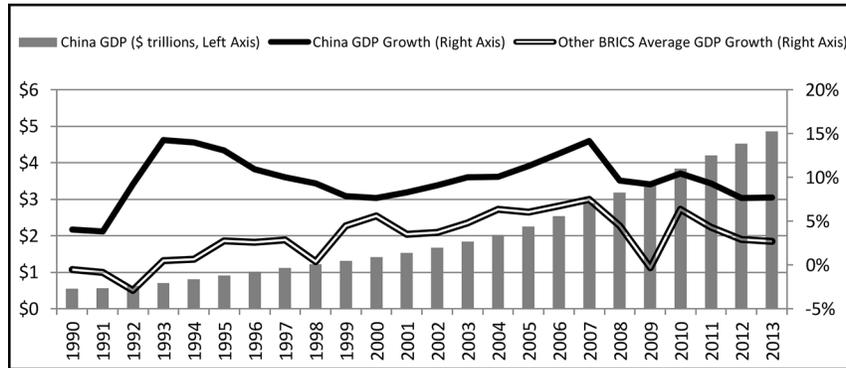
China’s Economic Slowdown and Stimulus

Slowdown—Causes and Symptoms

In the first three quarters of 2014, China reported an average growth rate of 7.4 percent, just below its official growth target of 7.5 percent, as the economy was bolstered through government stimulus. Throughout 2014, Chinese government leaders said lower growth rates would become the norm as the country seeks to transition from an investment and export-led economy to a consumption-based growth model. For example, Chinese Premier Li Keqiang said that China’s economy must grow at a “proper rate” expected at around 7.5 percent, which he described as “slower than the past, but normal.” Li indicated that the Chinese government was “adjusting its economic operations” to ensure that growth did not fall below 7.5 percent, a rate determined to maintain job creation.⁶ Li also pledged that there would be “no hard landing” for China’s economy.⁷ In summation, China conceded to a slower growth rate in 2014 but ensured intervention through stimulus whenever growth decelerated below the official target rate of 7.5 percent.

*A hard landing is a scenario in which an economy slows sharply toward or into recession after a period of growth.

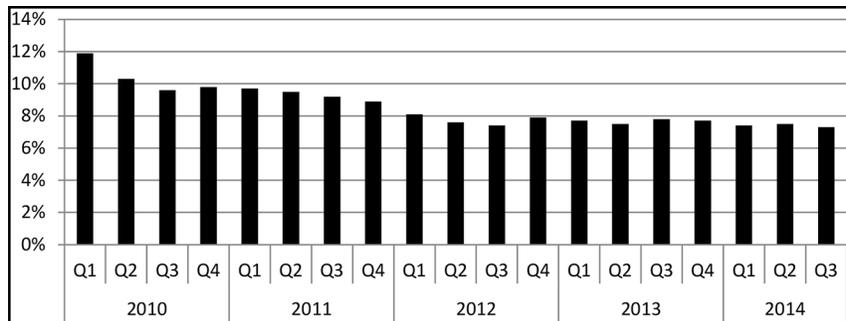
Figure 1: China's Annual GDP and GDP Growth



Source: World Bank Development Indicators. "Other BRICS Average GDP Growth" is an average of the GDP growth rates of Brazil, Russia, India, and South Africa.

Figure 1 shows China's annual GDP and GDP growth rates since 1990. Over this 23-year period, China's annual GDP increased from \$200 billion to \$4.8 trillion. Although annual growth rates declined somewhat from the peaks of the 1990s and early 2000s, they continue to remain consistently high, even in comparison to other large emerging economies. As shown in Figure 2, quarterly GDP growth rates declined slightly in 2010 and 2011, but have generally hovered in the 7.4 to 8 percent range since 2012. In the absence of sustained government stimulus, economists generally agree that China's GDP growth would have continued to decelerate below its official target in 2014.⁸

Figure 2: China's Quarterly GDP Growth Rates

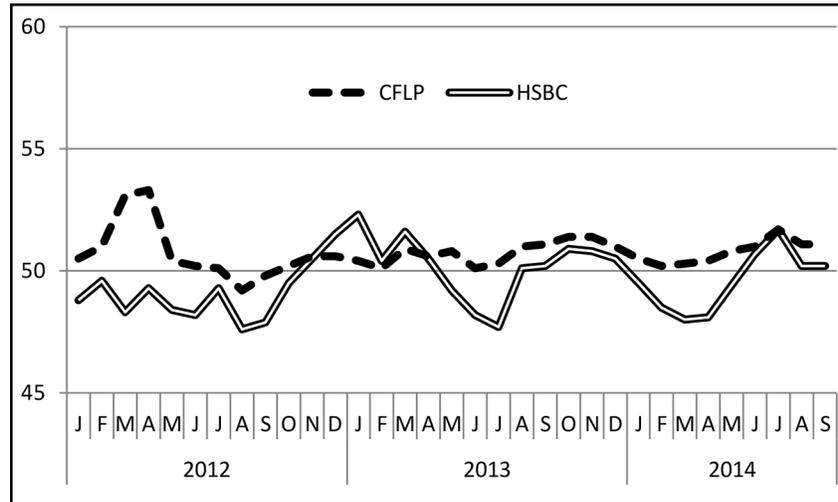


Source: Trading Economics.

China's Purchasing Managers' Index (PMI), an indicator of economic expansion and a proxy for industrial utilization, reveals how expanding government stimulus in 2014 may have mitigated China's economic slowdown. As shown in Figure 3, in the first half of the year, China's PMI remained under 50, the threshold for contraction in the economy. However, by June, as China's stimulus began to expand and take effect, China's PMI rose above 50, indicating evidence of increased production.⁹

Figure 3: Purchasing Managers' Index

(>50 = expansion; <50 = contraction)



Source: China Federation of Logistics and Purchasing (CFLP), via CEIC data; HSBC.

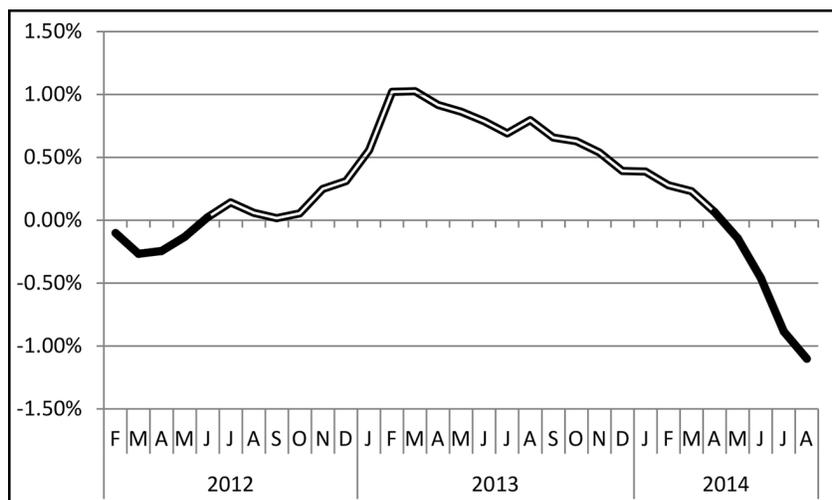
Although China's economy avoided a "hard landing" in 2014, several underlying structural problems combined to jeopardize growth: a worsening property market, persistent industrial overcapacity, and increasing debt levels. According to the International Monetary Fund (IMF), China's "growth has relied too heavily on investment and credit, a pattern that is not sustainable and [is] resulting in rising vulnerabilities."¹⁰ High levels of investment, especially in the property sector and related heavy industries, have been a central driver of economic growth and job creation in China since the 1990s.¹¹ Real estate and construction make up about 14 percent of urban employment in China, and local governments have financed construction-intensive projects as an easy means of job creation.¹² As slowing growth threatens to raise unemployment in China, local governments may continue to subsidize these industries to sustain employment levels and prevent the risk of domestic instability.

Historically, China's dynamic property sector has bolstered demand for steel, cement, and construction—the same industries that now face the most severe overcapacity problems. Such investment in traditional industries has often been spurred indirectly through local government subsidization of infrastructure projects that increased China's debt to the highest levels ever. Thus, the interdependence of China's property market, subsidized overcapacity of traditional industries, and rising local government debt has resulted in a vicious cycle that continues to put China's economy at risk of further slowdown.

Property Slump: In 2014, China's residential property prices fell for the first time in two years, sparking fears of an imminent crisis. As shown in Figure 4, price increases of newly constructed residential properties in 70 Chinese cities began to slow in March 2013 and continued to decelerate throughout that year.¹³ In May 2014,

prices began to decline and continued to do so into the third quarter. In July, 64 of 70 cities surveyed in China reported declining property prices, the largest proportion of cities showing a monthly decline since 2005. On average, property prices fell 0.9 percent between June and July.¹⁴

Figure 4: Change in Price of New Residential Construction
(Average of 70 Surveyed Chinese Cities)



Source: China National Bureau of Statistics, via CEIC data.

According to UBS Bank, “the risk of a more persistent and sharper downturn in the property sector is now the biggest risk facing China’s economy in 2014 and 2015.”¹⁵ As a pillar of China’s growth, the property sector affects a multitude of other key sectors, such as construction and steel production. Moody’s Analytics estimates that, including construction and home renovation, property sales account for nearly one-quarter of China’s GDP.¹⁶

Overcapacity: China’s chronic problem of overcapacity and excess investment continued to plague the economy. Chinese policymakers have been trying to pare down industrial overcapacity since 2005; yet after nearly a decade of efforts, economists believe that the problem has actually worsened.¹⁷ Traditionally, China’s overcapacity has been concentrated in certain sectors, such as steel, solar panels (photovoltaics), plate glass, cement, construction, and shipbuilding.¹⁸ Official data indicate that the average industrial utilization rate was 78 percent in the first half of 2013, while steel and plate glass had the lowest utilization rates at 72 percent, a level that would be considered recessionary in a capitalist system.*¹⁹ In the aluminum sector, overcapacity has increased with

*The utilization rate is a measurement of industrial capacity and is the rate at which the potential output levels are being met or used. Normal utilization rates in the United States tend to average around 80 percent.

approximately three million tons of new smelter space established since 2013.²⁰

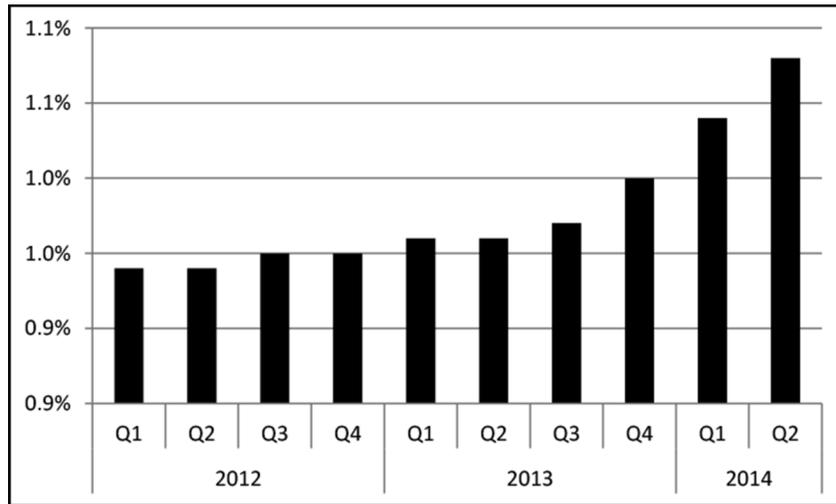
China's steel sector also suffers from serious overcapacity.²¹ Local governments amplify this problem by relying on steel mill expansion as an easy way to increase local output and employment.²² Chinese government subsidization of steel, even when domestic demand is low, has resulted in the selling of Chinese steel exports in global markets at below-market rates. As a result, the U.S. Commerce Department announced in July a preliminary decision to impose countervailing duties on certain Chinese steel imports; a final decision will be announced in November.²³

Economists estimate that for China to meet its 2014 target growth rate without enhanced stimulus, it would have to reduce excess capacity by 56.3 percent in steel, 38.9 percent in plate glass, and 11.4 percent in cement.²⁴ Although necessary in the long-term to reduce inefficiencies, the Chinese government appears to have adopted the view that reducing overcapacity during a time of economic slowdown would exacerbate the decline. For example, China's Minister of Industry and Information Technology, Miao Wei—who is charged with reducing industrial overcapacity—admitted to the difficulty of addressing the problem while the economy is under downward pressure.²⁵ The government did request that banks not lend to industries suffering from overcapacity; however, easy access to credit through the shadow banking sector has negated any effect from the official but widely ignored policy.²⁶

Rising Debt Levels: In 2014, China's debt levels rose at record rates, imposing another underlying threat to China's economic stability. Standard Chartered estimated that China's total debt-to-GDP ratio surpassed 250 percent in 2014,²⁷ a level well above most emerging economies and on par with Australia, South Korea, France, and Italy.* By comparison, the U.S. total debt-to-GDP ratio in 2013 was estimated at 270 percent. While economists do not consider the ratio itself to be dangerously high, they are concerned about the rate at which China's debt levels are increasing. By July 2014, China's debt-to-GDP ratio had already increased 20 percent over the previous year.²⁸ In the first half of 2014, China's total social financing, a more robust measurement of credit beyond traditional bank lending, increased 23.7 percent year-on-year.²⁹ China's rising debt levels are accompanied by a growing number and value of non-performing loans (NPL), which are loans upon which the borrower has not made payments for at least 90 days.³⁰ NPLs in China have been rapidly rising since late 2013, as shown in Figure 5. In addition, in 2014, China experienced its first corporate bond default since the establishment of its bond market in the early 1990s.³¹ If this trend continues, it could have negative consequences on the financial sector, as well as the broader economy.³²

* Standard Chartered's estimate of total debt is more comprehensive than China's official debt statistics and includes both domestic and foreign lending, as well as some types of lending that are often referred to as shadow banking. These include trust loans and entrusted loans, but do not include lending by underground banks, guarantee companies, online lending firms, and pawn brokers, which Standard Chartered considers to be very small compared to overall credit estimates. Some analysts estimate these forms of lending not included in Standard Chartered's calculation to be as high as 8 percent, in which case China's total debt-to-GDP ratio would be about 258 percent.

Figure 5: Chinese Non-Performing Loans
(as percentage of commercial bank loans)



Source: China Banking Regulatory Commission, via CEIC database.

Local governments are a major contributor to China's rising debt levels. Excessive investment in China's property sector and overcapacity-laden industries has largely been supported through local government financing.³³ In an effort to bolster local economic growth in a given Chinese town or province, local governments borrow to finance infrastructure projects that artificially boost demand for construction services and building materials. Consequently, local government debt is raising China's overall debt-to-GDP ratio at record rates and introducing another vulnerability to China's economic growth. In December 2013, a report issued by China's National Audit Office (NAO) revealed that "three provincial governments, 99 cities, 195 county-level administrations, and 3,465 townships had local public debt exceeding 100 percent" of their local economic activity.³⁴ In total, the NAO report disclosed that China's local governments held nearly \$3 trillion in debt, approximately one-third of China's GDP in 2013.³⁵

In recent years, China's central government has tried to rein in rising local government debt to lessen the oversupply of property and industrial overcapacity; however, Beijing's efforts have been largely inconsequential. Local governments have simply circumvented central government restrictions by borrowing from the large shadow banking sector.³⁶ The shadow banking system can be broadly defined as "lending that falls outside of the official banking system," and includes lending products such as entrusted loans, investment trusts, wealth management products, credit guarantees, and certain forms of microlending.³⁷ This year, the China Banking Regulatory Commission revealed that China's shadow banking sector reached about \$5.29 trillion, or 57 percent, of GDP in 2013.³⁸ Beijing has attempted to rein in the prominent shadow banking sector. For example, in May, the People's Bank of China (PBOC),

China's central bank, instructed commercial banks to limit inter-bank lending and lending to other financial institutions—both of which are important financing mechanisms for shadow bank lending. According to analysts, by limiting lending between banks and financial institutions, the government can curb risk-laden debt across the economy.³⁹ The government's efforts seem to have slowed shadow bank lending, which declined since 2013 as a share of aggregate credit; however, borrowing has simply shifted to the bond market, nullifying any net effect on overall debt.⁴⁰ (For more analysis of China's shadow banking sector, see the U.S.-China Economic and Security Review Commission's *2013 Annual Report to Congress*, Chapter 1, Section 3, "Governance and Accountability in China's Financial System.")

Stimulus—Scale and Effectiveness

Setting aside the structural reforms promised in the 2013 Third Plenary Session of the 18th CCP Central Committee (hereafter, "Third Plenum"), the Chinese government in 2014 resorted instead to economic stimulus to mitigate the slowdown. Although the Chinese government promised not to employ large-scale stimulus in 2014, Beijing implemented expansionary fiscal initiatives throughout the year to bolster the economy and maintain a growth rate at or near the official 7.5 percent target. Chinese Premier Li Keqiang stated that the government would only rely on "smart and targeted regulation" rather than strong stimulus.⁴¹ The government was wary of increasing already high debt levels, particularly among local governments.⁴²

Unofficially referred to as a "mini-stimulus," fiscal initiatives announced in July 2013 included expanded investment in railways and public housing, as well as reductions in the Required Reserve Ratios (RRRs) for banks, tax breaks for small businesses, and incentives for homebuyers.⁴³ Economists estimated that these fiscal initiatives, initially modest in volume, would have been insufficient to offset the effects of the slowing property market on economic growth.⁴⁴ Indeed, following the announcement of 7.4 percent GDP growth in the first quarter of 2014, the Chinese government steadily added to the initial "mini-stimulus," steering growth back toward the official target rate of 7.5 percent. For example, in September 2014, the PBOC provided \$81 billion in low-interest loans to China's five major state-owned banks as growth estimates declined in the third quarter of the year.⁴⁵ In July, the IMF called on China to lower its economic growth targets for 2015 and refrain from continued stimulus in favor of a "safer and more sustainable growth path."⁴⁶

Fiscal Spending: China's overall fiscal spending increased and accelerated throughout 2014 as the government increased stimulus. New central government spending, which increased 15.8 percent year-on-year in May, continued to support railway expansion, but also included other large infrastructure projects such as highways, oil and gas distribution, and storage facilities.⁴⁷ By mid-2014, the government had raised railway spending to \$128 billion, an increase of about 25 percent from 2013.⁴⁸ The China Railway Corporation (formerly, the Ministry of Railways) announced that it would be constructing 4,350 miles of new tracks in 2014.⁴⁹ Some

analysts claim that China's rail system does not suffer from the overcapacity found in other sectors and is, therefore, ripe for enhanced investment.⁵⁰ However, others argue that government subsidization of freight rail and investment in rail infrastructure serve as an indirect subsidy to China's export-oriented industries.*⁵¹

Despite high debt levels, Beijing urged local governments to boost fiscal spending. Fiscal spending accelerated throughout 2014 reaching a year-on-year increase of 26.1 percent in June.⁵² While the value of these fiscal initiatives paled in comparison to the \$640 billion stimulus implemented during the 2008–2009 global economic slowdown, the steady expansion of the stimulus over the year illustrated the Chinese government's commitment to bolstering the economy to avert rising unemployment and possible social instability.

As the decline of China's property market became the main risk to its economy in 2014, the government made policy adjustments to increase demand for housing. For example, the PBOC encouraged the country's largest banks to accelerate mortgage approvals.⁵³ Banks began offering low down-payment options to help first-time homebuyers.⁵⁴ Local governments also provided incentives to home buyers, such as tax breaks⁵⁵ and local household registration,† or *hukou*, to residents from other Chinese provinces.⁵⁶ On the supply side, the government also reduced reserve requirements of banks to allow property developers to obtain easier financing.⁵⁷ To boost lending, Chinese regulators redefined how loan-to-deposit ratios are calculated; the maneuver freed up new credit for small businesses.⁵⁸

Building Megaregions with Mini-Stimulus

The government's increased infrastructure expenditure under the mini-stimulus is accelerating the Chinese government's plans to integrate cities into megaregions. According to the McKinsey Global Institute, China is currently integrating cities into 22 clusters, seven of which can be characterized as megaregions.⁵⁹ The megaregions are Guangzhou, Shenzhen, Hangzhou, Shanghai, Nanjing, the Shandong Byland, and the Jing-Jin-Ji cluster, which includes Beijing, Tianjin, and parts of Hebei province.

However, the government's efforts to build megaregions have also come under criticism for contradicting Xi Jinping's pledge to let the market play a decisive role in the economy. While 2014 stimulus spending was small compared to the 2008 package, economists are concerned that China continues to resort to investment spending to boost the economy, exacerbating the overcapacity problem, and elevating the risk of an impending debt crisis. As one analyst remarked, "There are only so many 'ghost cities' and 'high-speed rail lines to nowhere' [Xi's] government can build."⁶⁰

* In the United States, the freight railway operators own the vast majority of rail tracks and self-finance new rail infrastructure investment.

† The location of one's household registration in China is the basis for eligibility to receive a variety of government services, such as education. It has traditionally been very difficult to change the location of one's household registration in China.

Building Megaregions with Mini-Stimulus—Continued

Furthermore, many urban planners argue that China’s megaregions are not being built in a way that would maximize the advantages of large urban clusters. Specifically, China’s megaregions are built around a single urban core with concentric circles of commuters extending out from the center.⁶¹ Some urban planning experts say that this model worsens traffic and pollution because residents will ultimately gravitate toward the megaregion’s core for work and city services.⁶² For example, Jan Wampler, a Massachusetts Institute of Technology (MIT) architect, criticized the Jing-Jin-Ji megaregion as simply an expansion of Beijing by building out more commuter ring roads.* Wampler said, “You can’t continue to build ring roads. It’s got to stop sometime.”⁶³ Instead, planning experts believe that the integration of cities only works when multiple urban cores are maintained, such as the U.S. Northeast corridor stretching from Washington, DC, to Boston, MA.⁶⁴

Supporters of the megaregion concept respond that these urban clusters are at less risk of becoming ghost towns since they build upon the economic momentum of China’s major cities. For example, in the case of the Jing-Jin-Ji cluster, advocates argue that the integration of the nearby but lesser developed Hebei region into the Beijing-centric megalopolis will reduce pressure on Beijing’s housing market, migrant flow, and water scarcity.⁶⁵

Status of China’s Economic Reform Agenda

In 2014, China’s government made minimal progress on the economic reforms it pledged to implement during the 2013 Third Plenum.⁶⁶ At the Third Plenum, Chinese President Xi Jinping announced an ambitious and comprehensive economic reform plan. In an oft-cited speech from that event, Xi stated the following:

*A proper relationship between the market and government remains the core of China’s economic reform. To build such a relationship is to settle whether the market or government plays a decisive role, and the market has proven to be the most effective.*⁶⁷

Xi’s comments articulate a clear guiding principle that the market should play a “decisive role” as China implements reforms.⁶⁸ However, in the same speech, Xi emphasized that the state would continue to play a key role in the economy, seemingly contradicting the so-called “decisive role” of the market. Critics noted that Xi’s comments should therefore not be misinterpreted to mean that the CCP would relinquish any power over China’s economy; on the contrary, the reforms have the potential to strengthen the CCP’s influence by clarifying the role of the state and consolidating its

*A ring road is a circumferential highway that surrounds a city, similar to the Capital Beltway (I-495) around Washington, DC, I-695 around Baltimore and I-285 around Atlanta (285). European cities, such as Stockholm, London, and Rome also have ring roads surrounding a city center.

power.⁶⁹ As The Brookings Institution scholar Arthur Kroeber said, “The respective roles of state and market need to be clarified, but the state role will remain very large.”⁷⁰ However, the IMF noted in a July 2014 country report on China that its reform blueprint “has not been followed up with details on the specific reforms or timetables.”⁷¹ In lieu of implementing substantive economic reforms, Xi and his economic reform leadership team spent the better part of 2014 consolidating political power and executing a vast anticorruption campaign.⁷²

Reform Leadership and Power Consolidation

In 2013, the Chinese government underwent a once-in-a-decade leadership transition that brought in Xi Jinping as president and altered the membership of the Politburo and other Party organs.* Initially, the transition sparked uncertainty about who would guide China’s future economic policies. Many analysts believed a broad consensus in China’s government supported comprehensive reform, highlighted by the November 2013 Third Plenum. At the National People’s Congress (NPC) meetings in March, the annual work reports issued by the Premier, the Ministry of Finance, and the National Development and Reform Commission (NDRC) were more detailed than previous reports, and appeared to build on the Third Plenum agenda.†

However, in 2014, President Xi took control over key Party organs, suggesting that he believes centralization of power is necessary to implement his reform agenda. For example, Xi has reorganized the CCP’s Central Committee’s small leading groups and now personally chairs more than half of them, including the powerful Comprehensive Deepening Reform, State Security, and Internet Security and Informationization groups.⁷³ The government’s justification for creating the Reform Group is that the Third Plenum reforms would be hard to implement through existing institutions, which represent local and sectoral interests, and do not coordinate sufficiently.⁷⁴ Attacking “vested interests” may present a pretext for Xi to target rivals, particularly in state-dominated sectors.⁷⁵

Some Key Economic Officials in Xi’s Cabinet

Lou Jiwei (Minister of Finance): Lou Jiwei is one of the most frequently quoted Chinese officials. In response to concerns about China’s economic slowdown, Lou argued that job creation is more important than GDP growth, and that a weaker role for manufacturing will help to relieve overcapacity and pollution.⁷⁶

* For more information, see Chapter 1, Section 1, of the U.S.-China Economic and Security Review Commission, *2013 Annual Report to Congress*, November 2013.

† For details, see Nargiza Salidjanova and Iacob Koch-Weser, *China’s 2014 Government Work Report: Taking Stock of Reforms* (U.S.-China Economic and Security Review Commission, April 1, 2014). http://origin.www.uscc.gov/sites/default/files/Research/USCC%20Backgrounder_NPC%20scorecard.pdf.

Some Key Economic Officials in Xi's Cabinet—Continued

He has also called on China to shift its tax base from production to consumption, with a focus on luxury goods, property, and energy-intensive products.⁷⁷ In an unusual move, Lou acknowledged in June 2014 that “persistent downside pressures in economic growth” could force the government to miss its fiscal revenue target, even as President Xi stated that there was “no way” China would miss its 2014 GDP growth target.⁷⁸ In China’s power structure, Lou likely has less influence than long-serving central bank head Zhou Xiaochuan, who was allowed to retain his post after the leadership transition.⁷⁹ The Xi administration recently criticized mismanagement at China’s sovereign wealth fund China Investment Corporation, where Lou served as chairman from 2007 to 2013.⁸⁰

Zhou Xiaochuan (PBOC Governor): Following the extension of his term as PBOC governor in March 2013, Zhou Xiaochuan now stands as China’s longest serving central banker.⁸¹ The extension of his tenure following last year’s leadership transition is likely related to his reformist views on interest rates and China’s exchange rate regime. Zhou is credited with overseeing the transition away from a fixed exchange rate to the current “managed float” system that designates a limited daily trading band within which the RMB can change value vis-à-vis the U.S. dollar.⁸² He is also known for recruiting U.S. educated economists into key PBOC posts, which is further evidence of his reformist views on economics.⁸³ Under Zhou’s leadership, the PBOC has taken marginal steps to address China’s growing credit crisis, such as by limiting lending within the shadow banking sector. However, given that the PBOC is not an independent government entity like the U.S. Federal Reserve, it is unlikely the Zhou-led PBOC will have the same power as the Federal Reserve in implementing broader economic reforms.

Zhang Gaoli (Executive Vice Premier): Considered to be a close ally of Xi Jinping, Zhang Gaoli holds multiple high-level titles that imply he is a key economic figure in Xi’s cabinet; however, analysts say that his “low-profile approach” makes it difficult to determine which economic issues are more important to him and how influential he is in Xi’s decision-making.⁸⁴ Zhang is not only a member of the Politburo Standing Committee and the executive vice premier; he also holds one of the four positions on the leading small group on reform, along with Xi Jinping, Li Keqiang, and Liu Yunshan. However, Zhang holds no other key positions on any other leading small groups.⁸⁵ Some analysts argue that Zhang’s leadership experience in some of China’s most developed regions, including Shenzhen, Shandong, and Tianjin, is evidence of Zhang’s support for economic reform.⁸⁶ However, Zhang’s alleged persecution of Falun Gong followers when he was Party secretary in Shandong province and his tight grip on the media when serving as Party secretary in Tianjin are evidence of his opposition to political reform.⁸⁷

Some Key Economic Officials in Xi's Cabinet—Continued

Wang Yang (Vice Premier): Prior to the leadership transition, Wang Yang served as Party secretary of Guangdong province, and was known as a particularly liberal reformer. He failed to secure a seat on the Politburo Standing Committee, giving him less authority than Zhang Gaoli. That is also reflected in the Central Reform Leading Group, where Wang Yang is an ordinary member, whereas Zhang co-heads the Group.⁸⁸ Nonetheless, Wang Yang is actively engaged in China's economic policy. He has inherited many functions of Wang Qishan, the former vice premier who now spearheads Xi's anticorruption campaign. Wang Yang is lead negotiator in China's Strategic and Economic Dialogue (S&ED) and Joint Commission on Commerce and Trade (JCCT) talks with the United States, where he has emphasized the importance of the Third Plenum reform agenda.⁸⁹ He frequently serves as interlocutor for foreign companies and commercial delegations, and has emphasized the importance of improving intellectual property protection and developing e-commerce.⁹⁰

Xu Shaoshi (Director of the NDRC): The NDRC, the powerful supra-ministry that formulates industrial policies, issues approvals, and sets prices, has arguably been relegated to secondary status under the new leadership.⁹¹ No one from the NDRC is represented in the Central Leading Reform Group, and the agency's former Deputy Director Liu Tienan was indicted on corruption charges in June 2014.⁹² However, the NDRC's current director Xu Shaoshi appears keen to adapt the agency to the reform agenda of the new leadership. Xu has called for increasing private sector investment in financial services, energy, and utilities, a departure from the NDRC's historic protection of domestic industry.⁹³ He told the NPC in March that the focus on industrial growth was restraining efforts to cut emissions and energy use.⁹⁴ Xu is also heading a new coordinating body, established by the State Council in May, which will seek ways to reduce income inequality.⁹⁵ On July 8, Xu published a lengthy opinion piece in the *People's Daily*, the Party-controlled paper, in which he praised "Comrade Xi Jinping's" "brilliant" speeches on market reform since the 18th Party Congress.⁹⁶

Xi Jinping's Anticorruption Campaign

In 2014, Xi Jinping accelerated his anticorruption campaign to address a major source of public dissatisfaction and eliminate his political opponents while further consolidating his power.⁹⁷ However, some analysts believe that the elimination of other political factions, namely former Politburo Standing Committee member Zhou Yongkang and his supporters as well as former President Jiang Zemin's lingering loyalists in the Shanghai region, is Xi's method for laying the groundwork for wider economic reforms.⁹⁸ The 2013 Third Plenum called for internal Party reform and reform of the CCP's disciplinary system in its blueprint for China's economic reforms. Xi and his likeminded reform leaders argued that

the government must eliminate the long-standing incentives that entice officials—especially local officials—to engage in corrupt practices.⁹⁹ For example, in September 2013, executives of China’s largest oil and gas company PetroChina were forced out when the government launched a corruption campaign.¹⁰⁰ As one of China’s three big oil companies, PetroChina has control over domestic fuel prices and oil supply in the Chinese energy market. Some analysts predict that Xi’s pro-reform government initiated the corruption probe into PetroChina as a means of breaking the state-owned enterprise (SOE) into smaller companies, thereby allowing for some privatization of the oil sector. The logic is that if Xi is able to remove high-level officials with vested interests in SOEs such as PetroChina on the basis of corruption, he can more swiftly implement other SOE-related reforms.¹⁰¹

Because President Xi’s ten-year term is in its beginning, the impact of Xi’s broad-sweeping housecleaning on his economic reform aspirations is not yet clear. Some analysts believe that if the anticorruption campaign continues to gain momentum, Xi risks intimidating the broad majority of Chinese officials into isolation, rendering them unwilling to govern effectively.¹⁰² Moreover, if Xi fails to implement other economic reforms in a timely manner because of a prolonged anticorruption purge, it is likely that China’s economic growth will continue to slow and imbalances will worsen.¹⁰³ (For more analysis of Xi’s anticorruption campaign, see Chapter 2, Section 3, “China’s Domestic Stability.”)

Stagnant Implementation of Economic Reform

China made minimal progress in 2014 toward implementing the economic reforms laid out in the 2013 Third Plenum.¹⁰⁴ The government stopped short of fulfilling its reform promises despite its slowing economy and ongoing dependence on export and investment-led growth. In July, the IMF urged China to expedite its economic reform agenda stating that it was “increasingly urgent” and that the current growth model was “not sustainable and is raising vulnerabilities.”¹⁰⁵ U.S. Treasury Secretary Jacob Lew called on China “to speed up” its reforms, reduce reliance on exports, adopt a consumption-led growth model, and contribute to a level playing field in global trade.¹⁰⁶ The U.S.-China Business Council reported that only six out of 59 reform policy announcements have a “significant impact” on foreign investment; of these, four were described as “largely aspirational.”¹⁰⁷

Shanghai Free Trade Zone (FTZ): Launched in September 2013, the Shanghai FTZ was lauded as one of China’s major reform initiatives.¹⁰⁸ However, the FTZ has achieved minimal progress in 2014 as businesses and legal advisers struggle to find any notable benefit from operating in the trade zone rather than elsewhere in China.¹⁰⁹ Incremental trade-related reforms, such as lifting a ban on foreign video game consoles, have benefited some niche industries; however, analysts compare these reforms to those of a traditional Chinese special economic zone, such as Shenzhen, noting that the Shanghai FTZ was intended to be far more comprehensive in its liberalization.¹¹⁰ Regarding foreign investment, the Shanghai FTZ adopted a negative list approach to regulating which sectors

face restrictions on foreign investment.* The FTZ came under criticism, though, when the negative list was revealed to include 190 sectors with foreign investment restrictions. In what was probably the most notable advance in the FTZ thus far, China reduced that number to 139 sectors in July, granting greater foreign investment access in industries such as finance, health care, and entertainment.¹¹¹

Monetary reforms were also intended to be a defining characteristic of the Shanghai FTZ; but these have been largely inconsequential, and economists have criticized some of the more aggressive reforms as infeasible. In one ostensible reform, the Chinese government informed foreign companies that by holding bank accounts in the Shanghai FTZ, they can more easily transfer excess local currency in and out of China; however, FTZ officials were reported saying that the process can already be done nationwide, based on regulations outside of the FTZ.¹¹² The government has also promised liberalized interest rates and full currency convertibility within the FTZ. Neither of these reforms has yet to be launched, and economists argue that it is nearly impossible to liberalize interest rates and adjust monetary policy within only a small region of the country.¹¹³ Economists believe that liberalized rates within the FTZ alone would not be a meaningful test of the economic reforms Beijing purports to launch nationally. Similarly, currency convertibility confined to the FTZ would require “a strong firewall,” which economists argue is challenging and would fail to accurately test the reforms on a nationwide basis.¹¹⁴

State-Owned Enterprise (SOE) Reform: Reform of China’s SOEs largely stalled in 2014, though some limited SOE reform did take place. For example, Sinopec launched a hybrid ownership structure that permits private investors to purchase company shares, and PetroChina privatized some of its pipeline business as well.¹¹⁵ On the policy side, the U.S.-China Business Council (USCBC) tracked three new official policies on SOE reform, including a Shanghai municipal government announcement that accelerates SOE reform, but only for Shanghai-based SOEs; a China Securities Regulatory Commission (CSRC) notice that requires SOEs to provide a portion of their revenues back to the government; and a State-Owned Assets Supervision and Administration Commission (SASAC) statement calling on SOEs to improve efficiency by using economic value-added (EVA) to measure performance.¹¹⁶ In addition, the anticorruption campaign is considered to be contributing partially to SOE reform by eliminating vested interests of government officials and incentives to engage in corruption.¹¹⁷

Financial Reforms: On financial reform, China made very limited progress toward liberalizing interest rates and reforming its government-managed exchange rate system that has allowed it to undervalue and manipulate its currency.¹¹⁸ China’s economy has been under increasing pressure to liberalize interest rates as risk-

* China has traditionally used purchasing catalogs to denote which products, services, and investments are approved for market access. Sectors not specifically listed in the catalogs are restricted from foreign competition. The system more widely used globally is a “negative list” approach which denotes only those sectors which face market access restrictions; sectors not listed are considered open.

ridden shadow banking and unregulated wealth managed products have flourished in circumvention of financial regulations.¹¹⁹ The shadow banking sector poses risks because it does not provide adequate disclosures of risk-related information to investors.¹²⁰ While China's regulators may understand that deregulation of interest rates is the best solution to reining in the massive shadow-banking sector and addressing China's growing debt problem, they lack the political clout to implement such a reform.¹²¹ In addition, the government has long touted the need for a bank deposit insurance system, but to date, has not implemented one.¹²² Although the World Bank, IMF, and U.S. government have called on China to implement these reforms in a timely manner, PBOC Governor Zhou Xiaochuan said the timing would depend on "good conditions" in the Chinese and global economies, and estimated that liberalization would take two years.¹²³

China made few reform moves toward a more flexible market-based exchange rate system. The United States has repeatedly called on China to adopt a floating exchange rate policy and cease undervaluing its currency; a policy that makes Chinese products cheaper and, therefore, serves as an export subsidy. Secretary Lew said that China needs to speed up floating its currency, a measure that will be a "crucial step" for the economy. However, during the 2014 U.S.-China Strategic and Economic Dialogue, Chinese Vice Premier Wang Yang warned against China moving too fast in exchange rate reform.¹²⁴ PBOC Governor Zhou Xiaochuan said that while China will "eventually" move toward a market-determined exchange rate regime, money flows were too unstable to do so now.¹²⁵ Despite the government's often stated intention of floating its currency, China has never tried to achieve this goal, nor has it announced any timeline for doing so.

Foreign Investment Reform: China's government has made minimal progress in liberalizing restrictions on foreign investment. In September 2013, the PBOC issued a "Notice on Relevant Matters Regarding RMB Settlement of Foreign Investors Investing in Domestic Financial Institutions," which allows foreign investors to use local currency for a broad range of domestic financial transactions that can support their expansion within China.¹²⁶ This was the only reform related to foreign investment that the USCBC reported as having a "significant impact" on foreign companies operating in China.¹²⁷ USCBC considered other reform initiatives that streamline certain administrative processes for foreign firms in China to have only moderate or limited impact.¹²⁸ Many sectors remain fully or partially closed to foreign investment in China, but the government has reformed foreign ownership restrictions in some niche sectors, such as hospitals.¹²⁹

Administrative and Procedural Reforms: Administrative reforms—specifically regarding how companies are incorporated and obtain licenses in China—were one area where the government took some positive, though still incremental, steps forward. In February, China's State Council issued a "Notice on Registered Capital Registration System Reform," which reduced capital requirements for establishing new businesses and streamlined incorporation processes.¹³⁰ According to legal analysts, the reforms should apply

to both domestic and foreign-invested businesses.¹³¹ The USCBC rated the measure as having “significant impact” on the operation of foreign firms in China. Other measures adopted by the State Council simplified procedures for obtaining administrative licensing, and began laying the groundwork for reviewing new investment projects based on a negative list approach to restricting foreign investment.¹³²

Internal Reforms: China made moderate progress in planning for certain internal reforms in areas such as the tax system, household registration or *hukou* system, and urbanization. Xi Jinping said, “Now the Chinese economy is too complex; [China] must first build the institutions of economic governance in which the market will operate.”¹³³ According to former World Bank president and U.S. Trade Representative Robert Zoellick, this implies that internal reforms such as the tax and household registration system are priorities for Xi.¹³⁴ Concrete timelines set out by the government in these areas indicate that the reform leadership considers these time-sensitive areas of reform. For example, the Ministry of Finance announced in July that a reform of China’s tax system, which includes a phased shift toward greater dependence on a value-added tax (VAT), will be completed by 2016.¹³⁵ In 2014, China announced multiple reforms to its household registration system that currently blocks many migrant workers in China’s largest cities from access to basic social services, such as education.¹³⁶ The reforms should allow for migrants from other provinces to apply for local *hukou* registration in the city they have migrated to, though initially the reforms are restricted to medium-size cities.¹³⁷ Analysts in China are optimistic that, with Beijing leading *hukou* reform, the effort may be “substantive” and “systematic.”*¹³⁸ (For more analysis of the *hukou* system, see Chapter 2, Section 3, “China’s Domestic Stability.”)

China’s Economic Rebalancing

In the absence of substantive reforms, China’s economic imbalances—both external and internal—continue to plague its economy and burden the U.S. and global economies. Externally, China’s dependence on exports for growth, which is supported by an undervalued currency, as well as large volumes of foreign currency reserves, contributes to major global trade imbalances. Internally, the government’s failure to shift the economy toward a consumption-based growth model sustains China’s overdependence on investment and limits opportunities for U.S. exports to China.

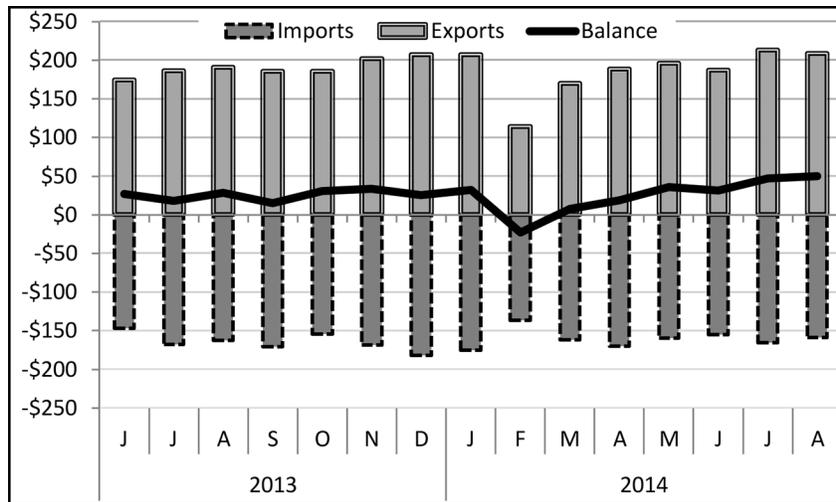
External Rebalancing

Global Trade Imbalances: In 2014, China maintained a global trade surplus, a hallmark feature of its export-oriented growth model. As of June, China’s trade surplus was approximately \$31.5 billion, a year-on-year increase of 16 percent. China’s expanding current account surplus was driven by increased exports, which rose by 7 percent year-on-year. Imports into China increased 5 percent year-on-year, but the higher rate of increase of exports was sufficient to sustain China’s surplus. As depicted in Figure 6, Chinese exports recovered in the first half of 2014 from a seasonal

drop in February. Thus, despite slowing economic growth, China's global trade surplus, including export levels, continued to rise as the government injected stimulus into the economy and maintained an undervalued currency. The IMF indicated that a reduction in China's current account surplus as a percentage of its GDP to 1.9 percent in 2013 was a positive sign toward external rebalancing; however, the change was due largely to weak global demand and increasing investment boosted by the stimulus.¹³⁹

Figure 6: China's Global Trade Flows

(US\$ billions)

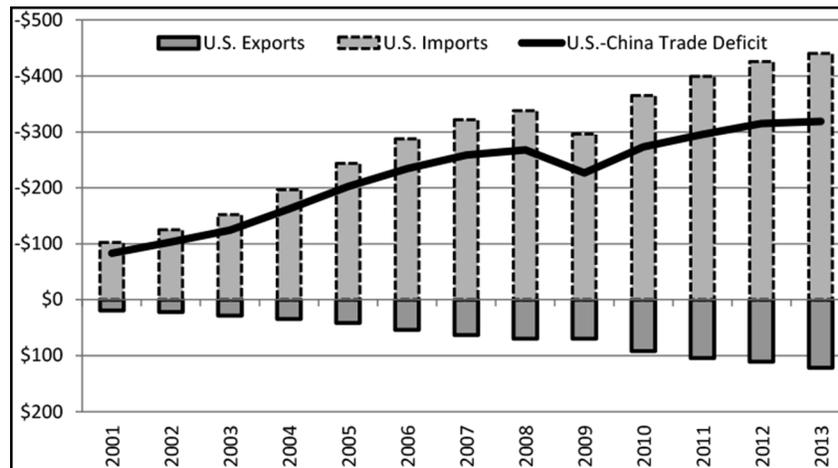


Source: China General Administration of Customs, via CEIC database.

Figure 7 shows the trend in the U.S.-China trade balance since 2001, when China joined the World Trade Organization (WTO). In the first eight months of 2014, the U.S.-China trade deficit in goods was over \$216 billion, an increase of 4.1 percent from the same period in 2013, according to data from the U.S. Census Bureau. In the first half of 2014, U.S. exports to China grew 6.2 percent year-on-year, while Chinese imports increased by only 4.6 percent.* The U.S.-China trade deficit in Advanced Technology Products (ATP) was \$72.6 billion in the first eight months of 2014, an increase of less than 1 percent year-on-year.¹⁴⁰ Tables 1 and 2 outline the top five U.S. exports to China and U.S. imports from China in the first half of 2014, respectively. The United States continued to register a trade surplus with China in services, which totaled \$13.5 billion in the first half of 2014, an increase of 25 percent year-on-year.¹⁴¹ (For further analysis of the challenges of the U.S.-China economic and trade relationship, see Section 2, "U.S.-China Bilateral Trade and Economic Challenges.")

*This calculation is based on the value of U.S. exports to China year-to-date from January to May 2014. The year-on-year comparison refers to the same period in 2013.

Figure 7: U.S. Trade Deficit with China
(US\$ billions)



Source: U.S. Bureau of Economic Analysis.

Table 1: Top Five U.S. Exports to China

Product Type	2014 H1 (US\$ billions)	Percent Change (year-on-year)
Transportation Equipment	12.2	21.6%
Computer and Electronic Products	7.8	-0.7%
Agricultural Products	7.3	10.2%
Chemicals	6.9	6.0%
Machinery (Except Electrical)	4.9	-3.2%

Source: U.S. Census Bureau.

Table 2: Top Five U.S. Imports from China

Product Type	2014 H1 (US\$ billions)	Percent Change (year-on-year)
Computer and Electronic Products	74.6	-0.3%
Electrical Equipment, Appliances & Components	17.7	17.0%
Miscellaneous Manufactured Commodities	15.2	4.9%
Machinery (Except Electrical)	15.1	26.1%
Apparel and Accessories	13.7	0.4%

Source: U.S. Census Bureau.

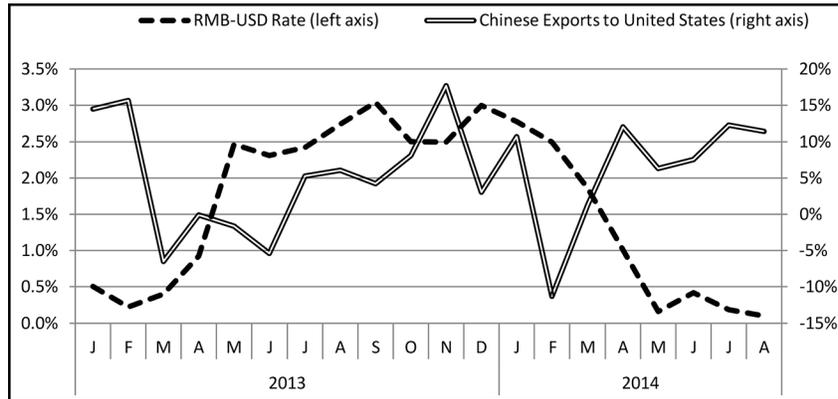
Monetary Policy Issues: Undervaluation of the RMB continues to serve as a subsidy to Chinese exports. In March 2014, the PBOC

doubled the RMB's trading band with the U.S. dollar (USD) to ± 2 percent each day.¹⁴² However, the Chinese government retained the power to set a new value for the RMB-dollar exchange rate each new trading day, even while allowing greater fluctuations in intra-day trading. While China's trade surplus should have caused the RMB to increase in value, the opposite happened as China continued to intervene massively in currency markets to lower the value of the RMB. The PBOC's confusing policy change was followed by an immediate weakening of the RMB against the USD by 7.7 percent from January to June. In its mid-year report to Congress released in April, the Treasury Department associated the expanded daily trading band with greater flexibility for China to intervene in its currency. The report states:

*In the month prior to the band widening, the PBOC took measures, including reported heavy intervention, to significantly weaken the RMB and push it away from the most appreciated edge of the previous band. The RMB has seen periods of depreciation before, such as mid-2012 when the RMB fell 1.5 percent against the dollar over a three-month period. However, the pace and the size of the recent decline were unprecedented.*¹⁵²

For the 20th consecutive year, the Treasury Department stopped short of officially accusing China of currency "manipulation"; however, a comparison of changes in the RMB-USD exchange rate against increases in Chinese exports demonstrates that the PBOC purposefully undervalued the RMB as a means of subsidizing Chinese exports during the first quarter of 2014, just as China fell short of reaching its 7.5 percent official growth target. As shown in Figure 8, the year-on-year change in the RMB value relative to the dollar, which had been gradually appreciating since 2005, suddenly declined sharply to almost no year-on-year appreciation by May. During that same period, year-on-year changes in Chinese exports to the United States, which were declining from November 2013 to February 2014 as China's economy slowed, suddenly spiked. In February, at the time of the PBOC band increase, Chinese exports to the United States were down about 11 percent year-on-year. By April, exports were increasing by over 12 percent year-on-year. Nonetheless, PBOC officials called the weakening of the RMB as falling within a "normal scope."¹⁴⁴

Figure 8: RMB Undervaluation as Export Subsidy
(Year-on-Year Change)

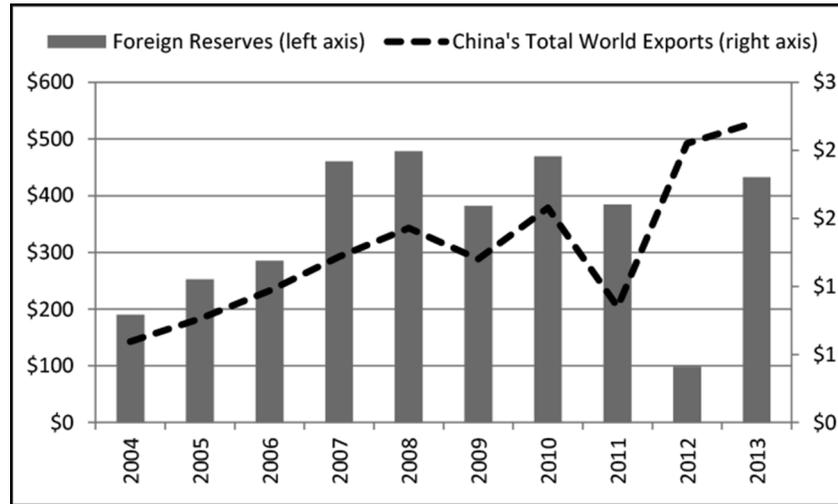


Source: People's Bank of China and General Administration of Customs, via CEIC data.

Foreign Exchange Reserves: Accumulation of foreign exchange reserves is further evidence of China undervaluing its currency and using monetary policy to subsidize exports. In the first quarter of 2014, China's foreign exchange reserves increased sharply by about \$140 billion bringing its total foreign reserve assets to nearly \$4 trillion. The foreign exchange reserve data from 2014 confirms that China's weakening RMB is due to "intensive intervention" by the PBOC.¹⁴⁵ Economists infer that China's increasing foreign reserves while maintaining a trade surplus is convincing evidence of heavy intervention in currency markets.¹⁴⁶ Figure 9 shows a direct correlation between China's exports and the purchase of foreign reserve assets from 2004 to 2011. Following a sharp drop in new foreign reserves in 2012, exports increased again as China resumed large-scale accumulation of foreign reserves in 2013. Preliminary data from 2014 indicates that this trend will continue. By May, Chinese exports began to increase again following the PBOC's massive interventionist policies in the first quarter.

Figure 9: China's Annual Acquisition of Foreign Reserves

(Left Axis: US\$ billions; Right Axis: US\$ trillions)



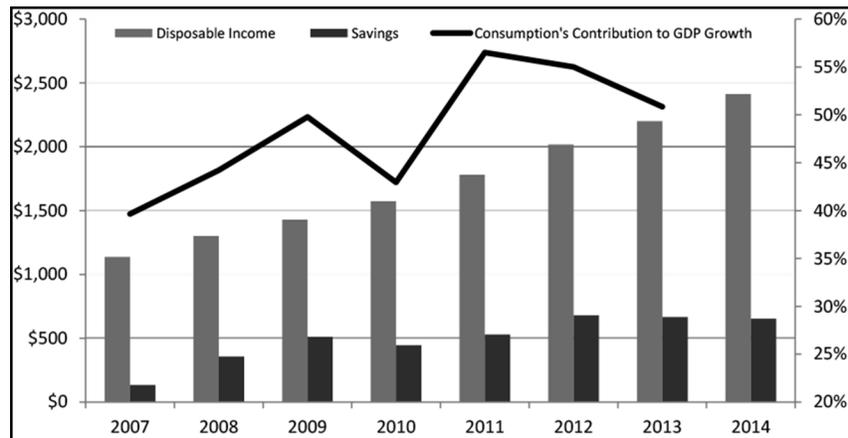
Source: China State Administration of Foreign Exchange and General Administration of Customs, via CEIC data.

Internal Rebalancing

The Chinese government's official narrative in 2014 was that its economy made progress toward a greater reliance on domestic sources rather than exports for growth by reducing wasteful investment.¹⁴⁷ China's growth model, which has been driven by high levels of investment in manufacturing capacity and infrastructure, is not sustainable and China needs to shift to a primarily consumption-driven growth model.¹⁴⁸ China's leadership has stated it accepts this view, which is also held by several Western governments, the World Bank, and the IMF. Analysis by the Peterson Institute for International Economics (PIIE) shows that in the first quarter of 2014, China's GDP growth and the growth rate of disposable income—a proxy for consumption capacity—expanded at nearly the same rate with a gap of only -0.2 percent.¹⁴⁹ PIIE economist Nicholas Borst said that the increase in Chinese disposable income, even during a time of slow growth, is the best sign for internal rebalancing in China since 2012.¹⁵⁰

Analysts continue to debate whether the positive trends in China's disposable income figures during 2014 reflect true internal rebalancing toward a sustainable consumption-led growth model. Figure 10 shows a comparison of annual per capita disposable income and savings with the contribution of consumption to GDP growth. Since 2012, per capita savings has remained constant, while per capita disposable income increased nearly 20 percent, an indicator of increasing consumption. However, with 2013 and 2014 government stimulus focusing on infrastructure investment and credit loosening—which tends to boost investment rather than consumption—the contribution of consumption to GDP growth declined from 2012 to 2013.

Figure 10: Per Capita Disposable Income and Savings in China
(Left Axis: US\$)



Source: China National Bureau of Statistics and People's Bank of China, via CEIC data. The data for disposable income and savings compare year-to-date data in June of each year. The consumption contribution to GDP data is annual.

Official data on the first half of 2014 indicates that consumption's contribution to GDP surpassed the contribution of gross capital formation this year.¹⁵¹ In addition, China's retail sales increased by 10.8 percent in the first half of 2014, which may also support this analysis.¹⁵² Analysts view both as positive signs of progress toward internal rebalancing; however, it remains to be seen if this trend toward greater consumption can be sustained in the absence of government stimulus and without increasing China's debt levels, which already account for 250 percent of GDP.¹⁵³

U.S.-China Bilateral Trade and Investment Issues

Bilateral Investment Issues

For the first time, Chinese foreign direct investment (FDI) flows into the United States are surpassing U.S. FDI into China.¹⁵⁴ This shift in the bilateral investment relationship occurs in an increasingly hostile investment climate for foreign firms operating in China.

Foreign Investment Climate in China: U.S. and other FDI flows into China continued a steady deceleration in 2014 as new investment opportunities dwindled and foreign firms faced hostile or discriminatory treatment by Chinese regulators (see Figure 11).¹⁵⁵ According to data from China's Ministry of Commerce, FDI into China declined 1.8 percent in the first eight months of 2014 compared to the same period last year.¹⁵⁶ According to University of North Carolina Finance Professor Christian Lundblad, the "low-hanging fruit" that foreign investors have enjoyed in China for years have been harvested, leaving opportunities only in the sectors where regulatory complications make investment very difficult or even impossible.¹⁵⁷ These include sectors dominated by Chinese SOEs, or in areas deemed sensitive or strategically important, such

as telecommunications, media, and financial services. In most of these sectors, foreign investment is either banned or restricted to joint ventures with Chinese partners.¹⁵⁸ Localization requirements—such as China-based research and development, technology transfer, and network servers—are also costly and inefficient for foreign businesses, especially those in the information and communication technology (ICT) sector.¹⁵⁹

Chinese regulators and state media have disproportionately targeted foreign firms operating in China with accusations ranging from monopolistic behavior to exploitation of Chinese consumers.¹⁶⁰ In 2014, China ramped up use of its Anti-Monopoly Law (AML) against foreign firms in what appears to be unequal enforcement in order to create favorable market conditions for Chinese competitors.¹⁶¹ This year, China used the AML to investigate foreign firms in sectors designated by the government as “strategic and emerging,” including automobiles and information technology. Four foreign industry associations including the U.S. Chamber of Commerce, the U.S.-China Business Council, the American Chamber of Commerce in China, and the European Union Chamber of Commerce in China issued reports in 2014 accusing China of unfair enforcement of the AML.¹⁶² The U.S. Chamber of Commerce said that “in many cases involving foreign companies, China’s anti-monopoly enforcement agencies have skewed the implementation of the AML and related statutes to support China’s industrial policy goals through discrimination and protectionism.”¹⁶³ The U.S.-China Business Council reported that 86 percent of respondents to its 2014 member company survey said that they were “at least somewhat concerned about China’s evolving competition regime.”¹⁶⁴ The European Union (EU) Chamber of Commerce said that the lack of transparency in China’s enforcement of the AML leaves speculation about the government’s intentions with the law.¹⁶⁵

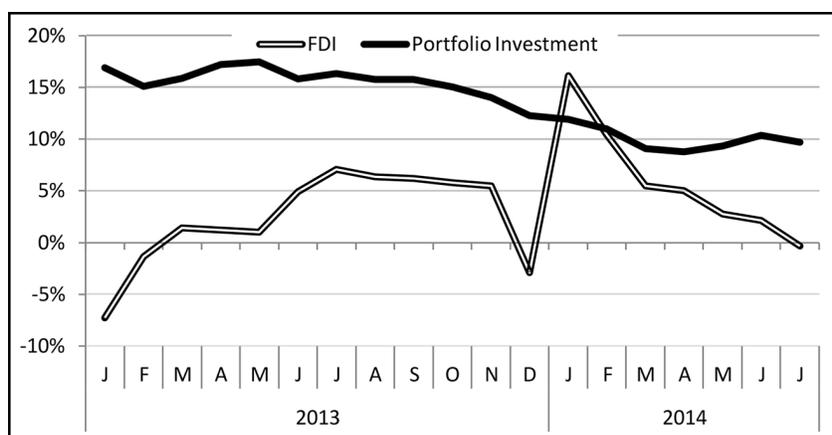
The U.S. Chamber of Commerce added that China disproportionately uses the AML against foreign firms to protect domestic industries and support national champions. The U.S. Chamber further argued that such unequal enforcement could violate China’s WTO obligations.¹⁶⁶ China’s NDRC, one of the enforcement agencies of the AML, refuted the industry groups’ accusations and claimed that in an NDRC review of 300 AML cases, only 10 percent were of foreign firms.¹⁶⁷ However, the NDRC failed to disclose the time frame of the 300 cases or how they were chosen for the review.

The Chinese government also uses procurement rules, state-media, and anticorruption laws to target foreign-invested firms disproportionately. For example, in May 2014, China banned the procurement of new government computers equipped with Microsoft’s Windows 8 operating system.¹⁶⁸ Two months later, under the auspices of an antimonopoly investigation, China’s State Administration for Industry and Commerce (SAIC) raided Microsoft’s offices in Beijing, Shanghai, Guangzhou, and Chengdu, seizing documents and computers.¹⁶⁹ In addition, in June 2014, Chinese state media called U.S. technology firms, such as Google and Apple, “pawns of the U.S. Government,” accusing them of espionage and cyber-theft in China.¹⁷⁰ Historically, China has disproportionately targeted foreign firms in corruption investigations, with one estimate indicating that of approximately 500,000 corruption investigations in

China between 2000 and 2009, 64 percent were of foreign-based firms.¹⁷¹ There also appears to be a coordinated effort by the Chinese government to promote domestic industries, while state-run media attack foreign competitors. For example, in 2010, after China announced plans to boost domestic-made car sales to control the majority of the Chinese auto market, state-run China Central Television (CCTV) launched a media campaign against Volkswagen that resulted in a recall of 640,000 vehicles.¹⁷²

In 2013, the USCBC described U.S. industry's attitude toward investment in China as "tempered optimism."¹⁷³ In its annual survey of the Chinese business environment, USCBC's members agreed that nine of the ten most pressing challenges they face in China—which include uneven enforcement of Chinese laws, transparency issues, and discriminatory practices toward foreign firms—did not improve at all from the previous year.¹⁷⁴

Figure 11: Foreign Investment in China
(percent change year-on-year)



Source: FDI from China Ministry of Commerce and Portfolio Investment from China PBOC, via CEIC database.

Despite the growing hostility to foreign investment in China, foreigners continue to invest there, though the year-on-year rate has declined steadily through the first half of 2014 (see Figure 11). Commensurate with the leadership transition in early 2013, China's FDI inflows remained generally positive with an upward spike in early 2014, perhaps in conjunction with enhanced government stimulus. However, as China's government has generally stalled implementation of economic reforms, year-on-year increases in FDI inflows have decelerated to a rate of 2.2 percent in June 2014.¹⁷⁵ Likewise, portfolio investment into China has been decelerating almost continuously since September 2013.

Inbound Chinese Investment: While U.S. FDI into China is slowing, Chinese investment in the United States has grown dramatically. According to analysis by Rhodium Group, the stock of Chinese FDI in the United States grew from \$1.9 billion in 2007 to

over \$17 billion in 2012.¹⁷⁶ From 2011 to 2012, the number of Chinese investments—mergers and acquisitions and greenfield projects combined—nearly doubled from below 40 to about 70. Rhodium Group estimated there were 82 new investments in 2013. The increase in inbound Chinese FDI has occurred simultaneously with Executive Branch efforts to attract more foreign investment into the United States, particularly with hopes of spurring job creation. Rhodium Group estimates that in 2013, Chinese-owned firms employed more than 70,000 U.S. citizens.¹⁷⁷ In recent years, the Obama Administration began more targeted efforts to attract FDI, including FDI from China, by, for example, expanding the Department of Commerce’s investment promotion function in 2012.^{178,179}

China’s Share of U.S. Housing Market Grows

According to the National Association of Realtors (NAR), Chinese buyers ranked as the largest foreign purchasers of U.S. real estate by dollar value in 2014.*¹⁸⁰ Chinese buyers also constitute the fastest growing segment of foreign buyers.¹⁸¹ In the first three months of the year, Chinese buyers spent \$22 billion on U.S. homes, more than any other nationality, and an increase of 72 percent from the same period in 2013.¹⁸² Over 75 percent of buyers from China pay cash for U.S. homes, and the median home price among Chinese buyers was \$523,148, more than twice the median price of existing home sales.¹⁸³ With this growing demand, the online real estate listing company Zillow Inc. established a Chinese language search portal in 2014 to link more effectively with potential Chinese buyers.¹⁸⁴

The motivation of Chinese buyers to purchase U.S. homes is varied. Chinese buyers view purchasing U.S. homes as a cheap, but reliable, investment with strong rent potential.¹⁸⁵ In addition, by purchasing U.S. real estate as a limited liability corporation (LLC) or through other “creative corporate structuring,” the U.S. property market is a convenient way to store money overseas anonymously.¹⁸⁶ Perhaps the most cited reason for Chinese buyers to purchase a home in the United States is because their children are enrolled, or hope to enroll, in U.S. schools and universities. One survey of wealthy Chinese shows that 85 percent want to send their children overseas for school.¹⁸⁷ Real estate brokers report that Chinese buyers prefer property near major educational institutions; one New York broker said that many Chinese clients purchase in Manhattan in hopes of sending their children to Columbia or New York University.¹⁸⁸

In light of a \$50,000 cap on the amount of money an individual can take out of China per year, the methods some Chinese buyers use to acquire property in the United States raise questions

*The NAR includes buyers from Taiwan and Hong Kong in their classification of “Chinese.” However, the NAR confirmed that only about 1 percent of “Chinese buyers” surveyed were from Taiwan or Hong Kong with the remaining 99 percent reportedly from mainland China.

China's Share of U.S. Housing Market Grows—Continued

of legality, transparency, and money laundering. Because 76 percent of Chinese buyers are offering cash on U.S. homes averaging well over \$500,000, money must be wired or physically carried as currency or valuables into the country.¹⁸⁹ University of California Los Angeles economist William Yu says that wealthy Chinese find creative ways to circumvent the \$50,000 restriction, including laundering money through Macau casinos and “cooking the books” of import-export firms.^{190,191} Potential buyers can also set up LLCs or other corporate entities to make the property ownership “untraceable.”¹⁹²

According to the International Consortium of Investigative Journalists, this practice has allowed many U.S. real estate deals linked to Chinese financial and political corruption scandals to take place.¹⁹³ For example, the 2011 investigation of former Chinese Minister of Railways Zhang Shuguang revealed that he purchased an \$860,000 home in a suburb of Los Angeles in 2002 while his government salary was less than \$400 per month.¹⁹⁴ Weeks prior to the start of the investigation, Zhang transferred full ownership of the property to his wife. The investigation is reportedly continuing, and some analysts predict that the property may be seized as President Xi Jinping's anti-corruption drive begins to target the overseas assets of corrupt officials.¹⁹⁵

Bilateral Investment Treaty (BIT): Claimed by the Administration as a major breakthrough following the 2013 U.S.-China Strategic and Economic Dialogue, negotiations resumed with China on BIT in 2013 and continued throughout 2014.¹⁹⁶ The talks are divided into two phases, focusing first on the core text of the treaty and then on a so-called negative list of sectors that the parties would deem off limits or restricted to foreign investment.¹⁹⁷ During the 2014 U.S.-China Strategic and Economic Dialogue, the two sides committed to reach agreement on the core text by the end of 2014 and to start discussions on their respective negative lists early in 2015.¹⁹⁸ U.S. Treasury Secretary Lew estimated that a treaty—if one is ultimately agreed upon—would not be finalized until 2016 at the earliest.¹⁹⁹ Uncertainty remains about what China's negative list for the BIT will look like. U.S.-China Business Council Vice President Erin Ennis said that getting China to commit to a “commercially significant negative list could be a battle,” citing the Chinese government's sluggish approach to liberalization in the Shanghai FTZ.²⁰⁰ American Enterprise Institute expert Derek Scissors believes that given the increasingly hostile foreign investment climate in China, the United States should suspend the BIT negotiations, arguing that under current conditions, Chinese investors in the United States have much more to gain from an agreement than U.S. investors in China.²⁰¹

Bilateral Trade Issues

Trade tensions between the United States and China escalated in 2014 as key WTO cases advanced or were concluded and the

U.S. Department of Justice filed indictments against five People's Liberation Army (PLA) soldiers for engaging in state-sponsored, cyber-enabled theft of commercial property. Three key sectors of dispute included rare earths, auto parts, and Chinese subsidization of solar panels.

Rare Earths: In a March 26, 2014 decision, the WTO Dispute Settlement Panel ruled that China's export quotas on rare earths violated its WTO obligations.²⁰² Rare earths are crucial to many U.S. industries, especially clean energy and advanced electronics.²⁰³ The *Rare Earths* case was initiated in 2012 by the United States, the European Union, and Japan in response to China's restrictions on the exports of rare earths.²⁰⁴ The WTO Dispute Settlement Panel found that China failed to justify its restrictions as legitimate conservation or environmental protection measures, saying the export quotas were "designed to achieve industrial policy goals rather than conservation." China appealed the decision, but the WTO Appellate Body rejected its appeal in August.*²⁰⁵ Rare earths are one of many raw materials upon which China imposes export restraints. Trade law analysts estimate that China imposed export duties on 346 items in 2014, only 103 of which are permitted under China's WTO accession agreement.²⁰⁶ Even if China lifts all of the export restraints deemed unlawful in the WTO ruling on rare earths, 162 items will still be subject to export duties.²⁰⁷

Automobiles and Auto Parts: In another WTO Dispute Settlement Panel ruling, the United States was successful in its complaint regarding China's application of antidumping (AD) and countervailing duties (CVD) on U.S. cars and sport utility vehicles with an engine capacity of 2.5 liters or larger.²⁰⁸ China alleged that certain U.S. cars were being subsidized or "dumped" in its markets, citing two programs under the U.S. government's Troubled Asset Relief Program (TARP), which provided loans to General Motors (GM) and Chrysler.²⁰⁹ The U.S. defense focused on the failure by the Chinese Ministry of Commerce (MOFCOM) to demonstrate that the duties caused economic injury.²¹⁰ The Panel agreed with the U.S. defense and further found MOFCOM failed to disclose to U.S. respondents the essential facts that formed the basis of its decision to impose duties. China's duties affected an estimated \$5.1 billion worth of auto exports in 2013.²¹¹ Still pending before the WTO is another auto-related case, challenging Chinese subsidization of auto and auto parts producers located in designated regions known as "export bases."²¹² According to the U.S. Trade Representative (USTR), consultations last took place on the auto parts dispute in November 2012, and the United States and China have been "engaging in further discussions" since then.²¹³ There is no public information of further progress in the case.

Solar Panels: In 2014, the U.S. Department of Commerce announced preliminary determinations in CVD and AD investigations of imports of certain types of Chinese solar panels.²¹⁴ U.S. Customs will begin collecting the duties—which range from 18.56 percent to

* Following China's appeal, the United States also filed an appeal because of concerns related to the Panel's decision to reject certain exhibits issued in support of its case.

35.21 percent in CVDs and 26.33 percent and 165.04 percent in ADs.²¹⁵ The recent duties build upon CVD and AD duties ranging from 24 percent to 36 percent imposed by the Commerce Department in 2012 on other types of solar panel products imported from China.²¹⁶ Chinese manufacturers responded to those duties by buying solar cells from Taiwan and elsewhere, which allowed them to avoid most of the duties. The U.S. solar industry is divided about the duties, with many companies opposed to the Commerce Department's determination.*²¹⁷ Some U.S. solar panel manufacturers support the duties arguing that Chinese dumping of solar panels has harmed U.S. manufacturing and employment and that duties will help "level the playing field."²¹⁸ However, companies developing solar-power projects have criticized the duties arguing that they will result in more expensive equipment, thereby inhibiting innovation and growth in the solar energy sector. (For further discussion of clean energy issues, please refer to Chapter 1, Section 4, "U.S.-China Clean Energy Cooperation.")

Table 3 summarizes recent cases brought by the United States against China at the WTO. Table 4 lists recent cases by China against the United States. Addendum I provides a more comprehensive summary of unresolved or uncontested trade disputes with China, many of which have no public record of progress made in 2014.

Table 3: Recent WTO Cases Brought against China by the United States

No.	Title	Request for Consultations	Panel Report	Status
DS414	Measures Imposing Countervailing and Antidumping Duties on Grain-Oriented Flat-Rolled Electrical Steel (GOES)	September 15, 2010	June 15, 2012 (Appellate Body Report, October 18, 2012)	The Panel upheld U.S. claims, and the Appellate Body upheld the Panel decision; China agreed to implement the ruling by July 31, 2013. In January 2014, the United States requested consultations with China regarding China's failure to implement WTO ruling.
DS427	Antidumping and Countervailing Duty Measures on Broiler Products from the United States	September 20, 2011	August 2, 2013	The Panel upheld most U.S. claims. In July 2014, China informed the WTO that it had fully implemented the Panel's decision. The United States disagreed with China's assertion that it had fully complied.

*SolarWorld Industries America Inc. filed the AD and CVD petitions with the U.S. Department of Commerce and received support from the Coalition for American Solar Manufacturing, an industry association with 255 U.S. solar manufacturer members. The Coalition for Affordable Solar Energy, an association of 94 U.S. solar energy firms, is opposed to the duties. <http://origin.www.uscc.gov/sites/default/files/Research/June%202014%20Trade%20Bulletin.pdf>.

**Table 3: Recent WTO Cases Brought against China by the United States—
Continued**

No.	Title	Request for Consultations	Panel Report	Status
DS431	Measures Related to the Exportation of Rare Earths, Tungsten and Molybdenum	March 13, 2012	March 26, 2014 (Appellate Body Report, April 8, 2014)	The Panel upheld U.S. claims. In April 2014, both parties to the dispute appealed certain issues of law covered in the panel report. The Appellate Body rejected China's appeal, and did not rule on the U.S. appeal.
DS440	Antidumping and Countervailing Duties on Certain Automobiles from the United States	July 5, 2012	May 23, 2014	The Panel agreed with the United States that China's imposition of antidumping and countervailing duties on U.S.-made cars and SUVs violated China's obligations under the WTO.
DS450	Certain Measures Affecting the Automobile and Automobile-Parts Industries	September 17, 2012	In consultations; panel not yet formed	The United States requested consultations with China concerning export-contingent provisions of certain subsidies and other incentives to automobile and automobile-parts enterprises in China.

Source: WTO; compiled by Commission staff.

Table 4: Recent WTO Cases Brought against the United States by China

No.	Title	Request for Consultations	Panel Report	Status
DS437	Countervailing Duty Measures on Certain Products from China *	May 25, 2012	July 14, 2014	The Panel issued a mixed ruling, rejecting some of China's claims, but finding that the United States acted inconsistently with some of its obligations under the WTO. China appealed the decision.

**Table 4: Recent WTO Cases Brought against the United States by China—
Continued**

No.	Title	Request for Consultations	Panel Report	Status
DS449	Countervailing and Anti-dumping Measures on Certain Products from China ²¹⁹	September 17, 2012	March 27, 2014	The Panel upheld U.S. Public Law (PL) 112–99 entitled “An act to apply the countervailing duty provisions of the U.S. Tariff Act of 1930 to nonmarket economy countries, and for other purposes,” but found that the United States acted inconsistently with its obligations in failing to investigate whether “double remedies” arose in proceedings at issue.
DS471	Antidumping Methodologies	December 3, 2013	Panel established March 26, 2014; report pending.	China requested consultations with the United States regarding the use of certain methodologies in antidumping investigations involving Chinese products.

*The Chinese products concerned by these investigations consist of solar panels; wind towers; thermal paper; coated paper; tow behind lawn groomers; kitchen shelving; steel sinks; citric acid; magnesia carbon bricks; pressure pipe; line pipe; seamless pipe; steel cylinders; drill pipe; oil country tubular goods; wire strand; and aluminum extrusions.

Source: WTO; compiled by Commission staff.

Chinese State-Sponsored Cyber Theft

Cyber-enabled theft of intellectual property (IP) and commercial espionage are among the biggest risks facing U.S. companies today. In the United States, the annual cost of cyber crime and cyber espionage is estimated to account for between \$24 billion and \$120 billion (or 0.2 to 0.8 percent of GDP), and results in the loss of as many as 200,000 U.S. jobs annually.²²⁰ The Chinese government's engagement in cyber espionage for commercial advantage was exposed on May 19, 2014, when the U.S. Department of Justice charged five PLA officers for cyber-enabled theft and other related offenses committed against six U.S. victims, including Westinghouse Electric Co. (Westinghouse), U.S. subsidiaries of SolarWorld AG (SolarWorld), United States Steel Corp. (U.S. Steel), Allegheny Technologies Inc. (ATI), Alcoa Inc., and the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union (USW or Steelworkers Union).²²¹ According to the indictment, PLA Unit 61398 *²²² officers Wang Dong, Sun Kailiang, Wen Xinyu, Huang Zhenyu, and Gu Chunhui hacked, or attempted to hack, into the victims' computers to steal information that would be useful to competitors in China, including SOEs.²²³ One victim, SolarWorld, subsequently petitioned the U.S. Department of Commerce to investigate the allegations made in the indictment as they directly related to SolarWorld's ongoing trade dispute over imports of solar products from China.²²⁴

The Chinese government strongly denied what it called the "fabricated" allegations,²²⁵ and within days of the indictment, China retaliated both economically and politically against the United States. The Chinese government suspended participation in a U.S.-China Cyber Working Group, which was established in 2013 as a bilateral dialogue on cyber security.²²⁶ China also announced that its government offices were forbidden from using Microsoft's Windows 8 operating system and ordered security checks on foreign IT products and services seemingly directed at U.S. companies, including Cisco Systems.²²⁷ Likewise, the PBOC and the Chinese Ministry of Finance asked banks to replace IBM servers with those produced by domestic brands to protect financial security.²²⁸ In the same week, the Chinese government instructed SOEs to sever ties with U.S. consulting companies, including McKinsey, Boston Consulting Group, Bain & Company, and Strategy & Co. (formerly known as Booz & Co.), and urged SOEs to establish teams of domestic consultants out of fears that U.S. consultants are government spies.²²⁹

*In 2013, U.S. cybersecurity firm Mandiant issued a report that identified one of the "most prolific cyber espionage groups in terms of the sheer quantity of information stolen" as Shanghai-based Unit 61398 of China's PLA, confirming that it is highly likely that China engages in state-sponsored, cyber-enabled economic espionage of U.S. companies, including large-scale theft of IP and confidential business information.

Chinese State-Sponsored Cyber Theft—Continued

Chinese entities have long been engaging in cyber-enabled theft against U.S. companies for commercial gain; however, the May 19 indictment represents the “first ever charges against known state actors for infiltrating U.S. commercial targets by cyber means.”²³⁰ In addition, the indictment states that “Chinese firms hired the same PLA Unit where the defendants worked to provide information technology services.”²³¹ This established a channel through which the Chinese firms could issue tasking orders to the PLA defendants to engage in cyber theft and commercial espionage. For example, in one case, according to the indictment, a Chinese SOE hired the PLA Unit “to build a ‘secret’ database to hold corporate ‘intelligence.’”²³²

Of the 141 organizations allegedly compromised by PLA Unit 61398 since 2006, 81 percent were located or headquartered in the United States.²³³ In June 2013, the U.S. Department of Justice indicted Chinese energy firm Sinovel for cyber-enabled IP theft committed against Massachusetts-based American Superconductor (AMSC).^{*} Florida-based biofuel company Algenol, which is developing technology that converts algae into fuels while decreasing greenhouse gas emissions, fell victim to more than 39 million hacking attempts since mid-2013.²³⁴ According to Algenol’s technology chief, 63,000 hacking attempts came from China, of which 6,653 attempts came from IP addresses identified by cyber security firm Mandiant as belonging to PLA Unit 61398.²³⁵ Algenol’s investigation also identified Alibaba’s cloud computing subsidiary Aliyun as an originator of hacking attempts, though Alibaba claimed that Algenol mischaracterized ordinary Internet traffic as hacking attempts.²³⁶

China’s Multilateral Trade and Investment Issues

China’s Role in the Global Trade System

China’s engagement in the multilateral trade arena continued to reflect its protectionist policies and its lack of regulatory transparency. Concerns about China’s opaque policies were raised during China’s fifth mandatory WTO trade policy review, and were again raised in response to China’s obstructive behavior in the Information Technology Agreement (ITA) negotiations, which further demonstrated its efforts to insulate domestic industries from competition.

China’s WTO Trade Policy Review: In 2014, China underwent its fifth WTO Trade Policy Review (TPR) since its 2001 WTO accession. While the official WTO report was mostly neutral in its description of China’s trade and investment policies, some statements within the TPR reflect several WTO members’ concerns about Chi-

^{*}AMSC continues to seek compensation from Sinovel through lawsuits in China. U.S.-China Economic and Security Review Commission, *2013 Annual Report to Congress*, November 2013, p. 248.

na's lack of transparency in forming and implementing trade-related policies. For example, the TPR was critical of the complexity and inconsistency of trade and investment catalogs, which China uses to specify those sectors that are eligible for preferential treatment in trade or are open to foreign investment.* The TPR said:

*It is not always clear how the different Catalogues should be read, as they sometimes overlap and even conflict, reflecting the different agendas at the different levels [of government]. The different layers of regulation add an additional level of difficulty when trying to unravel specific policy measures in China.*²³⁷

The TPR also stated that it is unclear how China subsidizes agricultural exports “since China has failed to notify [the WTO of] any agricultural support provided after 2008.”²³⁸ The review went on to say that “China retains a large number of support programs aimed at achieving its economic and social goals, but the WTO could not identify the full scope of these policies because they were often the result of “internal administrative measures.”²³⁹

During China's TPR proceedings, the United States was highly critical of China's lack of transparency in trade and investment-related policymaking. The United States described China's trade and investment practices as shrouded in a “systemic web of secrecy.”²⁴⁰ The United States accused China of failing to meet the transparency obligations that it agreed to upon accession to the WTO in 2001. Specifically, the Chinese government was inconsistent in notifying the WTO in advance of newly enacted policies that affect or distort trade, a requirement for WTO members.²⁴¹ The United States called China's subsidization of its domestic industries “widespread and massive.”²⁴² China did not respond directly to the United States' accusations, but said it would work to reply to questions as soon as possible.²⁴³

Information Technology Agreement (ITA): China continued to obstruct efforts to conclude a revised ITA in the WTO this year. During the latest negotiating round in June 2014, China failed to table a promised new offer amenable to the United States and other participants.²⁴⁴ Originally slated for conclusion last year, the ITA negotiations have stalled due to China's unwillingness to include key products such as multicomponent integrated circuits (MCOs) and flat-panel displays, and its insistence on lengthy tariff phase-out periods for other products.²⁴⁵ An updated ITA is considered an important component of early-harvest outcomes in the WTO Doha Round.²⁴⁶ The next meeting of the ITA Committee was scheduled for October 31, 2014, and the hope is still to reach an agreement by the end of the year.²⁴⁷

Trade in Services Agreement (TiSA): In September 2013, China asked to join multilateral negotiations toward a Trade in Services Agreement (TiSA), which began in May 2013 and have been spearheaded by the United States and EU Member states.²⁴⁸ In the

*China's “catalog” system is the opposite of the more widely used “negative list” approach, which only includes the sectors where foreign products or investors face restrictions.

aftermath of China's disruption in the ITA talks, some analysts speculate that allowing China to join the TiSA talks would be akin to inviting in a Trojan horse.²⁴⁹ The EU and Australia have welcomed China's bid to join the TiSA talks, arguing that liberalization of China's relatively small services sector would open more opportunities for trade and investment.²⁵⁰ However, China's procrastination in unilaterally liberalizing its services sector—a reform pledge it made in the Third Plenum—may be a signal that it is not committed to actual liberalization of services. Many of China's service industries are either highly consolidated into large SOEs, such as telecommunications, or highly fragmented and uncompetitive globally, such as logistics.²⁵¹ Information services, such as digitally transferable services, are heavily restricted because of China's control and censorship over the Internet. Only select service sectors in China, such as construction and shipping, are expected to be competitive globally.²⁵² These factors, combined with China's nontransparent political processes, raise serious concerns about including China in the TiSA talks.

Economic Aspects of China's Territorial Disputes

Territorial disputes between China and its neighbors have harmed commercial activity in the Asia Pacific and put at risk key U.S. interests in the region. In 2014, rising tensions surrounding these disputes have attracted global attention due to the large economic assets that are at stake around some of the territories, including key global trade routes, large oil and gas reserves, and fisheries. (Further analysis of China's territorial disputes is discussed in Chapter 2, Section 1, "Year in Review: Security and Foreign Affairs" and Chapter 3, Section 1, "China and Asia's Evolving Security Architecture.")

The locations of China's most sensitive territorial disputes are of strategic economic importance globally and to the United States. By the estimates of the U.S. Energy Information Administration (EIA), approximately 11 billion barrels of oil reserves and 190 trillion cubic feet of natural gas reserves lie in proved and probable reserves in the South China Sea.²⁵³ This equates to an approximate \$1.14 trillion in oil reserves and \$833 billion in natural gas reserves in the South China Sea.²⁵⁴ In addition, the EIA estimates that the East China Sea likely has approximately 200 million barrels of oil reserves and between 1 trillion and 2 trillion cubic feet in natural gas reserves, which equates to \$20.8 billion in oil reserves and between \$4.39 billion and \$8.77 billion in natural gas reserves.*^{255,256} Some Chinese sources claim undiscovered resources can run as high as 70 billion to 160 billion barrels of oil across the East China Sea.†

The South and East China Seas are also home to vast fisheries. The Food and Agriculture Organization of the United Nations esti-

*Calculations for oil reserves are based on a price of \$103.93 per barrel and for natural gas are based on \$4.27 per million British Thermal Units, MMBtu.

†Expert testimony delivered to the U.S.-China Economic and Security Review Commission in 2013 cast doubt on the feasibility of exploring and extracting these proven and probable reserves from the South and East China seas. For details, see the U.S.-China Economic and Security Review Commission's *2013 Annual Report to Congress*, Chapter 2, Section 3, "China's Maritime Disputes."

mates that the South China Sea produces 1.7 billion tons of fish, which accounts for over 10 percent of global fisheries production. The region is considered a key supply source for the fisheries sectors of Southeast Asian economies, a large portion of which are U.S.-bound exports.²⁵⁷

The South China Sea is also a key trading route. One hundred and seventy-two ports are located around the perimeter of the South China Sea, and approximately \$5 trillion of ship-borne trade (or nearly 30 percent of global trade) passes through the South China Sea every year.²⁵⁸ Annual U.S. trade through the South China Sea is valued at about \$1.2 trillion, which is nearly a quarter of overall U.S. trade.^{259,260} Should a crisis occur, the diversion of cargo ships to other routes would harm the global economy due to higher transport costs and longer shipping times.

Implications for the United States

China's preoccupation in 2014 with stimulating its economy to reach official GDP growth targets has been detrimental to the U.S. economy. China's "mini-stimulus," which continued to grow throughout the year, is causing investment to increase in sectors where overcapacity and oversupply are already problematic, such as steel. These subsidies encourage China to dump excess supply in overseas markets at below-market rates, putting U.S. manufacturers at a disadvantage.

Slow implementation of substantive economic reform has also been harmful to the United States. For example, U.S. businesses continue to face high market access barriers, including those for U.S. exports and investment. Separately, failure to transition to a floating exchange rate regime allows China to continue undervaluing its currency, thereby subsidizing Chinese exports, raising the cost of imports from the United States, and increasing the U.S.-China trade deficit. In addition, failure to accelerate privatization of sectors dominated by SOEs allows these companies, which are heavily subsidized by the government, to enjoy an unfair competitive advantage globally. China's slow path toward internal rebalancing and adopting a consumption-based growth model is also harmful to the United States. High levels of investment and savings rather than consumption by the Chinese keeps U.S. exports to China relatively low, which expands the U.S.-China trade deficit.

China's increasingly hostile foreign investment climate is also harming U.S. business interests. Beijing is using multiple tools—including its Anti-Monopoly Law and state-run media attacks—to discriminate against foreign invested firms. In addition, state-sponsored cyber theft of commercial IP and trade secrets has harmed U.S. businesses and the economy. China's obstructionist behavior in key multilateral trade negotiations, such as the Information Technology Agreement, has also inhibited the U.S. trade agenda.

Conclusions

- Despite U.S. exports to China growing by 6.2 percent, imbalances in the U.S.-China trade relationship increased in the first eight months of 2014 as the trade deficit grew by 4.1 percent. China stalled on liberalizing key sectors in which the United States is

competitive globally, such as services. Chinese foreign direct investment (FDI) flows into the United States grew, while U.S. FDI into China fell as foreign firms faced an increasingly hostile investment climate in China.

- Supported by government stimulus, China sustained economic growth at or near its official target rate of 7.5 percent through the first three quarters of 2014. Underlying economic problems in China, including oversupply of property and industrial overcapacity, continue to put economic growth at risk of further deceleration.
- China's chronic overcapacity, especially in sectors such as steel and solar panels, continued to harm U.S. manufacturing and exports by dumping excess supply into global markets.
- China's government made little to no progress this year in implementing the economic reforms designated by its leadership during the 2013 Third Plenum. Instead, Chinese President Xi Jinping and his leadership team focused on a broad anti-corruption campaign, while using stimulus to avoid further economic slowdown.
- While disposable income and consumption have increased relative to savings, China has not yet weaned itself off its traditional investment and export-based growth model, and continues to struggle with large internal imbalances.
- China's nontransparent policymaking came under criticism at the World Trade Organization, and China obstructed progress in key trade negotiations, such as the Information Technology Agreement. China's confrontational behavior in addressing contentious territorial disputes with neighboring countries also harmed economic and trade relations in the Asia Pacific.

Addendum I: Unresolved Trade Disputes with China

Issue	Last Action Taken	Summary of Dispute
China's Failure to Notify the WTO on Subsidies	The United States requested notification on Chinese subsidy programs in 2012 and 2014. There is no public record of China responding to the requests.	As noted in China's Fifth Trade Policy Review, China has a history of failing to report subsidies to the WTO, a requirement for all WTO members. China notified the WTO twice of subsidies in 2006 and 2011. In the latter case, the notification was made only after the United States issued a counter notification; however, China's notification only covered 93 subsidy programs from 2005 to 2008. The United States submitted requests for notification of Chinese subsidies in 2012 and 2014, but there is no public record of China responding to the requests.
Chinese Protectionist Measures on Auto Parts	The United States and China held consultations in November 2012 and are "engaging in further discussions." There is no public record of progress on the dispute since that time.	In 2012, the United States held consultations with China regarding auto parts export subsidies that appear to violate China's WTO obligations. The United States also accused China of failing to notify the WTO of the subsidies and failing to publish the measures as well as to provide translations in an official WTO language. There is no public record of further progress on the case or efforts to escalate the case to a Dispute Settlement Panel.
Subsidies to Chinese "Famous Brands"	In 2009, the United States and China came to an agreement in which China would eliminate a subsidy program to Chinese "famous brands."	In 2008, the United States and other WTO Member States challenged China for subsidies to producers of so-called Chinese "famous export brands." In December 2009, China agreed to eliminate the subsidy programs; however, Chinese "famous brands" subsidies have subsequently been reported, such as the one to a Chinese shrimp producer which became the basis of a 2013 U.S. countervailing duty.
Chinese Export Restraints	In April 2014, the United States won a case against China for export restraints on rare earths. Other export restraints have not yet been disputed.	Although prohibited by the WTO with limited exceptions, China maintains export restraints on several products, especially those deemed as strategic and emerging industries. In 2009, the United States and other WTO Member States lodged a dispute on export restraints of rare earths. In 2014, the WTO Dispute Settlement Body ruled against China; and an Appellate Body upheld the ruling. However, industry analysts report Chinese export duties on a broad range of other products which have yet to be disputed at the WTO.

Addendum I: Unresolved Trade Disputes with China—Continued

Issue	Last Action Taken	Summary of Dispute
Export Credits from China's Export-Import Bank	In 2012, the United States and China agreed to form a working group to establish guidelines on export financing by 2014.	Following U.S. industry complaints that China's Export-Import Bank provided export credits at below-market rates, the United States raised the issue of export financing with China in the 2011 U.S.-China Strategic and Economic Dialogue. Both sides agreed to form a working group to establish guidelines on export credits by 2014; however, reports from the European Union indicate that the scope of negotiations have been narrow, focusing on ships and medical equipment. To date, a dispute on Chinese export credits has not been raised at the WTO.
Localization Requirements	The USTR reports on-going discussions with China regarding localization requirements, such as of servers in the information and communication technology (ICT) sector.	China imposes localization requirements on several strategic and emerging industries as a means of acquiring foreign technology. For example, Internet companies that wish to provide services in China must establish a local presence, including servers, with a Chinese joint-venture partner. The USTR states in its annual report on China to Congress that it continues to discuss these localization requirements with China. To date, no formal dispute has been raised against China at the WTO.
Barriers to Trade in Digitally Distributable Services	In 2009, the WTO ruled partially in favor of the United States in a landmark dispute on trade in certain audiovisual services. China has yet to come into full conformity with the ruling.	The United States raised a case against Chinese barriers to the import of certain audio-visual services, and the WTO Dispute Settlement Panel ruled in favor of the United States in 2009. While China has come into partial compliance by permitting more imports of foreign-made movies, opaque Internet regulations in China continue to severely limit access for digitally distributable exports to China. The USTR submitted questions to China on its Internet censorship regulations in 2011, but the WTO has not published any response from China and a dispute settlement case has not been raised.
Market Access for Foreign Electronic Payment Services	China agreed to grant access to foreign suppliers of electronic payment services by July 2013, following a dispute panel decision that China's regulations were not WTO-compliant. To date, China has failed to grant market access.	In 2010, the United States raised a case against Chinese regulations that banned foreign suppliers of electronic payment services which are used to process credit card payments and other transfers among financial institutions. In 2012, the Dispute Settlement Panel found Chinese restrictions to be noncompliant, and China agreed to implement the Panel's recommendations by July 2013. To date, China has yet to authorize access to foreign suppliers, and there is no public record of further action on the dispute.

Source: WTO and USTR; compiled by Commission staff.

ENDNOTES FOR SECTION 1

1. Thomas Penny, "Li Says China to Avoid Hard Landing as GBP Trading Starts," Bloomberg, June 18, 2014. <http://www.bloomberg.com/news/2014-06-18/li-says-china-will-avoid-hard-landing-while-limiting-stimulus.html>.
2. Bloomberg News, "China Needs More Stimulus to Meet Growth Goal," July 23, 2014. <http://www.bloomberg.com/news/2014-07-23/china-seen-needing-more-stimulus-to-meet-growth-goal.html>.
3. Reuters, "China Ramps Up Spending to Spur Economy, Central Bank Sees Stable Policy," June 8, 2014. <http://in.reuters.com/article/2014/06/11/china-economy-idINKBN0EM0GW20140611>.
4. Esther Fung, "How a Slumping Property Market Could Drag Down China's GDP," *Wall Street Journal*, June 19, 2014. <http://blogs.wsj.com/chinarealttime/2014/06/19/how-a-slumping-property-market-could-drag-down-chinas-gdp/>; Ryan Rutkowski, *Will China Finally Tackle Overcapacity?* (Peterson Institute for International Economics, China Economic Watch, April 22, 2014). <http://blogs.piie.com/china/?p=3857>.
5. Center for Strategic and International Studies, "Issue in Focus: China's 'Going Out' Investment Policy," Freeman Briefing, May 27, 2008.
6. Thomas Penny, "Li Says China to Avoid Hard Landing as GBP Trading Starts," Bloomberg, June 18, 2014. <http://www.bloomberg.com/news/2014-06-18/li-says-china-will-avoid-hard-landing-while-limiting-stimulus.html>.
7. Thomas Penny, "Li Says China to Avoid Hard Landing as GBP Trading Starts," Bloomberg, June 18, 2014. <http://www.bloomberg.com/news/2014-06-18/li-says-china-will-avoid-hard-landing-while-limiting-stimulus.html>.
8. Bloomberg News, "China Needs More Stimulus to Meet Growth Goal," July 23, 2014. <http://www.bloomberg.com/news/2014-07-23/china-seen-needing-more-stimulus-to-meet-growth-goal.html>.
9. Richard Silk, "Economists React: China's Factories Bank in Business," *Wall Street Journal*, June 22, 2014. <http://stream.wsj.com/story/markets/SS-2-5/SS-2-416917/>.
10. International Monetary Fund, *People's Republic of China 2014 Article IV Consultation*, IMF Country Report No. 14/235. <http://www.imf.org/external/pubs/ft/scr/2014/cr14235.pdf>.
11. David Keohane, "China Property, Structural Faith Edition," FTAlphaville, June 9, 2014. <http://ftalphaville.ft.com/2014/06/09/1872412/china-property-structural-faith-edition/>.
12. Kenneth Rapoza, "Real Estate Oversupply Becoming Bigger Problem for China," *Forbes*, August 3, 2014. <http://www.forbes.com/sites/kenrapoza/2014/08/03/real-estate-oversupply-becoming-bigger-problem-for-china/>.
13. U.S.-China Economic and Security Review Commission, "Monthly Analysis of Trade Data," July 3, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/July%202014%20Trade%20Bulletin.pdf>; James Kyngge, "China Property Slump Gathers Pace in July," *Financial Times*, August 18, 2014, <http://www.ft.com/intl/cms/s/0/51b45632-269c-11e4-bc19-00144feabdc0.html>.
14. U.S.-China Economic and Security Review Commission, "Monthly Analysis of Trade Data," July 3, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/July%202014%20Trade%20Bulletin.pdf>.
15. Reuters, "China New Home Prices Fall in May—First Drop in Two Years," June 18, 2014. <http://www.reuters.com/assets/print?aid=USLAN0OZ0JB20140618>.
16. Esther Fung, "How a Slumping Property Market Could Drag Down China's GDP," *Wall Street Journal*, June 19, 2014. <http://blogs.wsj.com/chinarealttime/2014/06/19/how-a-slumping-property-market-could-drag-down-chinas-gdp/>.
17. Ryan Rutkowski, *Will China Finally Tackle Overcapacity?* (Peterson Institute for International Economics, China Economic Watch, April 22, 2014). <http://blogs.piie.com/china/?p=3857>.
18. Andy Xie, "China Must Allow Bad Loans to Fail for the Good of Its Economy," *South China Morning Post* (Hong Kong), July 1, 2014. <http://www.scmp.com/comment/article/1544348/china-must-allow-bad-loans-fail-good-its-economy>.
19. Peter Cai, "Curbing China's Excess Capacity," *Business Spectator*, June 10, 2014. <http://www.businessspectator.com.au/article/2014/6/10/china/curbing-chinas-excess-capacity>.
20. Abheek Bhattacharya, "Steer Clear of China's Aluminum Crush," *Wall Street Journal*, July 1, 2014. <http://online.wsj.com/articles/heard-on-the-street-steer-clear-of-chinas-aluminum-crush-1404205417?tesla=y&mg=reno64-wsj>.
21. Andy Xie, "China Must Allow Bad Loans to Fail for the Good of Its Economy," *South China Morning Post* (Hong Kong), July 1, 2014. <http://www.scmp.com/comment/article/1544348/china-must-allow-bad-loans-fail-good-its-economy>.

22. Andy Xie, "China Must Allow Bad Loans to Fail for the Good of Its Economy," *South China Morning Post* (Hong Kong), July 1, 2014. <http://www.scmp.com/comment/article/1544348/china-must-allow-bad-loans-fail-good-its-economy>.
23. International Trade Administration, *Fact Sheet: Commerce Preliminarily Finds Countervailable Subsidization of Imports of Carbon and Certain Alloy Steel Wire Rod from the People's Republic of China* (U.S. Department of Commerce, July 1, 2014). <http://enforcement.trade.gov/download/factsheets/factsheet-prc-carbon-certain-alloy-steel-wire-rod-cvd-prelim-070114.pdf>.
24. Peter Cai, "Curbing China's Excess Capacity," *Business Spectator*, June 10, 2014. <http://www.businessspectator.com.au/article/2014/6/10/china/curbing-chinas-excess-capacity>.
25. Peter Cai, "Curbing China's Excess Capacity," *Business Spectator*, June 10, 2014. <http://www.businessspectator.com.au/article/2014/6/10/china/curbing-chinas-excess-capacity>.
26. Richard Silk, "Despite Low Inflation, China Has Little Room to Cut Rates," *Wall Street Journal*, March 12, 2014. <http://blogs.wsj.com/economics/2014/03/13/despite-low-inflation-china-has-little-room-to-cut-rates/>.
27. Stephen Green, "China—Total Debt Breaks 250 Percent of GDP," *Standard Chartered*, July 21, 2014.
28. Jamil Anderlini, "China Debt Tops 250 Percent of National Income," *Financial Times*, July 21, 2014. <http://www.ft.com/intl/cms/s/0/895604ac-10d8-11e4-812b-00144feabdc0.html>.
29. U.S.-China Economic and Security Review Commission, "Monthly Analysis of Trade Data," August 6, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/August%202014%20Trade%20Bulletin.pdf>.
30. Investopedia, "Definition of Nonperforming Loan—NPL," <http://www.investopedia.com/terms/n/nonperformingloan.asp>.
31. Jamil Anderlini, "China Suffers First Corporate Bond Default," *Financial Times*, March 7, 2014. <http://www.ft.com/intl/cms/s/0/d4ccd956-a5cb-11e3-9818-00144feab7de.html>.
32. Heather Timmons, "China's Enormous Bad Debts May Mean Good Times for Bankruptcy Experts," *Quartz*, July 22, 2014. <http://qz.com/234779/chinas-enormous-bad-debts-may-mean-good-times-for-bankruptcy-experts/>.
33. Jamil Anderlini, "China Debt Tops 250 Percent of National Income," *Financial Times*, July 21, 2014. <http://www.ft.com/intl/cms/s/0/895604ac-10d8-11e4-812b-00144feabdc0.html>.
34. *Economist*, "Local Government Debt: Counting Ghosts," January 4, 2014. <http://www.economist.com/node/21592628/comments>.
35. Neil Gough, "China Says Local-Level Debt Soars, Stirring Fear," *New York Times*, December 30, 2013. <http://www.nytimes.com/2013/12/31/business/international/chinese-local-government-debt-up-13-in-6-months.html>.
36. *Economist*, "Local Government Debt: Counting Ghosts," January 4, 2014. <http://www.economist.com/node/21592628/comments>.
37. U.S.-China Economic and Security Review Commission, *2013 Annual Report to Congress*, November 2013, p. 123.
38. *Forbes*, "China Shadow Banking Sector Valued at 80 Percent of GDP," May 21, 2014. <http://www.forbes.com/sites/ywang/2014/05/21/chinas-shadow-banking-valued-at-80-of-gdp/>.
39. Bloomberg, "China Orders Interbank Lending Curbs to Quell Shadow Debt," May 16, 2014. <http://www.bloomberg.com/news/2014-05-16/china-orders-interbank-lending-curbs-to-quell-shadow-financing.html>.
40. U.S.-China Economic and Security Review Commission, "Monthly Analysis of Trade Data," August 6, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/August%202014%20Trade%20Bulletin.pdf>.
41. Li Keqiang, "Keynote Address at the Chatham House Royal Institute of International Affairs," June 18, 2014. <http://www.chathamhouse.org/event/keynote-address-chinese-premier-li-keqiang>.
42. James Kynge, "China Property Sales Fall in June, Smaller Cities Hit Hardest," *Financial Times*, June 24, 2014. <http://blogs.ft.com/beyond-brics/2014/06/23/china-property-sales-fall-in-june-smaller-cities-hit-hardest/>.
43. "Priming China's Economy: Don't Say Stimulus," *Economist*, June 7, 2014. <http://www.economist.com/node/21603459>.
44. David Keohane, "China Property, Structural Faith Edition," FTAlphaville, June 9, 2014. <http://ftalphaville.ft.com/2014/06/09/1872412/china-property-structural-faith-edition/>.
45. Lingling Wei, "China's Central Bank Injects \$81 Billion into Top Banks to Counter Slowdown," *Wall Street Journal*, September 17, 2014. <http://topics.wsj.com/person/W/lingling-wei/1562>.

46. Reuters, "China Should Set Less Ambitious 2015 Growth Target, Refrain from Stimulus: IMF," July 31, 2014. <http://www.reuters.com/article/2014/07/31/us-china-economy-imf-idUSKBN0G002P20140731?>
47. Reuters, "China Ramps Up Spending to Spur Economy, Central Bank Sees Stable Policy," June 8, 2014. <http://in.reuters.com/article/2014/06/11/china-economy-idINKBN0EM0GW20140611>.
48. Xiaowen Bi and Pete Sweeney, "China Raises Railway Spending Target to 800 Billion in 2014," Reuters, May 2, 2014. <http://www.reuters.com/article/2014/05/02/china-railway-idUSL3N0NO25S20140502>.
49. Xiaowen Bi and Pete Sweeney, "China Raises Railway Spending Target to 800 Billion in 2014," Reuters, May 2, 2014. <http://www.reuters.com/article/2014/05/02/china-railway-idUSL3N0NO25S20140502>.
50. *Wall Street Journal*, "China Unveils Mini-Stimulus Measures," April 2, 2014. <http://online.wsj.com/news/articles/SB10001424052702303847804579477060004679726>.
51. Ryan Rutkowski, *Rebalancing China's Railway Sector* (Peterson Institute for International Economics, August 29, 2013). <http://blogs.piie.com/china/?p=3145>.
52. Reuters, "China June Fiscal Spending Jumps 26.1 Percent y/y as Beijing Spurs Flagging Economy," July 14, 2014. <http://www.reuters.com/article/2014/07/14/us-china-fiscal-idUSKBN0FJ08F20140714>.
53. Bloomberg News, "China Central Bank Call for Faster Home Lending in Slump," May 14, 2014. <http://www.bloomberg.com/news/2014-05-13/china-central-bank-calls-for-faster-home-lending-in-slump.html>.
54. Bloomberg News, "China No-Money-Down Housing Echoes U.S. Subprime Loan Risks," June 13, 2014. <http://www.bloomberg.com/news/2014-06-12/china-s-no-money-down-housing-echoes-u-s-subprime-lending-risks.html>.
55. Bloomberg News, "China Central Bank Call for Faster Home Lending in Slump," May 14, 2014. <http://www.bloomberg.com/news/2014-05-13/china-central-bank-calls-for-faster-home-lending-in-slump.html>.
56. *China Daily* (Europe), "Cities Eye 'House-for-Hukou' to Boost Property Market," June 22, 2014, via Sinocism.
57. Gwynn Guilford, "It May Be too Late for the Chinese Government to Stop Its Housing Bubble from Popping," *Quartz*, May 14, 2014. <http://qz.com/209377/it-may-be-too-late-for-the-chinese-government-to-stop-its-housing-bubble-from-popping/>.
58. Aaron Back, "China Tries to Sweeten Stimulus," *Wall Street Journal*, July 3, 2014, p. C8.
59. Richard Dobbs, et al., *Urban World: Mapping the Economic Power of Cities* (McKinsey Global Institute, March 2011), http://www.mckinsey.com/insights/urbanization/urban_world.
60. Gordon Chang, "China in Deflationary Spiral, New Stimulus Looks Ineffective," *Forbes*, June 1, 2014, <http://www.forbes.com/sites/gordonchang/2014/06/01/china-in-deflationary-spiral-new-stimulus-looks-ineffective/>.
61. Richard Macauley, "China's Mega-Cities Are Combining into Mega-Regions, and They're Doing It All Wrong," *Quartz*, May 5, 2014. <http://qz.com/201012/chinas-mega-cities-are-combining-into-even-larger-mega-regions-and-theyre-doing-it-all-wrong/>.
62. Richard Macauley, "China's Mega-Cities Are Combining into Mega-Regions, and They're Doing It All Wrong," *Quartz*, May 5, 2014. <http://qz.com/201012/chinas-mega-cities-are-combining-into-even-larger-mega-regions-and-theyre-doing-it-all-wrong/>.
63. Lily Kuo, "China's New Megalopolis Would Be Bigger Than Uruguay and More Populous Than Germany," *Quartz*, April 12, 2014. <http://qz.com/198337/chinas-new-megalopolis-would-be-bigger-than-uruguay-and-more-populous-than-germany/>.
64. Richard Macauley, "China's Mega-Cities Are Combining into Mega-Regions, and They're Doing It All Wrong," *Quartz*, May 5, 2014. <http://qz.com/201012/chinas-mega-cities-are-combining-into-even-larger-mega-regions-and-theyre-doing-it-all-wrong/>.
65. Lily Kuo, "China's New Megalopolis Would Be Bigger Than Uruguay and More Populous Than Germany," *Quartz*, April 12, 2014. <http://qz.com/198337/chinas-new-megalopolis-would-be-bigger-than-uruguay-and-more-populous-than-germany/>.
66. Simon Rabinovitch, "IMF Urges China to Implement Critical Economic Reforms," *Financial Times*, July 17, 2014. <http://www.ft.com/intl/cms/s/0/103cf672-eebd-11e2-b8ec-00144feabdc0.html>.
67. Christopher Johnson, *Decoding China's Emerging 'Great Power' Strategy in Asia* (Center for Strategic and International Studies, June 2014), p. 10.
68. Christopher Johnson, *Decoding China's Emerging 'Great Power' Strategy in Asia* (Center for Strategic and International Studies, June 2014), p. 10.

69. Arthur Kroeber, *After the NPC: Xi Jinping's Roadmap for China* (Brookings Institution, March 11, 2014). <http://www.brookings.edu/research/opinions/2014/03/11-after-npc-xi-jinping-roadmap-for-china-kroeber>.
70. Arthur Kroeber, *After the NPC: Xi Jinping's Roadmap for China* (Brookings Institution, March 11, 2014). <http://www.brookings.edu/research/opinions/2014/03/11-after-npc-xi-jinping-roadmap-for-china-kroeber>.
71. International Monetary Fund, *People's Republic of China 2014 Article IV Consultation*, IMF Country Report No. 14/235, <http://www.imf.org/external/pubs/ft/scr/2014/cr14235.pdf>.
72. Jamil Anderlini, "Xi Jinping's Anti-Corruption Drive in China Takes Autocratic Turn," *Financial Times*, June 23, 2014. <http://www.ft.com/intl/cms/s/0/9b645f40-fac1-11e3-8959-00144feab7de.html>.
73. Alice Miller, *More Already on the Central Committee's Leading Small Groups* (Hoover Institution, July 28, 2014). <http://www.hoover.org/sites/default/files/research/docs/clm44am.pdf>.
74. "Reform Leading Group: What Can We Expect," *China Youth Daily*, July 14, 2014. Staff translation. http://views.ce.cn/view/ent/201407/14/t20140714_3151206.shtml; "Xi Jinping Hosts First Meeting of the Central Reform Leading Group," CCTV, January 22, 2014. Staff translation.
75. Peter Martin and David Cohen, "Inside Xi Jinping's Reform Strategy," *National Interest*, March 20, 2014, via Factiva.
76. Reuters, "China Finance Minister: Job Creation Most Important Policy Goal," March 5, 2014, via Factiva; *China Daily Industry Updates*, "Growth Drop Is Not a Cause for Alarm, Minister Says," February 24, 2014, via Factiva.
77. Reuters, "China May Tax More Luxury Goods, Expand Property Tax—Xinhua," August 28, 2013, via Factiva; *China Daily Industry Updates*, "Officials Eye Consumer, Vehicle Taxes," November 21, 2013, via Factiva; and Wei Tian, "More Tax Reforms on the Agenda," *China Daily*, March 7, 2014, via Factiva.
78. Victoria Ruan, "Chinese Local Governments Urged to Boost Spending," *South China Morning Post* (Hong Kong), June 26, 2014, via Factiva.
79. Reuters, "China's Zhou Re-Appointed Central Bank Chief in Reform Push," March 16, 2013. <http://www.cnbc.com/id/100560227>.
80. Bloomberg, "China's Wealth Fund Vows Better Investment Management after Audit," June 19, 2014. <http://www.bloomberg.com/news/2014-06-19/china-s-cic-vows-to-improve-investment-management-after-audit.html>.
81. Kevin Yao, "China Central Bank Head to Spur Reforms through Tough Waters," Reuters, March 16, 2013. <http://www.reuters.com/article/2013/03/16/china-parliament-zhou-idUSL3N0C7CV920130316>.
82. Tom Orlik, "The Steady Hand of China's Central Banker," *Wall Street Journal*, March 13, 2013. <http://blogs.wsj.com/chinarealtime/2013/03/13/the-steady-hand-of-chinas-central-banker/>.
83. Kevin Yao, "China Central Bank Head to Spur Reforms through Tough Waters," Reuters, March 16, 2013. <http://www.reuters.com/article/2013/03/16/china-parliament-zhou-idUSL3N0C7CV920130316>.
84. "Chinese Leaders: Zhang Gaoli," Chinese-Leaders.org, <http://chinese-leaders.org/zhang-gaoli/>.
85. Alice Miller, *More Already on the Central Committee's Leading Small Groups* (Hoover Institution, July 28, 2014). <http://www.hoover.org/sites/default/files/research/docs/clm44am.pdf>.
86. Cheng Li, *China's Top Future Leaders to Watch: Zhang Gaoli* (The Brookings Institution). <http://www.brookings.edu/about/centers/china/top-future-leaders/zhang-gaoli>.
87. Staff Reporter, "Zhang Gaoli: A Man of Means," *Want China Times* (Taiwan), September 17, 2012. <http://www.wantchinatimes.com/news-subclass-cnt.aspx?id=20120917000062&cid=1601>.
88. Zachary Keck, "China Reveals Members of New Leading Group on Reform," *Diplomat* (Tokyo), January 24, 2014, via Factiva.
89. Xinhua, "Vice Premier: China Reform Plan a Major Breakthrough," November 15, 2013, via Factiva.
90. Xinhua, "Chinese Vice Premier Stresses e-Commerce," January 6, 2014, via Factiva; Reuters, "IBM's CEO Visits China for Trust-building Talks with Govt Leaders—Sources," February 12, 2014, via Factiva; and Xinhua, "Chinese Vice Premier Stresses Fight against Counterfeits," February 16, 2014, via Factiva.
91. Peter Martin, *The Humbling of the NDRC: China's National Development and Reform Commission Searches for a New Role amid Restructuring* (Jamestown Foundation, March 6, 2014). http://www.jamestown.org/single!tx_ttnews%5B%5Dwords%5D=8fd5893941d69d0be3f378576261ae3e&tx_ttnews%5Bany_of_the_words%5D=

south%20stream&tx_ttnews%5Btt_news%5D=42057&tx_ttnews%5BbackPid%5D=7&cHash=d28daaa8147c34e0668e12b74d9997cf#.U8Wy-vldXmc.

92. Josh Chin, "Former Chinese State Planning Official Charged with Taking Bribes; Case Involves Liu Tienan, Who Was Expelled from Party Last Year," *Wall Street Journal Online*, June 23, 2014, via Factiva.

93. Aileen Wang and Kevin Yao, "China Central Bank Suggests Faster Tempo for Freeing Yuan," Reuters, November 20, 2013, via Factiva.

94. Reuters, "China's New Environment Law Submitted to Parliament," April 22, 2014, via Factiva.

95. *Wall Street Journal Online*, "Beijing Moves to Address Growing Inequality," May 14, 2014, via Factiva.

96. Renmin Ribao Online, "Article by Chair of National Development, Reform Commission on Guide for Healthy Economic Growth," July 8, 2014. https://www.opensource.gov/portal/server.pt/gateway/PTARGS_0_0_200_203_121123_43/content/Display/CHR2014070812420259#index=97&searchKey=15782087&rpp=500.

97. *Wall Street Journal*, "Xi Jinping and Mao's Playbook," July 9, 2014. <http://online.wsj.com/articles/xi-jinping-and-maos-playbook-1404924289>.

98. Cheng Li, *Xi's Reform Agenda: Promises and Risks* (Brookings Institution, March 6, 2014). <http://www.brookings.edu/research/opinions/2014/03/06-xi-reform-agenda-promises-risks-li>.

99. Adam Hersh, *Assessing China's Economic Reform Agenda* (Center for American Progress, May 1, 2014). <http://www.americanprogress.org/issues/economy/report/2014/05/01/88864/assessing-chinas-economic-reform-agenda/>.

100. Aibing Guo, Rakteeni Katakey, and Benjamin Haas, "Graft Probe Threatens PetroChina as Executives Targeted," Bloomberg, September 5, 2013. <http://www.bloomberg.com/news/2013-09-04/graft-probe-threatens-petrochina-as-executives-targeted-energy.html>.

101. Oliver Blade Barron, "China: Stimulus, Corruption, and Reform," *Forbes*, July 9, 2014. <http://www.forbes.com/sites/oliverbarron/2014/07/09/china-stimulus-corruption-and-reform/>.

102. Arthur Kroeber, *After the NPC: Xi Jinping's Roadmap for China* (Brookings Institution, March 11, 2014). <http://www.brookings.edu/research/opinions/2014/03/11-after-npc-xi-jinping-roadmap-for-china-kroeber>.

103. Simon Rabinovitch, "IMF Urges China to Implement Critical Economic Reforms," *Financial Times*, July 17, 2014. <http://www.ft.com/intl/cms/s/0/103cf672-eebd-11e2-b8ec-00144feabdc0.html>.

104. Simon Rabinovitch, "IMF Urges China to Implement Critical Economic Reforms," *Financial Times*, July 17, 2014. <http://www.ft.com/intl/cms/s/0/103cf672-eebd-11e2-b8ec-00144feabdc0.html>.

105. Simon Rabinovitch, "IMF Urges China to Implement Critical Economic Reforms," *Financial Times*, July 17, 2014. <http://www.ft.com/intl/cms/s/0/103cf672-eebd-11e2-b8ec-00144feabdc0.html>.

106. Howard Schneider and Krista Hughes, "China Must Speed Reforms Despite Potential Fallout, Says Lew," Reuters, June 11, 2014. <http://www.reuters.com/article/2014/06/11/us-usa-economy-jackleu-idUSKBN0EM17X20140611>; Kasia Klimasinska, "Lew Urges China to Be Clear about Exchange-Rate Interventions," Bloomberg, July 8, 2014. <http://www.bloomberg.com/news/2014-07-08/leu-urges-china-to-be-clear-about-exchange-rate-interventions.html>.

107. U.S.-China Business Council, "USCBC Economic Reform Scorecard," June 2014. http://uschina.org/sites/default/files/2014%20USCBC%20Economic%20Reform%20Scorecard_June_1.pdf.

108. *Guardian*, "China Opens Shanghai Free Trade Zone," September 29, 2013. <http://www.theguardian.com/world/2013/sep/29/china-shanghai-free-trade-zone>.

109. Simon Rabinovitch, "Benefits of Shanghai Free-Trade Zone Still Shrouded in Mystery," *Financial Times*, May 14, 2014. <http://www.ft.com/intl/cms/s/0/c1b3a678-d592-11e3-ade0-00144feabdc0.html>.

110. Simon Rabinovitch, "Benefits of Shanghai Free-Trade Zone Still Shrouded in Mystery," *Financial Times*, May 14, 2014. <http://www.ft.com/intl/cms/s/0/c1b3a678-d592-11e3-ade0-00144feabdc0.html>.

111. Richard Silk, "Shanghai Free Trade Zone Reduces Restrictions," *Wall Street Journal*, July 1, 2014. <http://online.wsj.com/news/articles/SB30001424052702304344504580002372998937764>.

112. Simon Rabinovitch, "Benefits of Shanghai Free-Trade Zone Still Shrouded in Mystery," *Financial Times*, May 14, 2014. <http://www.ft.com/intl/cms/s/0/c1b3a678-d592-11e3-ade0-00144feabdc0.html>.

113. John Sudworth, "Can Shanghai's Free Trade Zone Spur China's Growth?" BBC News, January 19, 2014. <http://www.bbc.com/news/business-25774227>.

114. John Sudworth, "Can Shanghai's Free Trade Zone Spur China's Growth?" BBC News, January 19, 2014. <http://www.bbc.com/news/business-25774227>.
115. Jing Song, "China Faces SOE Reform Dilemma," *Finance Asia*, May 14, 2014. <http://www.financeasia.com/Tools/Print.aspx?CIID=385446>.
116. U.S.-China Business Council, "USCBC Economic Reform Scorecard," June 2014. http://uschina.org/sites/default/files/2014%20USCBC%20Economic%20Reform%20Scorecard_June_1.pdf.
117. Jing Song, "China Faces SOE Reform Dilemma," *Finance Asia*, May 14, 2014. <http://www.financeasia.com/Tools/Print.aspx?CIID=385446>.
118. Howard Schneider and Krista Hughes, "China Must Speed Reforms Despite Potential Fallout," Reuters, June 11, 2014. <http://www.reuters.com/article/2014/06/11/usa-economy-jacklew-idUSL2N0OS0MI20140611>.
119. Takeshi Jingu, *China's Financial Reform Roadmap Unveiled at Third Plenum* (Nomura Research Institute, January 10, 2014). <http://www.nri.com/~media/PDF/global/opinion/lakyara/2014/lkr2014185.pdf>.
120. Takeshi Jingu, *China's Financial Reform Roadmap Unveiled at Third Plenum* (Nomura Research Institute, January 10, 2014). <http://www.nri.com/~media/PDF/global/opinion/lakyara/2014/lkr2014185.pdf>.
121. Takeshi Jingu, *China's Financial Reform Roadmap Unveiled at Third Plenum* (Nomura Research Institute, January 10, 2014). <http://www.nri.com/~media/PDF/global/opinion/lakyara/2014/lkr2014185.pdf>.
122. Bob Davis, "China Central Bank Said Committed to Rate Reform," *Wall Street Journal*, July 10, 2014. <http://online.wsj.com/articles/pbocs-zhou-still-committed-to-interest-rate-liberalization-in-two-years-1404970714>.
123. Bob Davis, "China Central Bank Said Committed to Rate Reform," *Wall Street Journal*, July 10, 2014. <http://online.wsj.com/articles/pbocs-zhou-still-committed-to-interest-rate-liberalization-in-two-years-1404970714>.
124. Kwong Man-ki and Teddy Ng, "Balance Needed in Financial Reforms, Wang Yang Says at Summit with U.S.," *South China Morning Post* (Hong Kong), July 10, 2014. <http://www.scmp.com/news/china/article/1550594/balance-needed-financial-reforms-wang-yang-says-summit-us>.
125. Bob Davis, "China Central Bank Said Committed to Rate Reform," *Wall Street Journal*, July 10, 2014. <http://online.wsj.com/articles/pbocs-zhou-still-committed-to-interest-rate-liberalization-in-two-years-1404970714>.
126. U.S.-China Business Council, "USCBC Economic Reform Scorecard," June 2014. http://uschina.org/sites/default/files/2014%20USCBC%20Economic%20Reform%20Scorecard_June_1.pdf.
127. U.S.-China Business Council, "USCBC Economic Reform Scorecard," June 2014. http://uschina.org/sites/default/files/2014%20USCBC%20Economic%20Reform%20Scorecard_June_1.pdf.
128. U.S.-China Business Council, "USCBC Economic Reform Scorecard," June 2014. http://uschina.org/sites/default/files/2014%20USCBC%20Economic%20Reform%20Scorecard_June_1.pdf.
129. Benjamin Shobert, "Confusing Messages for Investors and Multinational from China's Healthcare Reforms," *Forbes*, July 1, 2014. <http://www.forbes.com/sites/benjaminshobert/2014/07/01/confusing-messages-for-investors-and-multinationals-from-chinas-healthcare-reforms/>.
130. U.S.-China Business Council, "USCBC Economic Reform Scorecard," June 2014. http://uschina.org/sites/default/files/2014%20USCBC%20Economic%20Reform%20Scorecard_June_1.pdf.
131. Lester Ross, Kenneth Zhou, Tao Xu, "Reforms to China's Company Registration Law," Wilmer Hale, April 4, 2014. <http://www.wilmerhale.com/pages/publications/andnewsdetail.aspx?NewsPubId=17179872056>.
132. U.S.-China Business Council, "USCBC Economic Reform Scorecard," June 2014. http://uschina.org/sites/default/files/2014%20USCBC%20Economic%20Reform%20Scorecard_June_1.pdf.
133. Robert Zoellick, "The Aim of Xi's Reforms Is to Preserve Party Control," *Financial Times*, June 12, 2014. <http://www.ft.com/intl/cms/s/0/ee06f38c-efce-11e3-9b4c-00144feabdc0.html#axzz37AHCuOdw>.
134. Robert Zoellick, "The Aim of Xi's Reforms Is to Preserve Party Control," *Financial Times*, June 12, 2014. <http://www.ft.com/intl/cms/s/0/ee06f38c-efce-11e3-9b4c-00144feabdc0.html#axzz37AHCuOdw>.
135. Xinhua, "China Focus: Timetable Set for New Fiscal System: Minister," July 6, 2014. http://news.xinhuanet.com/english/china/2014-07/06/c_133463797.htm.
136. *Economist*, "Urbanization: Moving on Up," March 22, 2014. <http://www.economist.com/node/21599397/print>; Chris Buckley, "China Moves to Ease Home-Registration Rules in Urbanization Push," *New York Times*, July 30, 2014. <http://>

www.nytimes.com/2014/07/31/world/asia/with-urbanization-as-goal-china-moves-to-change-registration-rules.html.

137. *Economist*, “Urbanization: Moving on Up,” March 22, 2014. <http://www.economist.com/node/21599397/print>.

138. Chris Buckley, “China Moves to Ease Home-Registration Rules in Urbanization Push,” *New York Times*, July 30, 2014. <http://www.nytimes.com/2014/07/31/world/asia/with-urbanization-as-goal-china-moves-to-change-registration-rules.html>.

139. International Monetary Fund, *People’s Republic of China 2014 Article IV Consultation*, IMF Country Report No. 14/235, <http://www.imf.org/external/pubs/ft/scr/2014/cr14235.pdf>.

140. U.S. Census Bureau (Washington, DC: U.S. Department of Commerce, Foreign Trade Division). <http://www.census.gov/foreign-trade/statistics/country/>.

141. U.S. Census Bureau (Washington, DC: U.S. Department of Commerce, Foreign Trade Division). <http://www.census.gov/foreign-trade/statistics/country/>.

142. U.S. Department of the Treasury, “Report to Congress on International Economic and Exchange Rate Policies,” April 15, 2014. http://www.treasury.gov/resource-center/international/exchange-rate-policies/Documents/2014-4-15_FX%20REPORT%20FINAL.pdf.

143. U.S. Department of the Treasury, “Report to Congress on International Economic and Exchange Rate Policies,” April 15, 2014. http://www.treasury.gov/resource-center/international/exchange-rate-policies/Documents/2014-4-15_FX%20REPORT%20FINAL.pdf.

144. Fu Bilian, “RMB Depreciation: Response to U.S. Report; Domestic Impact,” Guoji Jinrong Bao Online, April 25, 2014. Open Source Center translation. ID: CHR 2014042546191297.

145. Josh Noble, “China’s Foreign Exchange Reserves Near Record \$4 Trillion,” *Financial Times*, April 15, 2014. <http://www.ft.com/intl/cms/s/0/4768bd3c-c461-11e3-8dd4-00144feabdc0.html>.

146. Josh Noble, “China’s Foreign Exchange Reserves Near Record \$4 Trillion,” *Financial Times*, April 15, 2014. <http://www.ft.com/intl/cms/s/0/4768bd3c-c461-11e3-8dd4-00144feabdc0.html>.

147. *Wall Street Journal*, “Yes, China Is Beginning to ‘Rebalance,’ But There’s a Long Way to Go,” July 17, 2014. <http://blogs.wsj.com/chinarealtime/2014/07/17/yes-china-is-beginning-to-rebalance-but-theres-a-long-way-to-go/>.

148. *Wall Street Journal*, “Yes, China Is Beginning to ‘Rebalance,’ But There’s a Long Way to Go,” July 17, 2014. <http://blogs.wsj.com/chinarealtime/2014/07/17/yes-china-is-beginning-to-rebalance-but-theres-a-long-way-to-go/>.

149. Nicholas Borst, *China Rebalancing Update—Q1 2014* (Peterson Institute for International Economics, April 29, 2014). <http://blogs.piie.com/china/?p=3875>.

150. Nicholas Borst, *China Rebalancing Update—Q1 2014* (Peterson Institute for International Economics, April 29, 2014). <http://blogs.piie.com/china/?p=3875>.

151. *Financial Times*, “China Has the World’s Best Consumer Story,” July 16, 2014. <http://blogs.ft.com/beyond-brics/2014/07/16/guest-post-china-has-the-worlds-best-consumer-story/#>.

152. *Financial Times*, “China Has the World’s Best Consumer Story,” July 16, 2014. <http://blogs.ft.com/beyond-brics/2014/07/16/guest-post-china-has-the-worlds-best-consumer-story/#>.

153. Jamil Anderlini, “China’s Debt to GDP Tops 250 Percent,” *Financial Times*, July 22, 2014. <http://www.ft.com/intl/cms/s/0/895604ac-10d8-11e4-812b-00144feabdc0.html>.

154. Daniel Rosen and Thilo Hanemann, *New Realities in the U.S.-China Investment Relationship* (Rhodium Group, April 29, 2014). <http://rhg.com/notes/new-realities-in-the-us-china-investment-relationship>.

155. Simon Denyer, “U.S. Companies Feel a Chill in China, Even as Many Still Rake in Profits,” *Washington Post*, July 4, 2014. http://www.washingtonpost.com/world/us-companies-feel-a-colder-wind-in-china-even-as-many-still-rake-in-profits/2014/07/03/dcbfa233-ee13-4e67-b791-3b3e38bca890_story.html.

156. Liyan Qi, Grace Zhu, Mark Magnier, Laurie Burkitt. “China Foreign Direct Investment at Four-Year Low,” *Wall Street Journal*, September 16, 2014. <http://online.wsj.com/articles/china-foreign-direct-investment-at-four-year-low-1410846696>.

157. Simon Denyer, “U.S. Companies Feel a Chill in China, Even as Many Still Rake in Profits,” *Washington Post*, July 4, 2014. http://www.washingtonpost.com/world/us-companies-feel-a-colder-wind-in-china-even-as-many-still-rake-in-profits/2014/07/03/dcbfa233-ee13-4e67-b791-3b3e38bca890_story.html.

158. Simon Denyer, “U.S. Companies Feel a Chill in China, Even as Many Still Rake in Profits,” *Washington Post*, July 4, 2014. http://www.washingtonpost.com/world/us-companies-feel-a-colder-wind-in-china-even-as-many-still-rake-in-profits/2014/07/03/dcbfa233-ee13-4e67-b791-3b3e38bca890_story.html.

159. Office of the U.S. Trade Representative, "Localization Barriers to Trade," <http://www.ustr.gov/trade-topics/localization-barriers>.
160. John Gong, "How Fair Is China's Crackdown on Anti-Monopoly Behaviour?" *South China Morning Post* (Hong Kong), August 9, 2013. <http://www.scmp.com/comment/insight-opinion/article/1295294/how-fair-chinas-crackdown-anti-monopoly-behaviour>.
161. U.S. Chamber of Commerce, "Competing Interests in China's Competition Law Enforcement," September 9, 2014. https://www.uschamber.com/sites/default/files/aml_final_090814_final_locked.pdf.
162. Michael Martina, "EU Lobby Piles in on Foreign Criticism of China's Antitrust Enforcement," Reuters, September 9, 2014. <http://uk.reuters.com/article/2014/09/09/uk-china-antitrust-eu-idUKKBN0H40SB20140909>.
163. U.S. Chamber of Commerce, "Competing Interests in China's Competition Law Enforcement," September 9, 2014. https://www.uschamber.com/sites/default/files/aml_final_090814_final_locked.pdf.
164. U.S.-China Business Council, "Competition Policy and Enforcement in China," September 2014. http://uschina.org/sites/default/files/AML%202014%20Report%20FINAL_0.pdf.
165. Michael Martina, "EU Lobby Piles in on Foreign Criticism of China's Antitrust Enforcement," Reuters, September 9, 2014. <http://uk.reuters.com/article/2014/09/09/uk-china-antitrust-eu-idUKKBN0H40SB20140909>.
166. U.S. Chamber of Commerce, "Competing Interests in China's Competition Law Enforcement," September 9, 2014. https://www.uschamber.com/sites/default/files/aml_final_090814_final_locked.pdf.
167. *Wall Street Journal*, "China Denies Using Antimonopoly Law to Target Foreign Companies," September 11, 2014. <http://online.wsj.com/articles/china-denies-using-antimonopoly-law-to-target-foreign-companies-1410429955>.
168. Simon Denyer, "As Cyber Rift Deepens, China Bans Use of Windows 8 on Government Computers," *Washington Post*, May 21, 2014. http://www.washingtonpost.com/world/asia_pacific/as-cyber-rift-deepens-china-bans-use-of-windows-8-on-government-computers/2014/05/21/11bdb4b6-597e-4afe-ba16-ce27afa7a7d7_story.html.
169. Zheng Peishan, "Microsoft's Ties with Government on Rocks as Offices in Four Cities Raided," *Caixin*, July 30, 2014. <http://english.caixin.com/2014-07-30/100710968.html>.
170. Reuters, "China State Media Calls for 'Severe Punishment' for Google, Apple, U.S. Tech Firms," June 4, 2014. <http://www.reuters.com/article/2014/06/04/china-usa-tech-idUSL3N0OL3N320140604>.
171. Ting Xu, *Don't Kill the Goose that Lays the Golden Eggs* (Center for Strategic & International Studies, PacNet 60, July 23, 2014). <http://csis.org/publication/pacnet-60-dont-kill-goose-lays-golden-eggs>.
172. Ting Xu, *Don't Kill the Goose that Lays the Golden Eggs* (Center for Strategic & International Studies, PacNet 60, July 23, 2014). <http://csis.org/publication/pacnet-60-dont-kill-goose-lays-golden-eggs>.
173. U.S.-China Business Council, "USCBC 2013 China Business Environment Survey Results," https://www.uschina.org/sites/default/files/USCBC%E2%80%942013Member%20Survey_1.pdf.
174. U.S.-China Business Council, "USCBC 2013 China Business Environment Survey Results," https://www.uschina.org/sites/default/files/USCBC%E2%80%942013Member%20Survey_1.pdf.
175. Reuters, "China June FDI Rises for 16th Straight Month," July 14, 2014. <http://uk.reuters.com/article/2014/07/15/china-economy-fdi-idUKL4N0PQ0KF20140715>.
176. Daniel Rosen and Thilo Hanemann, *New Realities in the U.S.-China Investment Relationship* (Rhodium Group, April 29, 2014). <http://rhg.com/notes/new-realities-in-the-us-china-investment-relationship>.
177. Daniel Rosen and Thilo Hanemann, *New Realities in the U.S.-China Investment Relationship* (Rhodium Group, April 29, 2014). <http://rhg.com/notes/new-realities-in-the-us-china-investment-relationship>.
178. David Marchick, *Fostering Greater Chinese Investment in the United States* (Council on Foreign Relations, February 2012). <http://www.cfr.org/china/fostering-greater-chinese-investment-united-states/p27310>.
179. U.S.-China Economic and Security Review Commission, *2013 Annual Report to Congress*, November 2013.
180. Nick Timiraos, "Foreigners Step up U.S. Home Purchases," *Wall Street Journal*, July 9, 2014. <http://online.wsj.com/news/articles/SB40001424052702304642804580017490191373632>.
181. Nick Timiraos, "Foreigners Step up U.S. Home Purchases," *Wall Street Journal*, July 9, 2014. <http://online.wsj.com/news/articles/SB40001424052702304642804580017490191373632>.

182. John Gittelsohn, “Chinese Cash-Bearing Buyers Drive U.S. Foreign Sales Jump,” Bloomberg, July 9, 2014. <http://www.bloomberg.com/news/2014-07-08/chinese-cash-bearing-buyers-drive-u-s-foreign-sales-jump.html>.

183. Lawrence Yun, Jed Smith, and Gay Cororaton, “2014 Profile of International Home Buying Activity,” National Association of Realtors, June 2014. <http://www.realtor.org/sites/default/files/2014%20Profile%20of%20International%20Home%20Buying%20Activity.pdf>.

184. Nick Timiraos, “Zillow to Offer Real Estate Listings to Chinese Portal,” *Wall Street Journal*, April 2, 2014. <http://online.wsj.com/news/articles/SB10001424052702303847804579477993029528798>.

185. John Gittelsohn, “Chinese Cash-Bearing Buyers Drive U.S. Foreign Sales Jump,” Bloomberg, July 9, 2014. <http://www.bloomberg.com/news/2014-07-08/chinese-cash-bearing-buyers-drive-u-s-foreign-sales-jump.html>.

186. Andrew Rice, “Stash Pad,” *New York Magazine*, June 29, 2014. <http://nymag.com/news/features/foreigners-hiding-money-new-york-real-estate-2014-6/?src=longreads>.

187. Juwai, “The Market,” Juawai.com, July 22, 2014.

188. Michelle Conlin and Maggie Lu Yueyang, “The Chinese Take Manhattan: Replace Russians as Top Apartment Buyers,” Reuters, April 25, 2014. <http://www.reuters.com/article/2014/04/25/us-realestate-china-manhattan-insight-idUSBREA300TL20140425>.

189. Andrew Rice, “Stash Pad,” *New York Magazine*, June 29, 2014. <http://nymag.com/news/features/foreigners-hiding-money-new-york-real-estate-2014-6/?src=longreads>.

190. John Gittelsohn, “Chinese Cash-Bearing Buyers Drive U.S. Foreign Sales Jump,” Bloomberg, July 9, 2014. <http://www.bloomberg.com/news/2014-07-08/chinese-cash-bearing-buyers-drive-u-s-foreign-sales-jump.html>.

191. U.S.-China Economic and Security Review Commission, “China and the World: Macau and Hong Kong,” *2013 Annual Report to Congress*, November 2013. http://origin.www.uscc.gov/sites/default/files/Annual_Report/Chapters/Chapter%203%3B%20Section%203%20Macau%20and%20Hong%20Kong.pdf.

192. Andrew Rice, “Stash Pad,” *New York Magazine*, June 29, 2014. <http://nymag.com/news/features/foreigners-hiding-money-new-york-real-estate-2014-6/?src=longreads>.

193. Andrew Rice, “Stash Pad,” *New York Magazine*, June 29, 2014. <http://nymag.com/news/features/foreigners-hiding-money-new-york-real-estate-2014-6/?src=longreads>.

194. Gu Yongqiang and Zhang Tao, “Mysteries of a Railways Minister’s Confidant,” *Caixin* (English edition), December 23, 2011. <http://english.caixin.com/2011-12-23/100341893.html>.

195. Heather Timmons, “Beijing Goes Hunting for Overseas Real Estate Bought with Dirty Money,” *Quartz*, November 5, 2013. <http://qz.com/143017/beijing-goes-hunting-for-overseas-real-estate-by-corrupt-officials/>.

196. U.S.-China Economic and Security Review Commission, *2013 Annual Report to Congress*, November 2013.

197. Xinhua, “Negative List Phase of BIT Negotiations Start between U.S., China,” *Want China Times* (Taiwan), July 11, 2014. <http://www.wantchinatimes.com/news-subclass-cnt.aspx?id=20140711000070&cid=1201&MainCatID=12>.

198. U.S. Department of the Treasury, *Sixth Meeting of the U.S.-China Strategic and Economic Dialogue U.S. Fact Sheet—Economic Track* (July 11, 2014). <http://www.treasury.gov/press-center/press-releases/Pages/jl2563.aspx>.

199. Kenneth Rapoza, “China Says U.S. Investment Treaty on ‘Fast Track,’” *Forbes*, July 10, 2014. <http://www.forbes.com/sites/kenrapoza/2014/07/10/china-says-u-s-investment-treaty-on-fast-track/2/>.

200. “U.S.-China S&ED Produces BIT Timeline, Few Other Concrete Outcomes,” *China Trade Extra*, July 11, 2014.

201. Derek Scissors, “Stop the U.S.-China Bilateral Investment Treaty (BIT) Talks,” *AEIdeas*, August 19, 2014. <http://www.aei-ideas.org/2014/08/stop-the-us-china-bilateral-investment-treaty-bit-talks/>.

202. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” April 4, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/April%202014%20Trade%20Bulletin.pdf>.

203. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” April 4, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/April%202014%20Trade%20Bulletin.pdf>.

204. World Trade Organization Dispute Settlement Body, *China—Measures Related to the Exportation of Rare Earths, Tungsten and Molybdenum*, WT/DS431/1, Request for Consultations Received March 13, 2012. http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds431_e.htm.

205. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” May 6, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/May%202014%20Trade%20Bulletin.pdf>.

206. Terence Stewart, Elizabeth Drake, and Ping Gong, “WTO Rules against China’s Export Restraints on Rare Earths,” Stewart and Stewart, March 26, 2014. <http://www.stewartlaw.com/ArticleViewArticle/989>.

207. Terence Stewart, Elizabeth Drake, and Ping Gong, “WTO Rules against China’s Export Restraints on Rare Earths,” Stewart and Stewart, March 26, 2014. <http://www.stewartlaw.com/ArticleViewArticle/989>.

208. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” June 4, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/June%202014%20Trade%20Bulletin.pdf>.

209. World Trade Organization, *China—Anti-Dumping and Countervailing Duties on Certain Automobiles from the United States*, Dispute DS440. http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds440_e.htm.

210. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” June 4, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/June%202014%20Trade%20Bulletin.pdf>.

211. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” June 4, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/June%202014%20Trade%20Bulletin.pdf>.

212. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” June 4, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/June%202014%20Trade%20Bulletin.pdf>. <http://www.ustr.gov/sites/default/files/05232014-China%20Auto-Fact-sheet.pdf>.

213. Office of the U.S. Trade Representative, “2013 Report to Congress on China’s WTO Compliance,” December 2013. <http://www.ustr.gov/sites/default/files/2013-Report-to-Congress-China-WTO-Compliance.pdf>.

214. International Trade Administration, *Fact Sheet: Commerce Preliminarily Finds Countervailable Subsidization of Imports of Certain Crystalline Silicon Photovoltaic Products from the People’s Republic of China* (June 3, 2014). <http://enforcement.trade.gov/download/factsheets/factsheet-prc-crystalline-silicon-photovoltaic-prod-cvd-prelim-060314.pdf>.

215. Biman Mukherji, “U.S. Hits China Solar Firms,” *Wall Street Journal*, August 1, 2014. http://online.wsj.com/articles/u-s-hits-china-solar-firms-1406882738?mod=asia_home.

216. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” June 4, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/June%202014%20Trade%20Bulletin.pdf>.

217. U.S.-China Economic and Security Review Commission, “Monthly Analysis of U.S.-China Trade Data,” June 4, 2014.

218. Keith Johnson and Cassandra Sweet, “Solar Trade Fight Flares Up,” *Wall Street Journal*, March 20, 2012. <http://online.wsj.com/news/articles/SB10001424052702304724404577293660723773198>.

219. China’s claims relate to the imposition or collection of duties in connection with investigations or reviews initiated between November 20, 2006 and March 13, 2012. For a full list, see WTO, “United States—Countervailing and Antidumping Measures on Certain Products from China,” request for consultations by China, WTO WT/DS449/1 (Geneva, Switzerland: September 20, 2012). https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-Html.aspx?Id=53282&BoxNumber=3&DocumentPartNumber=1&Language=E&Window=L&PreviewContext=DP&FullTextSearch=#KV_GENERATED_FILE_000007.htm.

220. CSIS, *Net Losses: Estimating the Global Cost of Cybercrime* (Center for Strategic and International Studies, June 2014), pp. 3, 21. http://csis.org/files/attachments/140609_rp_economic_impact_cybercrime_report.pdf; McAfee and CSIS, “The Economic Impact of Cybercrime and Cyber Espionage,” McAfee, 2013, <http://www.mcafee.com/us/resources/reports/rp-economic-impact-cybercrime.pdf>.

221. U.S. Department of Justice, “U.S. Charges Five Chinese Military Hackers for Cyber Espionage Against U.S. Corporations and a Labor Organization for Commercial Advantage,” May 19, 2014. <http://www.justice.gov/opa/pr/2014/May/14-ag-528.html>.

222. Mandiant, *APT1: Exposing One of China’s Cyber Espionage Units* (Mandiant, February 2013), p. 52. http://intelreport.mandiant.com/Mandiant_APT1_Report.pdf.

223. Indictment, *United States v. Wang Dong*, No. 14–118 (W.D. Pa. May 1, 2014), pp. 1–2. <http://www.justice.gov/iso/opa/resources/5122014519132358461949.pdf>.

224. Krista Hughes, “SolarWorld Seeks Probe into Claims of Chinese Cyber-spying,” Reuters, July 1, 2014. <http://www.reuters.com/article/2014/07/01/us-usa-trade-solar-idUSKBN0F65KL20140701>.

225. China’s Ministry of Foreign Affairs, “Foreign Ministry Spokesperson Hong Lei’s Regular Press Conference on May 21, 2014,” May 21, 2014. http://www.fmprc.gov.cn/mfa_eng/xuifu_665399/s2510_665401/2511_665403/t1158256.shtml.

226. China's Ministry of Foreign Affairs, "China Reacts Strongly to U.S. Announcement of Indictment against Chinese Personnel," May 19, 2014. http://www.fmprc.gov.cn/mfa_eng/xwfw_665399/vs2510_665401/2535_665405/t1157487.shtml; Ting Shi and Michael Riley, "China Halts Cybersecurity Cooperation after U.S. Spying Charges," Bloomberg, May 20, 2014. <http://www.bloomberg.com/news/2014-05-20/china-suspends-cybersecurity-cooperation-with-u-s-after-charges.html>.

227. Shannon Tiezzi, "In Cyber Dispute with US, China Targets IBM, Cisco," *Diplomat* (Tokyo), May 28, 2014. <http://thedi diplomat.com/2014/05/in-cyber-dispute-with-us-china-targets-ibm-cisco/>; Cao Yin, "Checks to Help Ensure Cybersecurity," *China Daily*, May 23, 2014. http://usa.chinadaily.com.cn/china/2014-05/23/content_17535124.htm.

228. "China Said to Study IBM Servers for Bank Security Risks," Bloomberg, May 27, 2014. <http://www.bloomberg.com/news/2014-05-27/china-said-to-push-banks-to-remove-ibm-servers-in-spy-dispute.html>.

229. Jamil Anderlini, "China Clamps Down on US Consulting Groups," *Financial Times*, May 25, 2014. <http://www.ft.com/intl/cms/s/0/310d29ea-e263-11e3-89fd-00144feabdc0.html?siteedition=intl#axzz32VG5zYGW>.

230. U.S. Department of Justice, "U.S. Charges Five Chinese Military Hackers for Cyber Espionage against U.S. Corporations and a Labor Organization for Commercial Advantage," May 19, 2014. <http://www.justice.gov/opa/pr/2014/May/14-ag-528.html>.

231. Indictment, *United States v. Wang Dong*, No. 14–118 (W.D. Pa. May 1, 2014), pp. 1–2. <http://www.justice.gov/iso/opa/resources/5122014519132358461949.pdf>.

232. Indictment, *United States v. Wang Dong*, No. 14–118 (W.D. Pa. May 1, 2014), pp. 1–2. <http://www.justice.gov/iso/opa/resources/5122014519132358461949.pdf>.

233. Mandiant, *APT1: Exposing One of China's Cyber Espionage Units* (Mandiant, February 2013), p. 22. http://intelreport.mandiant.com/Mandiant_APT1_Report.pdf.

234. Steven Mufson, "Why Were This Company's Computers Attacked Millions of Times This Year? Algae," *Washington Post*, July 12, 2014. http://m.washingtonpost.com/business/economy/why-were-this-companys-computers-attacked-millions-of-times-this-year-algae/2014/07/10/ac4df98c-f59a-11e3-a3a5-42be35962a52_story.html.

235. Steven Mufson, "Why Were This Company's Computers Attacked Millions of Times This Year? Algae," *Washington Post*, July 12, 2014. http://m.washingtonpost.com/business/economy/why-were-this-companys-computers-attacked-millions-of-times-this-year-algae/2014/07/10/ac4df98c-f59a-11e3-a3a5-42be35962a52_story.html.

236. Steven Mufson, "Why Were This Company's Computers Attacked Millions of Times This Year? Algae," *Washington Post*, July 12, 2014. http://m.washingtonpost.com/business/economy/why-were-this-companys-computers-attacked-millions-of-times-this-year-algae/2014/07/10/ac4df98c-f59a-11e3-a3a5-42be35962a52_story.html.

237. World Trade Organization, "Fifth Trade Policy Review: China," July 3, 2014. http://www.wto.org/english/tratop_e/tpr_e/s300_sum_e.pdf.

238. China Trade Extra, "U.S. Blasts China's System Secrecy on Subsidies, Discriminatory Trade Policies," July 2, 2014. <http://chinatradeextra.com/201407022475888/China-Trade-Extra-General/Daily-News/us-blasts-chinas-systemic-secrecy-on-subsidies-discriminatory-trade-policies/menu-id-428.html>.

239. China Trade Extra, "U.S. Blasts China's System Secrecy on Subsidies, Discriminatory Trade Policies," July 2, 2014. <http://chinatradeextra.com/201407022475888/China-Trade-Extra-General/Daily-News/us-blasts-chinas-systemic-secrecy-on-subsidies-discriminatory-trade-policies/menu-id-428.html>.

240. China Trade Extra, "U.S. Blasts China's System Secrecy on Subsidies, Discriminatory Trade Policies," July 2, 2014. <http://chinatradeextra.com/201407022475888/China-Trade-Extra-General/Daily-News/us-blasts-chinas-systemic-secrecy-on-subsidies-discriminatory-trade-policies/menu-id-428.html>.

241. U.S.-China Economic and Security Review Commission, "Monthly Analysis of U.S.-China Trade Data," July 3, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/July%202014%20Trade%20Bulletin.pdf>.

242. China Trade Extra, "U.S. Blasts China's System Secrecy on Subsidies, Discriminatory Trade Policies," July 2, 2014. <http://chinatradeextra.com/201407022475888/China-Trade-Extra-General/Daily-News/us-blasts-chinas-systemic-secrecy-on-subsidies-discriminatory-trade-policies/menu-id-428.html>.

243. U.S.-China Economic and Security Review Commission, "Monthly Analysis of U.S.-China Trade Data," July 3, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/July%202014%20Trade%20Bulletin.pdf>.

244. U.S.-China Economic and Security Review Commission, "Monthly Analysis of U.S.-China Trade Data," July 3, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/July%202014%20Trade%20Bulletin.pdf>.

245. U.S.-China Economic and Security Review Commission, "Monthly Analysis of U.S.-China Trade Data," July 3, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/July%202014%20Trade%20Bulletin.pdf>.
246. U.S.-China Economic and Security Review Commission, "Monthly Analysis of U.S.-China Trade Data," July 3, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/July%202014%20Trade%20Bulletin.pdf>.
247. U.S.-China Economic and Security Review Commission, "Monthly Analysis of U.S.-China Trade Data," July 3, 2014. <http://origin.www.uscc.gov/sites/default/files/Research/July%202014%20Trade%20Bulletin.pdf>.
248. James Parker, "China Asks to Join the Trade in Services Agreement Talks," *Diplomat* (Tokyo), October 11, 2013. <http://thediplomat.com/2013/10/china-asks-to-join-the-trade-in-services-agreement-talks/>.
249. James Parker, "China Asks to Join the Trade in Services Agreement Talks," *Diplomat* (Tokyo), October 11, 2013. <http://thediplomat.com/2013/10/china-asks-to-join-the-trade-in-services-agreement-talks/>.
250. Iacob Koch-Weser, *Should China Join the WTO's Services Agreement?* (U.S.-China Economic and Security Review Commission, March 11, 2014). <http://origin.www.uscc.gov/sites/default/files/Research/>.
251. Iacob Koch-Weser, *Should China Join the WTO's Services Agreement?* (U.S.-China Economic and Security Review Commission, March 11, 2014). <http://origin.www.uscc.gov/sites/default/files/Research/>.
252. Iacob Koch-Weser, *Should China Join the WTO's Services Agreement?* (U.S.-China Economic and Security Review Commission, March 11, 2014). <http://origin.www.uscc.gov/sites/default/files/Research/>.
253. U.S. Energy Information Administration, "South China Sea," EIA, February 7, 2013. http://www.eia.gov/countries/analysisbriefs/South_China_Sea/south_china_sea.pdf.
254. Bloomberg, "Energy & Oil Prices," Bloomberg, June 4, 2014. <http://www.bloomberg.com/energy/>.
255. U.S. Energy Information Administration, "East China Sea," EIA, September 25, 2012. <http://www.eia.gov/countries/regions-topics.cfm?fips=ECS>.
256. Bloomberg, "Energy & Oil Prices," Bloomberg, June 4, 2014. <http://www.bloomberg.com/energy/>.
257. Eva Pejsova, *The South China Sea's Commons: Behind and Beyond Sovereignty Disputes* (European Union Institute for Security Studies, May 2014). http://www.iss.europa.eu/uploads/media/Alert_30_South_China_Sea.pdf.
258. Manuel Mogato, "Philippines Calls for Construction Freeze in South China Sea," Reuters, May 16, 2014. <http://www.reuters.com/article/2014/06/16/us-philippines-southchinasea-idUSKBN0ER0LE20140616>.
259. Bonnie S. Glaser, "Armed Clash in the South China Sea" (Council on Foreign Relations, April 2012). <http://www.cfr.org/world/armed-clash-south-china-sea/p27883>.
260. U.S. Census Bureau, "U.S. International Trade in Goods and Services December 2012," U.S. Department of Commerce, February 8, 2014. <http://www.bea.gov/newsreleases/international/trade/2013/pdf/trad1212.pdf>.

SECTION 2: U.S.-CHINA BILATERAL TRADE AND ECONOMIC CHALLENGES

Introduction

The U.S.-China trade and economic relationship grows larger—and more unbalanced—with each passing year. China became the world's largest trading nation in 2013, overtaking the United States to register a record \$4.16 trillion in total exports and imports.¹ Like a mirror image of the United States, China's trade ledger was heavily weighted toward exports over imports. China enjoyed a global surplus of \$260 billion and a surplus with the United States of \$318.4 billion. As of the end of August, the U.S. trade deficit with China already stood at \$216 billion, about \$8.5 billion more than that time last year.² At this pace, the 2014 deficit will reach a historic high.

U.S. exports to China have grown—fourfold in the last decade—and China has become America's third largest export market, behind neighbors Canada and Mexico.³ The United States shipped \$120 billion worth of goods to China in 2013, a 7 percent increase over 2012.⁴ In 2014, U.S. exports to China also increased, totaling \$68 billion through the end of July, a 7 percent increase over the same period in 2013.⁵ But the value of imports from China still dwarfs the value of our exports to China.⁶ Americans turn to China to purchase computer and communications equipment, and apparel. China's main purchases from the United States are oil seeds, aircraft and parts, as well as waste and scrap. China thus has the benefit of selling more value-added goods, which tend to employ more workers at higher pay in the production process than does the marketing of commodities or lower value-added goods. Consequently, a growing percentage of the U.S. trade deficit also involves high-tech merchandise. The United States ran a \$116.8 billion deficit in advanced technology trade with China in 2013.⁷ In short, Chinese exports to the United States are contributing to an increasingly sophisticated labor market while U.S. exports to China are falling short both in volume and in labor market value. Table 1 and Table 2 show top U.S. imports from China and exports to China between 2009 and 2013.

Table 1: Total and Top U.S. Imports from China, 2009–2013
(US\$ millions)

Year	2009	2010	2011	2012	2013	Percent Change 2009–2013	Percent Change 2012–2013
Total Imports from China	296,402	364,944	399,335	425,644	440,434	48.5%	3.50%
Computer Equipment	44,818	59,800	68,276	68,815	68,123	51.9%	–0.10%
Communications Equipment	26,362	33,464	39,806	51,857	58,839	123%	13.50%
Miscellaneous Manufactured Commodities	30,668	34,168	32,672	32,644	32,440	5.7%	–0.60%
Apparel	22,669	26,603	27,554	26,926	27,410	21%	1.80%
Semiconductors and Other Electronic Components	12,363	18,263	19,835	19,012	19,363	56.7%	1.80%

Source: U.S. International Trade Commission DataWeb and Wayne M. Morrison, *China-U.S. Trade Issues* (Congressional Research Service, February 10, 2014).

Table 2: Total and Top U.S. Exports to China, 2009–2013
(US\$ millions)

Year	2009	2010	2011	2012	2013	Percent Change 2009–2013	Percent Change 2012–2013
Total Exports to China	69,576	91,878	103,879	110,590	122,016	75.4%	10.30%
Oilseeds and Grains	9,376	11,208	11,500	16,546	16,092	76.4%	–2.70%
Aerospace Products and Parts	5,344	5,766	6,392	8,367	12,620	36.4%	50.80%
Waste and Scrap	7,142	8,561	11,540	9,526	8,765	22.7%	–8.00%
Motor Vehicles	1,134	3,515	5,369	5,788	8,614	660%	48.80%
Navigational, Measuring, Electromedical, and Controlling Instruments	2,917	3,782	4,275	5,153	5,732	96.5%	11.20%

Source: U.S. International Trade Commission DataWeb and Wayne M. Morrison, *China-U.S. Trade Issues* (Congressional Research Service, February 10, 2014).

Meanwhile, a rapidly growing stream of Chinese direct investment is flowing into the United States, which currently totals \$35.9 billion. More than \$14 billion of this amount was contributed in 2013 alone, and \$8 billion in the first quarter of 2014.⁸ In 2014, the relationship between the two countries reached a milestone as

Chinese direct investment into the United States began to surpass U.S. direct investment into China.⁹ Despite this recent change, China is not among the top sources of foreign direct investment in the United States. The top nine sources—the United Kingdom, Japan, the Netherlands, Canada, France, Switzerland, Luxembourg, Germany, and Belgium—collectively account for more than 80 percent of the total stock of foreign direct investment in the United States, while China, with less than 1 percent, is just one of 150 other countries that collectively account for the remainder.¹⁰ However, China is the fastest growing source of foreign direct investment (FDI) globally, and in the United States, and its global outbound investment is expected to continue to grow exponentially in the years to come.¹¹

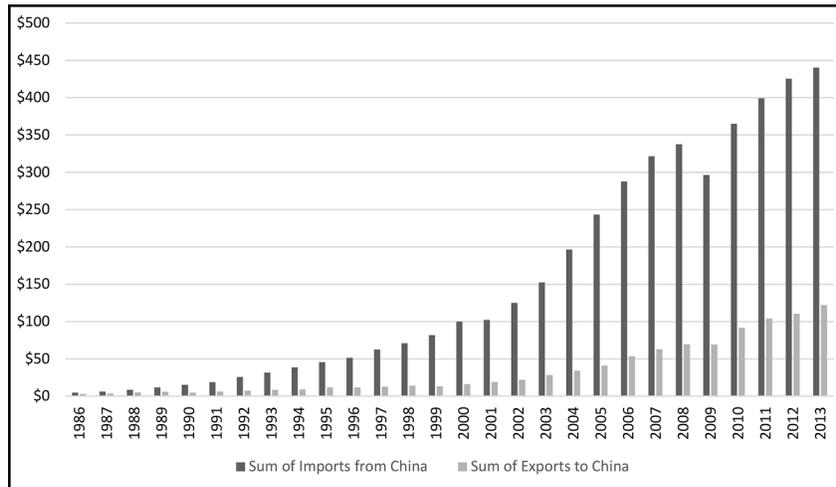
This section draws on the Commission’s February 21, 2014, public hearing on U.S.-China economic challenges. It advances the Commission’s continuing assessment of the impact of U.S.-China trade on U.S. employment and investment. It examines the effectiveness of U.S. diplomacy and the sufficiency of enforcement efforts in attempting to bring greater balance to the trading relationship. Finally, it assesses the motives and incentives driving Chinese investment in the United States and forecasts the potential impacts of this investment flow on U.S. labor markets.

The Impact of Bilateral Trade on U.S. Employment

Sizing up the Deficit

U.S.-China bilateral trade reached a new peak of \$562 billion in 2013, but China shipped nearly four dollars’ worth of goods to the United States for every dollar’s worth of imports it purchased from the United States.¹² The resulting U.S. trade deficit with China set a record for the fourth straight year.¹³ This deficit, non-existent three decades ago, is now the largest bilateral deficit in the world and three times the size of the second largest deficit, with Japan.¹⁴ Figure 1 illustrates the rise in the U.S.-China trade deficit between 1986 and 2013.

Figure 1: U.S. Trade Deficit with China: Annual 1986–2013
(US\$ billions)



Source: United States Census Bureau. <http://www.census.gov/foreign-trade/balance/c5700.html#2006>.

China's trade surplus in goods with the United States last year represented 41 percent of America's total global deficit in goods of \$703 billion.¹⁵ The size of the overall trade deficit—and the bilateral trade deficit with China in particular—is a perennial source of concern in the U.S. about “declining competitiveness, job losses, and unfair trade practices by Chinese companies.”¹⁶ In a February 2014 press release, Alliance for American Manufacturing President Scott Paul blamed the U.S. trade deficit with China for “a shrinking middle class” and “fewer good job opportunities,” and described the deficit as “further proof that our economic policies—including a lack of enforcement of existing trade laws—contribute to outsourcing.”¹⁷ A 2012 Gallup poll found that a majority of Americans (66 percent) believe the trade deficit with China is a major barrier in the bilateral relationship, and 52 percent of Americans see China's economy as a critical threat to U.S. vital interests in the future.¹⁸

Yet some economic theories support the opposite conclusion: that trade creates jobs overall when nations specialize in producing goods in categories where they enjoy an advantage due, perhaps, to an abundance of natural resources or transportation routes. Even where no actual advantage exists in any particular good, according to David Ricardo's classic economic theory a “comparative advantage” falls to the nation that is able to specialize in production.¹⁹ The Organization for Economic Cooperation and Development (OECD), for example, argues that “liberalized trade is an engine for job creation in all countries.”²⁰ The United States International Trade Administration (ITA) cites statistical evidence that exports supported the creation of 1.6 million jobs between 2009 and 2013. This perspective on trade, however, assumes that nations follow generally accepted international trade rules, are market ori-

ented and not dominated by state-owned enterprises, and that commercial ventures are not provided lavish government subsidies or government protection from imports. Such is not the case with China, whose longstanding industrial policies call for running large trade surpluses by discriminating against imports in favor of domestically produced goods.* China hurts the U.S. economy “by undermining our comparative advantage,” notes Derek Scissors, an economist at the American Enterprise Institute. He notes that China protects its domestic industries by blocking some U.S. exports. The Chinese government also “reserves large parts of its market for state-owned enterprises” which compete unfairly. Finally, as the world’s “biggest thief” of American intellectual property, China “undermines our biggest advantage in trade,” says Dr. Scissors.²¹

Economic Policy Institute economist Robert Scott told the Commission at its February 21 hearing that while exports support U.S. jobs, imports undermine jobs in import-sensitive industries and in related industries. Thus, Scott contends, while trade can create jobs, it is “the trade balances—the net of exports and imports—that determine the number of jobs created or displaced by trade agreements.” Dr. Scott argues that if liberalized trade relations do not raise exports more than imports, there will not be a net job gain.²² Although the extent to which growing bilateral trade deficits have shifted jobs from the United States to China is unclear, Dr. Scott believes as many as 2.4 million American jobs have been lost or displaced as a result of China joining the World Trade Organization (WTO) in 2001.²³ This would represent a significant portion of the 3.6 million reduction in manufacturing jobs in the United States since December 2001.²⁴

Other economists disagree as to the extent to which trade with China is responsible for U.S. job losses. According to the Chicago Council’s Philip Levy, equating a given value of trade with a given number of jobs is a “popular—and deeply flawed—shortcut.” He points out that Dr. Scott’s analysis assumes any imports that did not come from China would be replaced with U.S. production even though there is much reason to believe that production would simply shift to other countries where it could be done more cheaply than it can be done here at home.²⁵ But Dr. Scott is not an outlier in his conclusion that the economic relationship has cost American jobs, especially in the manufacturing sector. Yale economist and Commission witness Peter Schott published a National Bureau of Economic Research study in 2013 demonstrating that closer trade relations with China have depressed American manufacturing job growth.²⁶ Dr. Schott’s findings are corroborated by an earlier study led by Massachusetts Institute of Technology economist David Autor, which found that “increased exposure to low-income-country imports [such as those from China] is associated with rising unemployment, decreased labor-force participation, and increased use of disability and other benefits, as well as with lower wages.”²⁷ Yet even as some critics decry the costs of U.S.-China trade, proponents counter that China is a source of affordable goods for American

*For further descriptions of China’s industrial policies, see the U.S.-China Economic and Security Review Commission’s *2012 Annual Report to Congress*, Chapter 1, Section 3, “The Evolving U.S.-China Trade and Investment Relationship,” p. 82.

consumers, which raises their buying power. Proponents of trade agreements with China also note China's growing significance as an export market for U.S. goods, and the opportunities for U.S.-based companies to invest in the Chinese market. In 2013 alone, U.S. companies invested \$3.4 billion in China.*

Gross vs. Value-Added Measurements of Trade

One view is that different stories are borne out by different calculations. The WTO and the OECD argue that traditional trade data distorts our understanding of bilateral trade balances.²⁸ They advocate the use of value-added measurements of trade, which have the effect of reducing the U.S. trade deficit with China. This accounting methodology was highlighted in the February 21 hearing discussion of value added, a topic that has garnered growing attention in recent years and was taken up in depth by the Commission in 2012.† Whereas traditional measurements of trade attribute the entire value of a good to the country in which it last underwent processing, value-added measurements account specifically for the value contributed to the good while in that country. Although China is the final assembly place for many goods exported to the United States, it often adds comparatively little value to those goods. Applying value-added measurements to the bilateral trade relationship could reduce the perceived deficit with China by approximately 25 percent, according to the WTO and the OECD.²⁹ These measurements particularly impact perceptions where high-tech goods are concerned, because technology goods tend to be high-value, but China may add only marginal labor-assembly value to the high-tech goods it exports.³⁰

Because value-added measurements of the deficit portray the trade imbalance as much smaller than is suggested by traditional measurements, it might be assumed that the damage sustained by the U.S. labor market has been overstated as well. But value-added measurements of trade do not alter the overall trade deficit. They merely reapportion responsibility among the surplus countries. Regardless of how the bilateral trade balance is measured, U.S. employment in some sectors has clearly declined as trade with China has increased. The negative impact the trade relationship has had on employment in those sectors is not diminished by the lower deficit estimates that value-added measurements produce. In fact, as Dr. Schott noted, in the U.S. manufacturing sector, value added has increased even as employment has declined. This means the percentage of total value a country adds to its goods is not necessarily a reflection of the health of its labor market.³¹ U.S. manufacturers appear in some instances to have increased value added by applying more efficient technologies and simultaneously cutting workers—reducing jobs while increasing their share of the total production process precisely to improve their ability to compete

* See "China 2013 Foreign Investment Inflows Hit Record High," Reuters, January 16, 2014. <http://www.reuters.com/article/2014/01/16/us-china-economy-fdi-idUSBREA0F0E120140116>; Derek Scissors, *The U.S. and China: Jobs, Trade, and More* (Heritage Foundation, October 11, 2012). <http://www.heritage.org/research/reports/2012/10/the-us-and-china-jobs-trade-and-more>; and "Shades of Grey: Ten Years of China in the WTO," *The Economist*, December 10, 2011. <http://www.economist.com/node/21541408>.

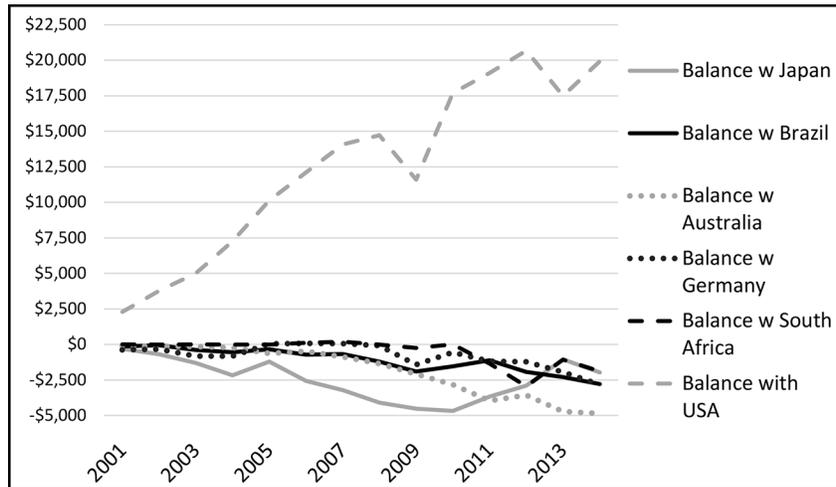
† See the U.S.-China Economic and Security Review Commission's *2012 Annual Report to Congress*, Chapter 1, Section 3.

with China.³² Furthermore, increased value added is often achieved by more skilled and more highly paid workers, so these developments have been a boon to some American workers, but they have nevertheless translated to fewer American jobs overall.

Permanent Normal Trade Relations (PNTR) and China's WTO Accession

Some analysts maintain that a contributing factor in the development of the trade imbalance was the decision to allow China to join the WTO in 2001 without making it first fully commit to removing all barriers to imports.* While U.S. manufacturing employment has long been in decline, and has dropped 34 percent from its peak in the 1970s, China's WTO entry and initial membership years coincided with a particularly precipitous dip.³³ Dr. Schott noted in his testimony that there was an 18 percent drop in U.S. manufacturing employment from March 2001 to March 2007. Dr. Scott calculates that "since China entered the WTO in 2001, job losses have increased to an average of 353,000 per year."³⁴ China currently holds bilateral trade deficits with Australia, Germany, and Japan.³⁵ The European Union's trade deficit with China declined from \$236 billion in 2008 to \$182 billion in 2013.³⁶ Yet, China's trade surplus with the United States continues to grow. Figure 2 illustrates the growth of the U.S. trade deficit with China over time, as compared to surpluses with China maintained by developed nations on each of the other continents.

Figure 2: China's Monthly June Bilateral Trade Balance with the United States vs. Other Developed Nations, 2001-2014
(US\$ millions)



Dr. Schott's research indicates that the U.S. decision to grant permanent normal trade relations (PNTR), which paved the way for China to join the WTO and receive most-favored nation status

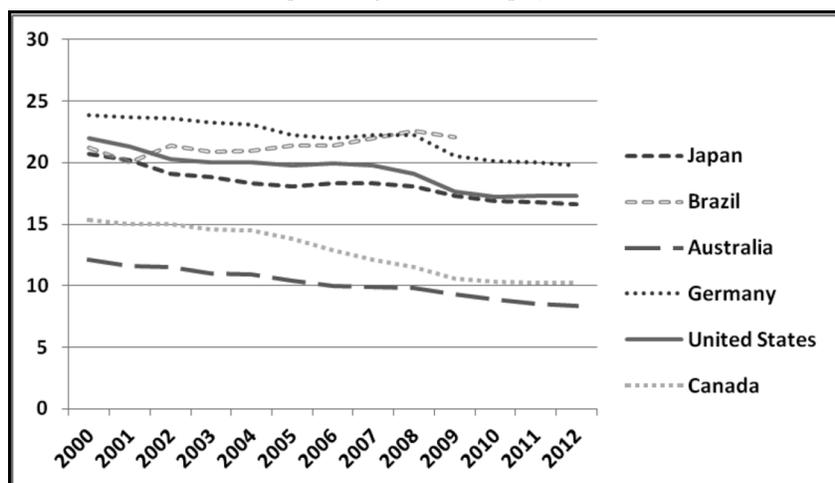
* See for example David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013).

(MFN),* led to the 18 percent U.S. employment drop in the ensuing years. According to Dr. Schott, a clear correlation exists between the jobs dip and the U.S. granting PNTR to China, which preceded China's entry into the WTO.³⁷ Once China had permanent MFN status and WTO membership, the yearly voting requirement ended, and U.S.-based corporations could invest in China with confidence that Congress would not revoke China's MFN status, which would have raised tariffs on Chinese exports to the United States. With the uncertainty removed, foreign investment in China climbed dramatically, funding foreign-invested factories and jobs producing exports bound for the United States and Europe. In 2012, China surpassed the United States to become the world's top destination for FDI.³⁸ FDI into China rose from \$40 billion per year in 1999³⁹ to \$95 billion in 2009 and \$117.59 billion in 2013.⁴⁰ Since China joined the WTO, foreign-invested enterprises have accounted for between 45 and 60 percent of Chinese exports annually.⁴¹ In recent years, the United States has consistently ranked as China's fifth-largest source of FDI, behind Hong Kong, Taiwan, Singapore, and Japan. China's Ministry of Commerce reported U.S. FDI into China of \$3.35 billion in 2013.⁴² In 2013, an estimated 55 percent of all exports from China to the United States were from foreign-invested enterprises—80 percent in the case of advanced technology products.⁴³

As Chinese imports rose, U.S. employment fell across a range of manufacturing sectors, but this impact was most dramatic in those U.S. industries where tariffs had previously stood to rise most significantly if Congress did not renew annual MFN rates. According to Dr. Schott, it was this "ending of the possibility of sudden spikes in Chinese import tariffs that likely strengthened import competition and suppressed U.S. employment growth."⁴⁴ Dr. Schott notes that the "very large" decline in U.S. manufacturing was more precipitous in the 2001 to 2007 period than in response to the 2008 international economic crisis.⁴⁵ "In absolute levels, manufacturing employment is kind of sideways until you get to about (2001) and then it falls off a cliff," he testified. Figure 3 indicates the declines in the percentage of manufacturing employment since 2000 in several of China's major trading partner countries.

* MFN or PNTR, as it came to be known. China was provided permanent most-favored nation status by Congress as part of its successful efforts to negotiate the terms of its entry into WTO membership. Previously, the administration could grant temporary MFN status each year under the terms of the Jackson-Vanik Amendment (Section 401, Title IV of the Trade Act of 1974, P.L. 93-618) that governed U.S. trade relations with communist countries that restrict freedom of emigration and other human rights. While successive administrations granted China annual waivers from the Jackson-Vanik Amendment, Congress each year debated rescinding the waiver, as provided for in the Amendment. The debate in Congress became particularly heated after the 1989 massacre of students and prodemocracy protestors at Tiananmen Square. But Congress never succeeded in revoking the administration's yearly grant of temporary MFN status to China. After a debate in which supporters championed the benefits of China's WTO accession, the House approved PNTR for China on May 24, 2000. The Senate gave its approval in September 2000.

Figure 3: Comparative Declines in Manufacturing Jobs in Countries Trading with China, 2000–2012
(as percentage of total employment)



Source: "Brazil: Distribution of Employment by Economic Sector from 1999 to 2011," Statista. <http://www.statista.com/statistics/271042/employment-by-economic-sector-in-brazil/>; Federal Reserve Bank of St. Louis.

The granting of permanent MFN status also had three other effects which drove down employment in the United States, according to Dr. Schott. China's new MFN status encouraged more U.S. businesses to outsource their manufacturing to Chinese subcontractors. This trend was already underway in low value-added manufacturing, such as clothing and shoes, but it accelerated, particularly in the field of electronics. In addition, Chinese manufacturers were also reassured by the granting of permanent MFN status that they could count on the United States as a more reliable market. With the advantage of lower labor costs, lower costs of capital due to below-market rate loans from state-owned banks, and with other government tax inducements to export, Chinese manufacturers responded to the call to increase exports.⁴⁶

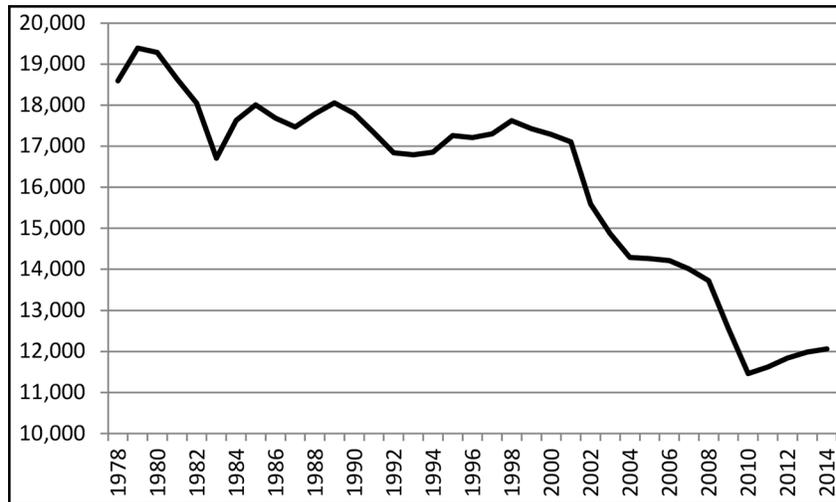
Finally, U.S.-based manufacturers who elected to maintain production in the United States felt comfortable doing so if they were able to cut production costs in domestic plants—often by automating to reduce labor costs. "U.S. manufacturers both used technology that substituted away from workers to make the things that they were making before, but they also substituted out of labor intensive manufacturing and into the higher-value-added [sectors] that you think the U.S. has a comparative advantage in, as is completely predicted by most views of trade," said Dr. Schott.⁴⁷

Among other indirect causes of declining employment in U.S. manufacturing brought on by China's WTO membership were the provisions for limiting foreign investment in certain manufacturing operations in China, according to the testimony of Oded Shenkar, an Ohio State University economist who has studied the effects on the U.S. automobile industry of trade with China. Dr. Shenkar pointed to a Chinese prohibition on majority ownership of auto

plants in China as one cause for U.S. job losses. The prohibition facilitated Chinese efforts to obtain process technology in vehicle manufacturing because foreign firms interested in participating in the Chinese auto industry were forced to bid on the chance to become minority shareholders in joint ventures with Chinese companies, often with contractual obligations to share their technology with the Chinese partner and to assist the partner in developing a Chinese car brand. “The Chinese have done a remarkable job of absorbing this technology ... and they are now ready to take it to the next level,” he said. “We are entering an imitation age, meaning that it is easier to imitate, it is more beneficial to imitate.”⁴⁸ As a result, China has quickly developed a sophisticated vehicle manufacturing capability that could supply most of the Chinese market without imports from North America or Europe.

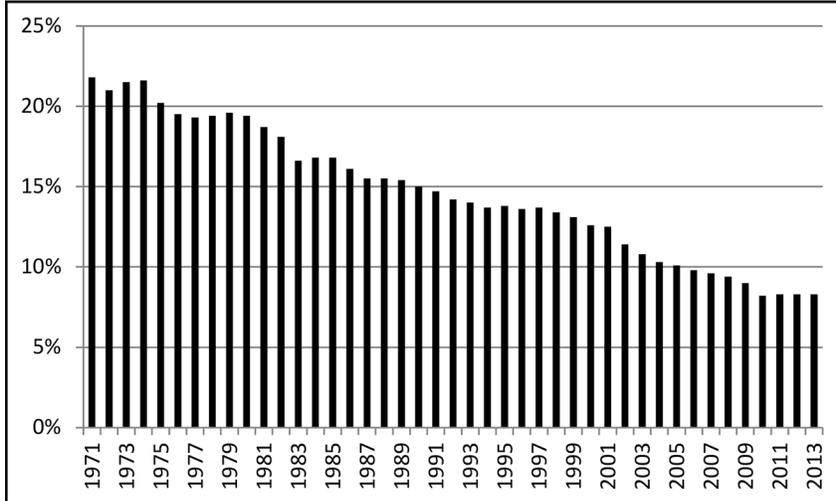
Figure 4 and Figure 5 show the decline of U.S. manufacturing jobs and the growth of the U.S. trade deficit with China since the late 1970s. As a percentage of total U.S. employment, manufacturing jobs have dropped from 21.8 percent in 1971 to 8.3 percent in 2013.⁴⁹ Figure 6 shows how the U.S. trade deficit with China has grown over time.

Figure 4: U.S. Manufacturing Jobs in Thousands, January 1978–January 2014



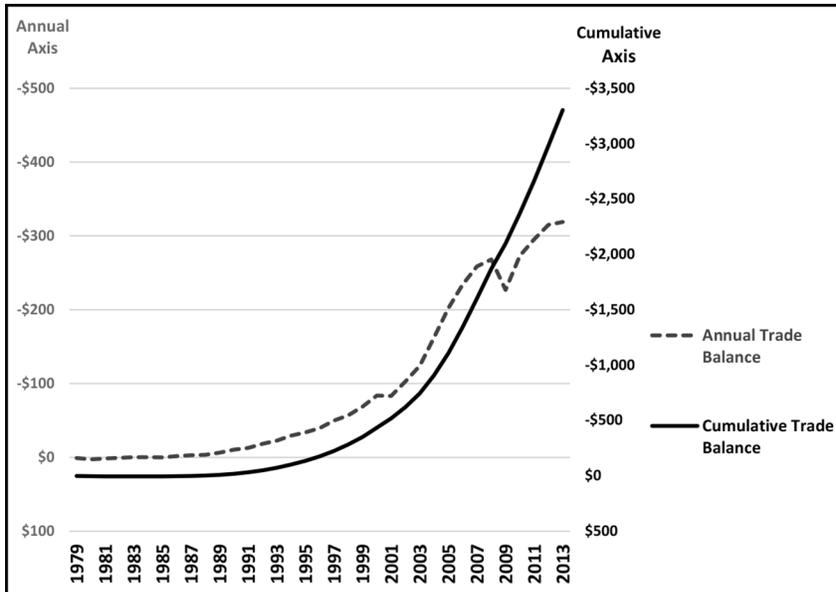
Source: U.S. Bureau of Labor Statistics.

Figure 5: Manufacturing as a Percentage of Total U.S. Employment, 1971–2013



Source: U.S. Bureau of Labor Statistics.

Figure 6: U.S. Trade Balance with China, 1979–2013
(US\$ billions)



Source: 1979–1984 numbers from International Monetary Fund, via China Business Review, March–April 1985; 1985–2013 (through November) numbers from U.S. Census Bureau.

Managing the Bilateral Trade Relationship

When China joined the WTO in 2001, Beijing committed to sweeping reforms, which required “changes to hundreds of laws, regulations, and other measures affecting trade and investment,” according to the office of the U.S. Trade Representative (USTR).⁵⁰ China’s very motivation for joining the WTO was “rooted in the realization that it needed an external impetus to overcome domestic obstacles to further reforms . . . if it was to sustain the rapid economic growth of the 1980s and 1990s,” according to supporters of China’s WTO entry.⁵¹ But in 2003, the Hu Jintao leadership came to power and began emphasizing increased state involvement in the economy, leading to institutionalized preferences for state-owned enterprises and other state interferences that conflicted with the market reforms envisioned by the United States as well as other trading partners, and promised by China itself. The report from the Third Plenum calls for the market to play a “decisive role” in the allocation of resources in the economy, rather than the “fundamental role” it has previously been allocated. But thanks to the policies of the Hu Jintao era, China has already solidified its role as the workshop to the world, according to David Shambaugh, director of the China policy program at the George Washington University. Says Dr. Shambaugh:

*Currently, it is the world’s largest producer of household and office furniture sets, machine tools, lubricant oils, lithium ion batteries, Christmas ornaments, footwear, cameras, computers, televisions, tape recorders, instrumentation, cloth and nylon fibers, textiles, plastics, stainless steel, washing machines, watches, mobile phones, and other consumer durables. In 2014 China is projected to overtake Australia as the world’s largest wine producer by volume.*⁵²

According to a 2012 report from the Information Technology and Innovation Foundation, “While virtually all governments have crafted economic development policies to boost competitive advantages, China has developed the most comprehensive set of policies, with most of them violating the spirit, if not the letter of the law of the WTO.”⁵³ Currency manipulation, subsidies, tariffs, forced technology transfers, export restrictions, manipulative standard setting and other policies have been used to “gain an absolute advantage” for Chinese companies across a wide array of industries, to the detriment of competitors in the United States and globally.⁵⁴ While the WTO membership committed China to adopt free market policies, its divergence from WTO rules and principles benefited China at the expense of its rule-following trading partners.

The United States has relied on a combination of dialogue and enforcement efforts to try to address the range of problems arising from Chinese state capitalism and to encourage China to uphold its WTO accession commitments. Washington has pressed 15 of the 31 WTO cases brought against Beijing to date, more than twice as many as any other WTO member.⁵⁵ (For a detailed list of pending cases before the WTO involving the United States and China, see Chapter 1, Section 1, “Year in Review: Economics and Trade.”) In addition to these enforcement efforts, high-level diplomatic engage-

ments are scheduled throughout each year in the form of the biannual meetings of the Joint Commission on Commerce and Trade (JCCT), the annual meetings of the Strategic and Economic Dialogue (S&ED), and a host of related meetings. In many respects, however, these efforts have been ineffective, as underscored by the annual reports to Congress on China’s WTO compliance, in which the Office of the United States Trade Representative highlights many of the same issues year after year.*

Dialogues—All Talk, Little Action

The JCCT was established in 1983 to focus on bilateral economic issues, and the S&ED was launched in 2006 (originally as the Strategic Economic Dialogue), to serve as a bilateral framework for managing a wide array of political, economic, and security issues. These dialogues are intended to act as information-sharing forums and to facilitate reciprocity and collaboration.⁵⁶ They provide structure to the bilateral relationship, offering “a degree of assurance that diplomatic relations will not be allowed to regress beyond a certain point.”⁵⁷ Face-to-face meetings are supposed to grease the wheels for collaborative action, and in the last decade, the number of meetings has proliferated as both sides have identified more and more issues in need of attention. The JCCT includes at least 13 trade-related dialogues and working groups, four devoted to intellectual property rights, and seven that are sector specific, while the S&ED has at least 30 working groups and dialogues of its own.⁵⁸ Figure 7 and Figure 8 show the range of trade and economic working groups and dialogues associated with the JCCT and S&ED, respectively.

Figure 7: Working Groups and Dialogues of the Joint Commission on Commerce and Trade

Working Groups that Meet Throughout the Year	
Agriculture	Pharmaceuticals and Medical Devices
Commercial Law	Sanitary and Phytosanitary
Environment	Statistics
High Technology and Strategic Trade	Steel
Industries and Competitiveness	Structural Issues
Information Industry	Trade and Investment
Insurance	Trade Remedies
Intellectual Property	Travel and Tourism
Additional Known JCCT Working Groups and Dialogues that Meet or Have Met Irregularly	
<i>Trade</i>	<i>Intellectual Property Rights</i>
Transparency Dialogue	Intellectual Property Rights Law Enforcement Group
Trade Remedies Working Group	Intellectual Property Rights Criminal Enforcement Working Group
Antimonopoly Dialogue	
Commercial Law Working Group	

*Prepared pursuant to section 421 of the U.S.-China Relations Act of 2000 (P.L. 106-286), 22 U.S.C. §6951, which requires USTR to report annually to Congress on China’s compliance with commitments made as part of its 2001 accession to the WTO, including multilateral commitments and bilateral commitments made to the United States.

Figure 7: Working Groups and Dialogues of the Joint Commission on Commerce and Trade—Continued

Additional Known JCCT Working Groups and Dialogues that Meet or Have Met Irregularly	
<i>Trade</i>	<i>Intellectual Property Rights</i>
Structural Issues Working Group Business Development and Industrial Cooperation Working Group Telecommunications Dialogue Insurance Dialogue Industries and Competitiveness Dialogue Broadband Wireless Internet Protocol Standard Group Statistics Working Group High Technology and Strategic Trade Working Group Statistics Working Group Industrial and Innovation Policies Dialogue	Government SOE Procurement Group Intellectual Property Rights Working Group on Software Legalization
	Sectors Agricultural Trade Working Group Textiles Consultative Group
	Travel and Tourism Working Group Information Industry Working Group
	Steel Dialogue Joint Liaison Group on Law Enforcement

Figure 8: Economic Track Working Groups and Dialogues Under the Strategic and Economic Dialogue

S&ED Economic Track Pillars	
Macroeconomic Cooperation Global Economic Governance Trade and Investment Financial Markets	
Additional Known S&ED Economic Track Working Groups and Dialogues that Meet or Have Met Irregularly	
<i>Energy</i>	<i>Other</i>
Climate Change Policy Dialogue Energy Policy Dialogue Ten-Year Framework Joint Working Group U.S.-China Energy Efficiency Forum Renewable Energy Forum Advanced Biofuels Forum	Anticorruption Group Investment Forum Policy Planning Dialogue Initiative on City-level Economic Cooperation U.S.-China Governors Forum to Promote Sub-national Cooperation
<i>Regional</i>	<i>Quasi-independent</i>
Africa Dialogue Central Asia Dialogue Latin America Dialogue South Asia Dialogue	Joint Experts Dialogue on Rules of Origin Annual Labor Dialogue High-level Consultation on People-to-People Exchange Healthcare Forum Joint Financial Committee

Sources: Derek Scissors, *Tools to Build the U.S.-China Economic Relationship*, Backgrounder No. 2590 (Heritage Foundation, August 8, 2011); *United States has Secured Commitments in Key Bilateral Dialogues, but U.S. Agency Reporting on Status Should be Improved*, Report to Congressional Requestors, United States Government Accountability Office, February 2014. <http://www.gao.gov/assets/670/660824.pdf>.

Critics argue the meetings have become “glorified talk-shops” that do not produce real progress. Dr. Scissors has criticized the S&ED and its subordinate institutional arrangements as ineffective tools that seem to have evolved “haphazardly over time” rather than having been consciously designed.⁵⁹ He notes an “incoherent proliferation of groups and discussions,” which “appear to have no logical relationship whatsoever.”⁶⁰ As these sub-level engagements continue to multiply, Dr. Scissors says that they “have become the cover story for the failure to act on fundamental matters—that is, nothing was accomplished but the two sides agreed to create several more working groups.”⁶¹ A February 2014 study by the U.S. Government Accountability Office (GAO) lends credence to his critique. The GAO identified 298 trade and investment commitments made by China through the various JCCT and S&ED dialogues since 2004, but was unable to determine the extent to which any of them had been fulfilled due to poor tracking by U.S. government agencies.⁶² The report concluded that “more comprehensive reporting would give Congress and other policy makers a clearer understanding of progress and the role of the dialogues as they continue to assess challenges in the U.S.-China relationship.”⁶³

Enforcement Efforts

In all, the Obama Administration has brought more than twice as many trade enforcement cases against China as did the previous Bush Administration, stepping up efforts to enforce China’s agreements.⁶⁴ The current Administration has filed eight requests for WTO consultations* with China to date, and has alerted the WTO to the existence of 200 Chinese subsidy programs that Beijing failed to disclose to the WTO as required by Article 25 of the WTO Agreement.⁶⁵ It is the first administration to enforce the Section 421 China-specific safeguard, an import relief mechanism aimed at protecting U.S. industries and workers in the event of import surges from China.†⁶⁶ It also accepted a Section 301 petition on China’s funding and protection of its clean energy industries, resurrecting a trade enforcement tool that has largely lain dormant in recent years.‡⁶⁷

Despite these efforts “violations continue and our trade relationship grows more lopsided each year,” according to Elizabeth Drake an expert on international trade at the Washington law firm Stewart and Stewart. Ms. Drake cited “problems such as WTO-illegal and trade-distorting subsidies, discrimination against U.S. goods, services, and technologies, localization requirements, inadequate protections for intellectual property and more.”⁶⁸ One particularly acute problem, according to Ms. Drake, is that when issues are politically sensitive, the United States too often chooses dialogue

*A consultation request is the first step in filing a formal complaint in the WTO.

†Section 421 of the Trade Act of 1974 as amended allowed the United States to apply safeguard measures targeted exclusively at Chinese products, an exception to WTO rules that was available to counter Chinese import surges until it expired on December 11, 2013 in accordance with provisions of the U.S.-China WTO agreement.

‡According to the International Trade Administration, Section 301 of the Trade Act of 1974 as amended is “the principal statutory authority under which the United States may impose trade sanctions on foreign countries that either violate trade agreements or engage in other unfair trade practices. When negotiations to remove the offending trade practice fail, the United States may take action to raise import duties on the foreign country’s products as a means to rebalance lost concessions.”

rather than enforcement action, and the problem festers when the dialogue fails to deliver. She cites China's undervaluation of its currency as a prime example of a problem that creates major distortions in our trade relationship and yet continues to go unresolved because of a lack of enforcement action on the part of the U.S. government.⁶⁹

The Currency Problem—A Case Study

By artificially suppressing the tendency of a currency value to rise in an economy running a large trade surplus, China is able to avoid the compensatory pressures of a higher renminbi (RMB) that would otherwise make its exports more expensive and imports cheaper. By counteracting the compensatory forces that would tend to level the playing field in international trade, China has "gained a substitute for the mercantilist measures it gave up to join the WTO," according to Ms. Drake.⁷⁰

China has made little effort to conceal the way it deliberately stymies market forces to keep the RMB from appreciating. As a matter of policy, China tightly pegged its currency's value to that of the dollar from 1995 to 2005, at a rate of slightly more than 8 RMB per dollar. In July 2005, the government announced a policy of allowing the RMB to trade within a narrow margin compared to an unspecified "basket of currencies." The RMB gradually appreciated 21.2 percent against the U.S. dollar even as China's bilateral trade surplus continued to climb.⁷¹ From July 2008 through July 2010, the RMB was again pegged to the U.S. dollar. In July 2010, China announced a return to a "managed float" exchange rate system in which some flexibility was tolerated during the trading day, but the RMB-to-dollar ratio was reset at the start of each trading day.⁷² Between July 2010 and October 2013, the RMB appreciated 12 percent against the U.S. dollar, and by the end of 2013, it had appreciated roughly 45 percent in inflation adjusted terms since China began its currency reform efforts in 2005.⁷³ The currency exchange rate is now at about 6.2 RMB per dollar.⁷⁴

The International Monetary Fund estimates that the RMB remains "moderately undervalued" by "about 5 to 10 percent on a real effective basis, as of August 2014."⁷⁵ There is no universally accepted method of calculating the extent to which a currency is undervalued, and some experts argue that the RMB may still be depressed by as much as 20 percent.⁷⁶ In 2014, the U.S. Treasury Department reiterated its longstanding assessment that China's currency is "significantly undervalued."⁷⁷

China is not alone in seeking to gain an export advantage by undervaluing its currency. Fred Bergsten and Joseph Gagnon of the Peterson Institute for International Economics note that more than 20 countries have intervened in international currency markets in a variety of ways, trading currencies at an average rate of nearly \$1 trillion annually "in order to keep their currencies undervalued and thus boost their international competitiveness and trade surpluses."⁷⁸ They calculate that the United States has lost between 1 million and 5 million jobs as a result of currency manipulation globally.

The largest loser [where currency undervaluation is concerned] is the United States, whose trade and current account deficits have been \$200 billion to \$500 billion per year larger as a result. . . . Half or more of excess U.S. unemployment—the extent to which current joblessness exceeds the full employment level—is attributable to currency manipulation by foreign governments. . . . Eliminating excessive currency intervention would narrow the U.S. trade deficit by 1 to 3 percent of GDP and would thus move the U.S. economy much of the way to full employment, with an even larger effect possible once multiplier effects on domestic demand are taken into consideration.⁷⁹

Dr. Bergsten and Dr. Gagnon's data show that China is far and away the most significant currency intervener, "in terms of both economic importance and amounts of intervention."⁸⁰ China's lower currency valuation functions as a de facto subsidy, giving its exports a price advantage vis-à-vis domestically produced goods in the U.S. marketplace and vis-à-vis U.S. products globally. Experts, including Dr. Scott, contend that this translates to artificially high demand for Chinese manufactured exports and the movement of U.S. manufacturing jobs overseas. According to Dr. Scott, China's currency manipulation has led to the loss of 3 million U.S. jobs since China joined the WTO in December 2001, more than three-fourths of them in the manufacturing sector.⁸¹ If China were to value its currency fairly, 2.3 to 5.8 million U.S. jobs would be created, he says.⁸²

President Obama has said that China's undervaluation of its currency puts American firms at a "huge competitive disadvantage," and in 2010 he made the issue a top policy priority in dealings with China, devoting most of a two-hour meeting with Chinese Prime Minister Wen Jiabao to underscoring currency concerns.⁸³ As recently as March of 2014, the president urged his Chinese counterpart to move the RMB toward a more market-based exchange rate.⁸⁴ The last time the U.S. Treasury Department branded China a currency manipulator was in 1994, and successive administrations, including that of President Obama, have consistently declined to label China a currency manipulator in biennial reports to Congress. Naming China would have elevated the issue diplomatically by requiring the Treasury Department to initiate negotiations on the issue with China. (Since at least 2003, the United States has raised the issue in other annual bilateral talks such as the Security and Economic Dialogue.)⁸⁵ Though there would be no other direct impact, Congressional proponents believe that naming China as a currency manipulator is needed. Meanwhile, the Treasury Department has unofficially cited a variety of reasons not to, among them: (1) high pressure would make the Chinese government less likely to respond because to do so would embarrass officials; (2) China has allowed the RMB to gradually appreciate during certain periods and is therefore moving toward compliance, albeit slowly; (3) Chinese officials have secretly promised to do so once the economy is stabilized; and (4) the issue in China is simply too sensitive so officials are unable to act.⁸⁶

To date, the Commerce Department has also refused to treat currency undervaluation as an indirect export subsidy, a ruling that

could lead to penalty tariffs on certain imports from China, thereby boosting the competitiveness of domestic alternatives.⁸⁷ A number of U.S. countervailing duty petitioners have asserted claims against China's currency policy as an actionable subsidy under U.S. law. However, the Commerce Department has not officially included undervalued currency as part of a countervailing duty investigation. There is also debate over whether such an action would be consistent with U.S. law and WTO rules. In two 2010 cases involving aluminum and coated paper producers, the Commerce Department found that currency undervaluation did not constitute a domestic subsidy specific to a particular company, industry, or group of companies or industries, as is statutorily required for Commerce to initiate an investigation. Both U.S. law and WTO regulations define subsidies as financial contributions from a government benefiting a specific industry.⁸⁸ Bills to address China's currency policy have been introduced during every session of Congress since 2003. While none of these bills has yet become law, during the 111th Congress, the House passed the Currency Reform for Fair Trade Act (H.R. 2378) by a vote of 348 to 79. During the 112th Congress, the Senate passed the Currency Exchange Rate Oversight Reform Act of 2011 (S. 1619) by a vote of 63 to 35.⁸⁹ There remains significant support in the House and Senate to require the Commerce Department to treat currency undervaluation as a subsidy. In September 2013, a bipartisan group of 60 senators signed a letter calling for action on the Chinese currency issue as part of the United States' Trans-Pacific Partnership negotiations.⁹⁰ Various other proposed bills would require greater action by the executive branch to address China's currency manipulation, or would define currency manipulation as an illegal subsidy and would make China and other transgressor nations subject to penalty duties.* However, gradual appreciation of the RMB and strong opposition from the U.S. business community and the Administration have thwarted the passage of legislation. The United States has also declined to challenge China's currency valuation practices at the WTO, though that, too, is a potential enforcement tool at our disposal.⁹¹

Some insist that currency undervaluation is not as serious a problem as critics of China's policy contend. Edward Lazear, former chairman of the President's Council of Economic Advisers during the George W. Bush Administration (2006–2009), points out that Chinese exports to the United States do not track closely with currency movements, evidence he cites to claim that currency undervaluation is not a key factor in determining trade patterns. Dr. Lazear notes that between 1995 and 2005, when the dollar-RMB exchange rate was stagnant, Chinese exports to the United States increased sixfold, or 19.6 percent per year. Between 2005 and 2008, when the RMB's value relative to the dollar appreciated roughly 21

*Bills to address China's currency manipulation in the 113th Congress have included: H.R. 1276: The Currency Reform for Fair Trade Act, which would seek to clarify that the Commerce Department can consider a "fundamentally misaligned currency" as an actionable subsidy, and S. 1114: The Currency Exchange Rate Oversight Reform Act of 2013, which specifies criteria for identifying fundamentally misaligned currencies and would require action to correct misalignment where certain "priority" countries are concerned. Both bills are essentially identical to legislation proposed but not passed in previous Congresses. For more detailed information on these and older legislative proposals to address Chinese currency valuation, see Wayne M. Morrison, "China's Currency Policy: An Analysis of the Economic Issues." <https://www.fas.org/sgp/crs/row/RS21625.pdf>.

percent, Chinese exports to the United States should have fallen if there were a strong correlation between trade and currency valuation. Instead Chinese exports “continued to grow at about the same pace, averaging 18.2 percent per year.”⁹² *Forbes Magazine* contributor Dan Ikenson echoes Lazear’s argument, noting that “the U.S. economy has ‘created’ more jobs in periods when the trade deficit was growing than in periods when it was shrinking.”⁹³ Dr. Scissors agrees, noting that “jobs have been lost by the millions over the past three years, while the yuan has either held steady or been rising against the dollar.”⁹⁴

Even if U.S. employment rates are affected by China’s currency valuation, business community advocates generally contend that trying to force China to revalue its currency will only result in layoffs in the United States and price increases for consumer goods in the U.S. marketplace, not the return of jobs lost in prior years. Commission witness Philip Levy, senior fellow at the Chicago Council on Global Affairs, notes that U.S. companies that have moved manufacturing facilities to China would not return those operations to the United States if China’s currency were revalued, but would instead shift manufacturing to alternative cost-effective countries, such as Vietnam, Cambodia, and Malaysia.⁹⁵ This is because, said Dr. Levy, “there is no way a minimum-wage worker in the United States earning a meager annual income of \$13,920 can compete with someone in Asia earning between \$1,000 and \$1,500 annually.”⁹⁶ Groups such as the U.S.-China Business Council also oppose legislative proposals because they would impose tariffs based on “subjective estimates.”⁹⁷ This means that findings would inevitably be politicized, they argue, triggering a trade war that would undermine U.S. employment by stunting the growth of U.S. exports to China without delivering U.S. jobs in import-sensitive industries.⁹⁸

While forcing a revaluation of China’s currency may be a key component to resolving the negative impact of bilateral trade on U.S. employment that does not guarantee it will be a panacea. In his testimony to the Commission, Dr. Shenkar of the Ohio State University recalled the 1985 Plaza Accord,* which was supposed to rebalance the U.S. trade deficit with Japan by decreasing the U.S. dollar’s valuation vis-à-vis the Japanese yen, but even after the currency misalignment was altered in the U.S. favor, the United States never realized the expected recovery of employment in the U.S. car manufacturing industry.⁹⁹ But Dr. Scott contends that there is no doubt that China’s currency undervaluation contributes to the bilateral trade imbalance, and neglecting to push harder for resolution in order to protect the growth of U.S. exports to China is short sighted. “Talking about trade and only talking about the growth of exports is like keeping score in a baseball game and only counting runs scored by the home team,” he says. “It might make your team sound like it’s doing well, but it won’t tell you if they’ve won the game.”¹⁰⁰ While U.S. exports to China have grown dra-

*The Plaza Accord, signed in September 1985, was an agreement among France, West Germany, Japan, the United States, and the United Kingdom, which allowed the depreciation of the U.S. dollar in relation to Japan’s Yen and West Germany’s Deutsche Mark. The goal of this agreement was to reduce the U.S. current account deficit and assist the U.S. economy in recovering from a serious recession by making the U.S. manufacturing industry more competitive in the global market place.

matically, our trade deficit “is still so vast that even if this great growth rate continues, it would take 38 years for America to close it,” he points out.¹⁰¹

The Interagency Trade Enforcement Center

In February 2012, President Obama created the Interagency Trade Enforcement Center (ITEC) via executive order. The purpose was to engage in “robust monitoring and enforcement of U.S. rights under international trade agreements, and enforcement of domestic trade laws.”¹⁰² The center is within the USTR and coordinates enforcement efforts among the Departments of State, Treasury, Justice, Agriculture, Commerce, Homeland Security, National Intelligence, and others. It is meant to provide “a more dedicated ‘whole-of-government’ approach to addressing unfair trade practices and barriers,” by serving as a forum for coordination between experts across agencies.¹⁰³ ITEC may be improving U.S. trade enforcement efforts overall, but there has been no specific news of ITEC efforts aimed at addressing China’s trade abuses since the establishment of the interagency group in February 2012, and the last U.S. request for WTO consultations to resolve a trade dispute with China came in September 2012.¹⁰⁴

Accessibility of Trade Remedies, the Need for a Private Right of Action and Other Proposals for New Enforcement Tools

Even when U.S. industries are successful at seeking trade remedies, they do not always work. Witnesses at the February 21 hearing testified about a range of shortcomings in the United States’ trade remedy toolbox. As Ms. Drake put it, “If a trade remedy case is successful, it should actually deliver the relief that is promised.”¹⁰⁵ But circumvention of penalty tariffs, transshipment of goods through a third party, duty evasion by specific companies, a lack of transparency, access, and accountability, are among the many problems “severely hampering the ability of domestic industries to ensure the orders they have fought for are being effectively enforced.”¹⁰⁶ Ms. Drake told the Commission that we need more tools to “help our trade relationship mature into one that is more balanced and more beneficial to American industries, workers and communities.”¹⁰⁷

U.S. trade remedy laws can be ineffective and U.S. industries can often face challenges bringing petitions for relief because of quirks in trade remedy laws. For example, when a domestic industry brings a case, it is required to demonstrate that a sufficient percentage of other domestic producers in the same industry support the petition. Specifically, petitioners must represent at least 25 percent of domestic production.¹⁰⁸ Sometimes industry interests are fragmented because of shifting trade or investment relationships of large players, so producers in need of relief cannot seek it. As the U.S. wooden furniture industry switched from manufacturing within the United States merely to retailing furniture made in China,

furniture manufacturers-turned-retailers opposed efforts to protect the remaining furniture makers in the United States.* In addition, currently no means exist by which other parties with vested interests in fair trade enforcement, such as states and localities, can bring petitions.

Other significant challenges for U.S. industries seeking relief from anticompetitive Chinese practices are the shortcomings of the WTO's dispute resolution system, including long trial delays and appeals and weak enforcement. As Dr. Scissors points out, "WTO adjudication certainly seemed like an obvious solution to bilateral disputes at the time of the PRC's accession a decade ago. The WTO has since been revealed to be ponderous in dispute resolution, effectively permitting years of 'illegal' behavior before penalties can be imposed."¹⁰⁹

Unfortunately, U.S. industry suffers from limited options for directly pursuing trade complaints, since neither domestic nor international trade rules provide for a private right of action. Existing rules of international trade limit dispute settlements to government-to-government actions. One 1916 law that allowed for private lawsuits against rule-breaking companies was struck down shortly before China joined the WTO. The Antidumping Act of 1916 provided a private cause of action against international companies that illegally dumped goods in the United States by selling them at prices below fair market value. It was the only law that allowed U.S. companies to file an action against competitors directly and in their home market jurisdictions, rather than seeking U.S. government assistance in pursuing dumping charges. But in 2000, a WTO dispute settlement panel ruled that the U.S. law violated Articles VI:1 and VI:2 of the General Agreement on Tariffs and Trade 1994, Articles 1, 4, and 5.5 of the Anti-Dumping Agreement, and Article XVI:4 of the WTO Agreement because the Act, as reinterpreted by U.S. courts, provides antidumping measures that do not comply with requirements of those provisions.^{110,111} In 2004, the Act was repealed by Public Law 108-492, the Miscellaneous Trade and Technical Corrections Act.¹¹²

Market Economy Status

Even as debate focuses on how to rectify negative impacts of the bilateral trade relationship on U.S. employment, there is general agreement that granting China market economy status would exacerbate the problem. Multiple witnesses have testified to the Commission that China is not now a market economy and is not on the path to become one within the next two years. But in December 2016, the provision of China's WTO accession protocol that enables countries to treat China automatically as a non-market economy (NME) expires. China agreed to accept this temporary provision during its negotiations to join the WTO but has aggressively sought to have the designation terminated by its trading partners and will almost certainly demand that the United States treat it as a market economy after 2016.

*For more on the difficulty faced by U.S. furniture and textile industries in bringing unfair trade actions against overseas competitors, see the U.S.-China Economic and Security Review Commission's *2007 Annual Report to Congress*, Chapter 1, Section 4, "A Case Study of the Local Impact of Trade with China: North Carolina."

Neither NME status nor market economy status are explicitly mentioned in China's WTO Accession Protocol. However, the Protocol does specify the expiration of Article 15(a)(ii) in December 2016. At the end of 2016, the existing statutory test will be the only basis upon which the United States determines whether a country operates as a market economy is applied. Under the law, there are criteria that the Administration would have to certify that China has met before granting China market economy status. The main effect of a shift to market economy status for China would be to make it far more difficult for the United States to levy penalty tariffs on China for dumping.* A 2005 study by GAO found that, "if Commerce grants China market economy status ... required methodological changes could well reduce antidumping duties [and] it is not clear whether CVDs [countervailing duties] would compensate for these reductions."¹¹³ However, GAO also concluded that even if China is not designated as a market economy, "there is an element of uncertainty about the magnitude of the total level of protection that would be applied to Chinese products" in either scenario.¹¹⁴ China is currently the single largest target of U.S. antidumping actions. From 2001 through 2012, the United States initiated 91 antidumping cases against China, imposing measures in 66 of those cases, and spearheaded 15 of the 31 WTO complaints brought against China.¹¹⁵

A market economy is an economic system in which decisions about the allocation of resources and production are made on the basis of prices generated by voluntary exchanges among producers, consumers, workers, and owners of factors of production. In China's economy, crucial economic processes are determined by the state rather than by market forces. Chinese government officials themselves describe China as a socialist market economy, in which "the government accepts and allows the use of free market forces in a number of areas to help grow the economy, but still plays a vital role in managing the country's economic development."¹¹⁶ As of 2009, 97 nations had granted China market economy status. But because of government interventions in the Chinese marketplace, the United States and other major developed countries still recognize China as an NME.¹¹⁷

In situations involving imports from an NME, the WTO more readily allows for the "normal value" (the appropriate price in the market of the exporting country) of the imports to be determined using data from a surrogate country. Typically, the WTO requires the normal value of a country's export be based on a strict comparison with domestic prices or costs in that country. Since Chinese domestic prices and costs are often artificially suppressed because of government subsidies, surrogate country data is generally crucial for trading partners to demonstrate that China is engaged in dumping.¹¹⁸

Much attention has been focused on arguments that the expiration of Article 15(a)(ii) will not give China market economy status,

*Dumping is the act of introducing a product into another country's market at less than its "normal value." "Normal value" is "the comparable price, in the ordinary course of trade, for the like product when destined for consumption in the exporting country." See Christian Tietje and Karsten Nowrot, *Myth or Reality? China's Market Economy Status under WTO Anti-Dumping Law after 2016*, Policy Papers on Transnational Economic Law, No. 34 (Transnational Economic Law Research Center, December 2011).

not least because Article 15(d) of China's Accession Protocol makes clear that China's recognition as a market economy is something it must achieve bilaterally with individual members by meeting the conditions of those members' national laws. As international trade law expert Bernard O'Connor argues in his heavily cited paper, *The Myth of China and Market Economy Status in 2016*, China's WTO Accession Protocol contains "no presumption" that it will attain market economy status in 2016, and to imply that presumption "reads out of the law China's burden to prove that it is a market economy as defined by the laws of the country it seeks recognition from."¹¹⁹ But even if market economy status is not automatic in 2016, the expiration of Article 15(a)(ii) does mean that China will no longer automatically be assumed to be an NME. In short, China's market economy status will be left to the determination of each of its trading partners, and the United States will not automatically have to grant China that status after 2016. But even if the United States opts to continue treating China as a non-market economy, the terms of the Accession Protocol will increase the evidentiary burden for justifying the use of surrogate country data in assessing duties against China after 2016.

Eileen Bradner, senior director and counsel for Nucor Corporation, told the Commission that, "part of the reason our trade laws work is because they properly treat China as a non-market, government-run economy. That should not change until China itself changes."¹²⁰ However, China is working under the assumption that market economy status will be conferred upon it in 2016, and any action by the United States to continue treating China as an NME is almost certain to provoke a challenge by China at the WTO. U.S. law lays out criteria for deciding whether or not a country is a market economy, but grants great flexibility to the U.S. executive branch in making the determination,* a determination that Ms. Drake notes is not currently reviewable by U.S. courts.¹²¹ This means that if the U.S. executive branch determines it is diplomatically in our best interest to treat China as a market economy beginning in 2016, negatively impacted companies will have no clear legal recourse to challenge that decision.

The Non-Market Economics of Chinese Investments in the United States

The Primacy of the State Sector in China's Economy

When China joined the WTO, its accession agreement indicated a gradual move towards a free market economy and a diminishing

*The United States' Tariff Act of 1930, as amended, provides a statutory test for determining if an economy can be classified as a market economy. The law specifies that the determination of a country's market or non-market status be made in consideration of the following factors:

- (i) the extent to which the currency of the foreign country is convertible into the currency of other countries,
- (ii) the extent to which wage rates in the foreign country are determined by free bargaining between labor and management,
- (iii) the extent to which joint ventures or other investments by firms of other foreign countries are permitted in the foreign country,
- (iv) the extent of government ownership or control of the means of production,
- (v) the extent of government control over the allocation of resources and over the price and output decisions of enterprises, and
- (vi) such other factors as the administering authority considers appropriate.

See U.S. Section 771(18) of the Tariff Act of 1930, as amended, 19 U.S.C. § 1677(18).

role for state-owned enterprises (SOEs). Although China adopted significant reforms, many of the country's largest and most influential businesses remain state-owned or state-controlled, enjoying preferential treatment and financing at the central, provincial, or local level.¹²² By some estimates, in 2011, China had approximately 144,700 enterprises owned and operated by a branch of the central government with total assets of \$13.7 billion, revenues of \$6.3 billion, and profits of \$418.5 billion, or nearly half of the country's total industrial and business profit.¹²³ For detailed discussion of the breakdown of enterprises owned or controlled by the Chinese state, see Chapter 1, Section 2, of the Commission's 2012 Annual Report.

China's Third Plenum of the 12th National People's Congress, held in late 2013, introduced new reform initiatives for SOEs, but they are primarily aimed at restructuring and increasing the efficiency of the state sector, not reducing the state's role in the economy. The Plenum emphasized the equal importance of the state sector and the private sector, a departure from previous plenums which gave primacy to the state, but it still gave state ownership a "leading role" in the economy.¹²⁴ Commission witness Willy Shih, a professor at the Harvard Business School, described the reforms as a deliberate attempt to increase SOEs' exposure to the competitive forces of China's private economy while preserving their power.¹²⁵ The Brookings Institution's Arthur Kroeber offered a skeptical prognosis, calling it "a very safe bet that when he retires in 2022, Xi will leave behind the world's biggest collection of state-owned enterprises."¹²⁶ "Xi is not some Chinese version of Ronald Reagan or Margaret Thatcher," Kroeber said. "For him and his colleagues, the market is a tool, not an end in itself. The respective roles of state and market need to be clarified, but the state role will remain very large."¹²⁷

A recent media campaign of the State-owned Assets Supervision and Administration Commission (SASAC), which oversees China's 121 central state-owned enterprises, appears to affirm these assessments. SASAC's advertising blitz, via articles and coverage in major state-run news outlets including *The People's Daily*, Xinhua, and CCTV, promotes the benefits of a state sector that has already been "transformed" and "streamlined into a competitive force."^{* 128} As witness Adam Hersh of the Center for American Progress testified to the Commission:

*The same people with the same policy levers and the same financial incentives will continue to be in charge of China's productive resources even if the Third Plenum plans are implemented. . . . The ability to deliver subsidies to keep these state-owned enterprises operating on a non-market basis can go on for quite some time given the political structure and the ability to extract incomes from individuals in China and from firms throughout the economic system. . . . This is not a model that is going to fail in any economically meaningful timeline.*¹²⁹

*The number of enterprises owned by the central government has generally been declining each year due to consolidations and mergers rather than privatization.

Characteristics of China's Outbound Investment

Chinese investment in the United States has increased in recent years. Since FDI is generally associated with job creation and economic development, this trend has been generally applauded, particularly within state governments. The Washington, DC, based Organization for International Investment notes in its 2013 report that “foreign companies fund domestic manufacturing plants, but-tress research and development facilities, and support 5.6 million well-paying American jobs with average pay of around \$77,000 in 2011.”¹³⁰ The United States International Trade Administration also highlights the importance of FDI for “the creation of jobs, an increase in wealth and living standards, and [the] overall growth and innovation that drive U.S. economic competitiveness.”¹³¹ But the U.S. experience with investment by state-directed corporations is limited, and the ramifications are unclear.

China's global outbound FDI exceeded \$77 billion in 2012 and is projected to reach \$2 trillion by 2020. Of this outbound investment, private firms accounted for only an estimated 9.5 percent, while SOEs accounted for the remainder.¹³² The business motivation for Chinese companies to invest abroad is strong. Some seek to acquire advanced technology to maintain an edge in a fiercely competitive domestic market, and others are driven to expand market share outside of China to broaden their customer bases, develop recognition as global brands, and gain expertise in global marketing and supply chain management.¹³³ But the government is also a key driver for both private and SOE outbound investment activities. International investment helps the government to secure resources needed to maintain China's economic growth, serves as a form of economic diplomacy, and “provides the Chinese government with a channel to invest its vast foreign exchange reserves while boosting long-term economic growth.”¹³⁴

Outbound Chinese investment is supported and encouraged by a formal government framework, the “go out” policy, which was launched in 2000.¹³⁵ Although the Chinese government recently announced plans to eliminate the need for government approval of outbound investments valued at less than \$1 billion, virtually all larger proposed investments by Chinese companies abroad must still be reviewed and approved by the government.¹³⁶ The *Guidelines for Investments in Overseas Countries' Industries* as well as the *Overseas Investment Guidance Catalogue* provide guidance such as recommended industry sectors and recommended recipient nations (of which there are currently 115).¹³⁷ The government involvement in Chinese outbound investment is also underscored by the entourages of businessmen Chinese officials typically bring along when traveling abroad.¹³⁸

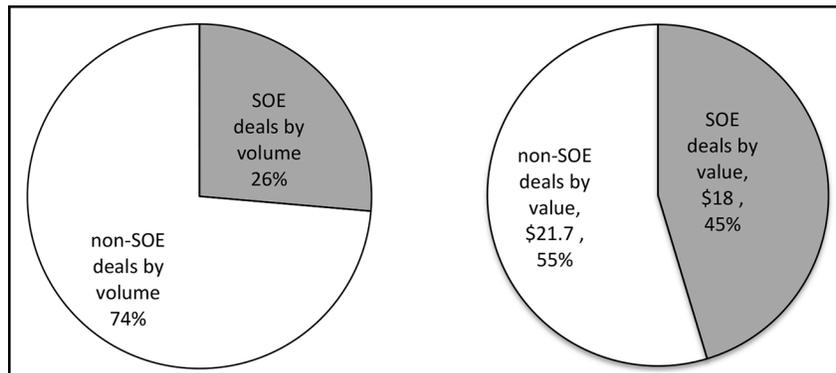
Chinese SOEs and private firms with access to state aid or state-controlled bank capital are “aggressive,” according to Timothy Brightbill, a Commission witness and partner at the law firm of Wiley Rein LLP in Washington, DC. “They think globally, and they have long investment horizons.”¹³⁹ In 2012 testimony before the Commission, Mr. Brightbill noted that Chinese investment abroad “represents a new and growing threat to fair competition and the ability of U.S. producers to compete here and around the globe” because “these SOEs that often do not operate based on market prin-

ciples ... [and] can introduce anti-competitive behavior and other market distortions where they invest.”¹⁴⁰ He described a situation in which U.S. companies are essentially competing directly against the Chinese government in U.S. and global markets, “creating significant imbalances that harm U.S. workers and private companies.”¹⁴¹ Noting reluctance on the part of the United States to address this challenge proactively, Dr. Shih testified that, “we need to learn from history and not delude ourselves into thinking that in the end, fair play and justice will prevail.”¹⁴²

Chinese Investment in the United States

China is the world’s fifth largest overseas direct investor.¹⁴³ It is not yet among the top sources of foreign investment in the United States. Official estimates are that FDI from China averaged roughly \$1 billion between 2010 and 2012, or a miniscule 0.5 percent of the United States’ total inbound FDI.¹⁴⁴ However, it is the fastest growing source of U.S.-bound FDI, registering an average annual growth rate of almost 71 percent from 2008 through 2012.¹⁴⁵ As of 2013, Chinese firms had invested in 37 U.S. states.¹⁴⁶ This trend appears to be accelerating. In June 2013, China announced its largest purchase of a U.S. asset to date—a \$4.7 billion acquisition of Virginia-based Smithfield Foods, Inc.¹⁴⁷ Research conducted by the Rhodium Group, a leading private sector consultancy tracking Chinese investments in the United States, indicates that private firms now account for the majority of U.S.-bound Chinese investments. According to their calculations, in 2013, private firms and entrepreneurs contributed 87 percent of Chinese direct investment transactions in the United States and 76 percent of the total value of inbound Chinese investment.¹⁴⁸ As of the second quarter of 2014, cumulative private Chinese investment in the United States since 2000 totaled \$21.7 billion, as compared to \$18 billion in state-owned investment. (See Figure 9.)

Figure 9: Volume and Value of Chinese SOE and Non-SOE Investments in the United States, 2000–2014Q2



Source: Rhodium Group.

But SOE investment in the United States remains significant, and at any rate, when it comes to Chinese enterprises, the distinc-

tion between public and private is often a false dichotomy. SOEs are frequently complex, multilayered business groups with “a myriad of subsidiary firms, some of which may be publicly listed on stock exchanges in China and overseas.”¹⁴⁹ Joel Backaler, director of the Frontier Strategy Group, testified to the Commission that government control of Chinese firms is not limited exclusively to state-owned enterprises and “it is wrong to think that state-owned enterprises are the only firms with ties to the Chinese government and recipients of financial and political support from the state.”¹⁵⁰ In addition, as Dr. Hersh testified, the extent of state ownership and subsidization “are becoming increasingly obscured as more enterprises are corporatized and registered in offshore tax havens.”¹⁵¹

Potential Pitfalls of Chinese Investment

Although private Chinese companies pursuing deals overseas have typically provoked fewer concerns from government regulators, the murky connections between the state and private sectors show that there may be little difference between the two in terms of their impact on U.S. competitors. Whether nominally private, Chinese companies may enjoy low-cost or free land rights and below-market interest rates on loans, and “in some cases have a monopoly on an entire industry and thus enormous pricing power.”¹⁵² They may not be beholden to market forces, and access to the government’s printing press and preferential treatment can provide Chinese companies competitive advantages far beyond the reach of foreign private counterparts.¹⁵³ It is not the type of Chinese investment but its likely impact that should be foremost in the minds of policymakers.¹⁵⁴ Ms. Bradner summarized the potential anticompetitive challenges for Commissioners:

*We can compete with anyone if it's fair, but if you're competing with a government that does not have to cover their costs, does not have to show a profit to their shareholders or their board of directors, it's a big concern. . . . We need some kind of an enforceable mechanism [to ensure that] these entities [are operating] on commercial terms, and I think the key is that we can't be required to wait until we show injury before some kind of enforcement mechanism kicks in. . . . Some producers will be driven out of business, and it's not just the producers, but it's also the upstream and the downstream affected. And it's not at all clear that even if the foreign producer then corrects itself . . . once they get the market share, it's not at all clear that the domestic industry would be able to reconstitute itself because some of those players will be gone and won't be able to come back.*¹⁵⁵

How does an American company or an American industry compete with a Chinese company that opens up a factory in the United States and has little or no cost of capital and innumerable subsidies? No comprehensive tracking exists of job creation by Chinese investment in the United States, but the bulk of China’s outbound investment is in the form of mergers and acquisitions, rather than

the greenfield investment that tends to be the biggest boon to local employment.¹⁵⁶ Still, some do promise significant job creation.

When a major Chinese SOE investment could create hundreds or thousands of jobs but also creates a threat of unfair competition for the domestic industry in question, how should the United States balance the risks and benefits? In June 2011, the Alabama legislature passed the 2011 Alabama Tariff Subsidy Bill, attracting a \$100 million manufacturing investment from Henan Province-based Golden Dragon Precise Copper Tube Group Inc. by offering tax incentives that countered antidumping duties the U.S. government had leveled against imports of the company's products. Currently no federal law is aimed at deterring states from offering investment incentives that have the purpose or effect of undermining federal trade enforcement efforts.

Rules aimed at preventing undue foreign influence on trade petitions may also fall short where Chinese investment is concerned. Trade petitions for antidumping and countervailing duty cases must be supported by at least 25 percent of the domestic industry (as measured by production), and while U.S. companies that are related to foreign producers and importing the merchandise under investigation may be excluded from calculations of industry support,¹⁵⁷ companies that do not themselves import the merchandise under investigation cannot be excluded. This may prove to be a significant loophole for state-influenced Chinese companies investing in the United States, allowing them to influence unduly trade petitions involving merchandise from China.

Ms. Drake noted that China's WTO accession agreement did include a general requirement that it ensure its SOEs operate on a commercial basis, but this commitment has never been enforced. As for the more specific threats that Chinese investments may pose, she told Commissioners that this is part of "a very broad area where we would like for there to be rules that govern behavior, but we don't have those rules exactly right now."¹⁵⁸ The United States also lacks sufficient tracking of Chinese investments.* The Commerce Department has tracked, on average, slightly less than \$1 billion per year in Chinese investment in the United States between 2010 and 2012, whereas the Rhodium Group, a private sector consulting firm, has tracked \$16.9 billion for that same period.¹⁵⁹ The United States does not have clear data on how much money U.S. investment bankers are raising on behalf of Chinese SOEs in initial public offerings, nor the ownership structures of these SOEs or the bases for their contracts. This is material information for U.S. shareholders in these companies and relevant to a range of other parties potentially impacted when these companies invest here.

*The International Trade Administration (ITA), a bureau within the U.S. Department of Commerce, stated in a 2013 report on Chinese FDI in the United States that it is "important to be aware of different estimates" of Chinese investment. ITA noted that private sector valuations employ different definitions of FDI, data gathering mechanisms, and accounting methods that lead to differences in reported value of investments. See International Trade Administration, *Report: Foreign Direct Investment (FDI) in the United States from China and Hong Kong SAR* (Washington, DC: July 17, 2013).

Are Worries Overblown?

In defense of Chinese investment in the United States, Mr. Backaler, of the Frontier Strategy Group, testified that “overall, the United States has much to gain from the global emergence of Chinese companies, including: employment generation, tax revenues, potential investors in domestic infrastructure, and new market access.”¹⁶⁰ Dr. Scissors says, “American individuals and companies voluntarily engage in transactions with Chinese companies and benefit from them.” He argues that the discussion of the Chinese investment threat is largely politically motivated and says these “exaggerations do not serve the national interest.”¹⁶¹

Other experts, such as Dr. Shambaugh agree, noting that worries over Chinese investment tend to credit Chinese companies with more competence than most of them have yet demonstrated. Dr. Shambaugh stresses that Chinese firms are, by and large, still navigating a steep learning curve to understand how to compete on par with leading multinational corporations from more developed countries. Most do not develop business plans and strategies before they globalize but instead are driven by “pent-up cash in search of a place to invest.”¹⁶² They “often fail to do their homework to develop detailed plans for global market entry ... and demonstrate difficulties adapting to foreign legal, regulatory, tax and political environments.”¹⁶³ In fact, the vast majority of Chinese investments overseas are not even successful. As much as 90 percent of China’s 300 overseas mergers and acquisitions in 2008–2010 were unsuccessful for a variety of reasons, including overpaying and inability to manage the new company.¹⁶⁴

Implications for the United States

New research and analysis conducted by Dr. Schott suggests that the rapid growth of the United States’ bilateral trade relationship with China since 2001 has indirectly contributed to a sharp decline in U.S. manufacturing employment during that same period. Although China has become America’s third-largest export market and fastest-growing export destination, imports of Chinese goods to the United States still far surpass sales of U.S. goods to China. The imbalance is most pronounced in the manufactured goods sector, since the bulk of U.S. sales to China involves commodities whereas the bulk of Chinese sales to the United States is manufactured products. Direct investment in China by U.S. and other foreign corporations has increased sharply since China joined the WTO,¹⁶⁵ and 55 percent of Chinese exports to the United States are now manufactured by foreign invested enterprises. The net result is a trade relationship that clearly produces jobs for Chinese workers but costs jobs for blue collar Americans even as U.S. exports to China grow.

The negative impacts on some segments of the U.S. workforce have persisted, in part, because of inadequate U.S. management of the bilateral relationship. The United States relies heavily on dialogue to press China to uphold its international trade commitments, further open its markets, and ensure fair treatment of U.S. businesses. The number and variety of talks continue to proliferate, but they generally result in vague or narrow commitments, and no

guarantee that promises will be upheld. Under the Obama Administration, American enforcement efforts have been redoubled, but enforcement tools are limited and often ineffective.

There is some room for optimism that China's growing FDI in the United States will become an abundant source of new jobs here at home. Forbes Magazine recently projected Chinese investment in the United States could reach \$300 billion and create 1 million U.S. jobs by 2020.¹⁶⁶ But U.S. experience with Chinese investment remains limited; the bulk of this investment to date has been in the form of merger and acquisition transactions, not the greenfield investments that tend to be big job creators, and concern exists regarding the influence of the state on both state-owned and ostensibly private Chinese companies' behavior, which may pose threats to fair competition in the U.S. marketplace and hurt domestic employers.

Conclusions

- The United States' trade deficit with China is by far its largest, and it has grown sharply in recent years to become the single biggest bilateral deficit in the world. In 2013, it reached \$318.4 billion, setting a record for the fourth straight year, with China exporting nearly four dollars' worth of goods to the United States for every dollar's worth of imports it purchased from the United States. Even as U.S. exports to China have grown, our deficit has grown faster. This deficit is associated with declining U.S. economic competitiveness and job losses, which helps explain why 52 percent of Americans now believe that China poses a critical threat to vital future U.S. economic interests.
- U.S. employment in some sectors, particularly the manufacturing sector, has dropped substantially as trade with China has increased. Since China joined the World Trade Organization (WTO), the United States has lost 29 percent of its manufacturing jobs, according to the U.S. Bureau of Labor Statistics, and economists have begun to establish clear correlations between this job loss and the bilateral trading relationship.
- Even as U.S. manufacturing has slumped, U.S. corporations have relocated manufacturing operations to China and imports of Chinese manufactured goods have grown exponentially. As a result, the benefits of the U.S.-China trade relationship have accrued disproportionately to U.S. corporations, while most of the drawbacks have been borne by U.S. workers.
- Unfair Chinese trade practices, including market protections, subsidization, and favoritism toward certain domestic players, as well as provisions for limiting foreign investment in certain manufacturing operations, have also contributed indirectly to the ongoing decline in U.S. manufacturing employment. Although China committed to sweeping reforms when it joined the WTO, Chinese efforts to honor these commitments have slackened in the last ten years. The Chinese economy benefits from a host of policies and practices that violate the spirit, and even the letter, of Beijing's WTO commitments and harm U.S. interests. Despite a proliferation of bilateral forums for engagement, U.S. efforts to

talk through these problems have consistently fallen short. Enforcement actions have increased, but the results of these efforts have been limited, and many issues remain unaddressed.

- The dominance of state-owned enterprises in the Chinese economy is one of the reasons the United States has not designated China as a market economy, despite China's active pursuit of such a designation for many years. The United States has a statutory test for determining whether an economy can be classified as a market economy. The factors to be considered under U.S. law in granting market economy status include the extent to which the country's currency is convertible, the extent to which wage rates are freely determined by negotiations between labor and management, and the extent to which the government owns or controls the means and decisions of production. Expert witnesses have testified to the Commission that China is not currently a market economy and is not on the path to become one in the near future.
- Because trade remedies are often inaccessible, they are effectively useless to smaller U.S. companies that cannot afford to pursue cases and to companies that cannot muster the threshold industry support. Available trade remedies remain inadequate and fail to account for the interests of other affected constituents, such as workers and communities; China's undervaluation of its currency, for example, continues to function as a de facto subsidy for its exports, and U.S. law still does not provide a sufficient remedy to this problem for private parties. The Administration has not been effective in getting China to change its policies. A number of U.S. petitioners have asserted claims against China's currency policy as an actionable subsidy, but the Commerce Department has refused to treat currency undervaluation as actionable under the law. Even when trade remedy cases are successful, they do not always deliver sufficient and timely relief.
- Growing Chinese investment in the United States could be a boon to U.S. employment, but the peculiarities of state influence on Chinese corporate behavior in the United States may also pose significant competitive challenges for domestic companies, with serious drawbacks for U.S. workers. Chinese investment in the United States could pose impediments to members of domestic industries petitioning the Federal Government for trade enforcement assistance, and anecdotal evidence demonstrates that state efforts to attract Chinese investment can also undermine federal trade enforcement efforts. The potential impact of inbound Chinese investment should be more thoroughly investigated and addressed.

ENDNOTES FOR SECTION 2

1. Angela Monaghan, "China Surpasses US as World's Largest Trading Nation." *The Guardian*, January 10, 2014. <http://www.theguardian.com/business/2014/jan/10/china-surpasses-us-world-largest-trading-nation>.
2. U.S. Census Bureau, <http://www.census.gov/foreign-trade/balance/c5700.html>.
3. "China is America's Third Largest Export Market," *Governing*, June 7, 2013. <http://www.governing.com/news/state/sl-states-seek-to-increase-trade-with-china.html>;
- Benjamin Carlson, "Good News: U.S. Exports to China Soar, Setting a New Record," *Global Post*, January 21, 2014. <http://www.globalpost.com/dispatch/news/regions/asia-pacific/china/140120/good-news-us-exports-china-soar-setting-new-record>.
4. Benjamin Carlson, "Good News: U.S. Exports to China Soar, Setting a New Record," *Global Post*, January 21, 2014. <http://www.globalpost.com/dispatch/news/regions/asia-pacific/china/140120/good-news-us-exports-china-soar-setting-new-record>.
5. U.S. Census Bureau, <http://www.census.gov/foreign-trade/balance/c5700.html>.
6. U.S. Census Bureau, <http://www.census.gov/foreign-trade/balance/c5700.html>.
7. Wayne M. Morrison, *China-U.S. Trade Issues* (Congressional Research Service, February 10, 2014). <http://www.fas.org/sgp/crs/row/RL33536.pdf>.
8. Rhodium Group, *China Investment Monitor*. <http://rhg.com/interactive/china-investment-monitor/>; Daniel H. Rosen and Thilo Hanemann, *High-Tech: The Next Wave of Chinese Investment in America* (Rhodium Group, April 1, 2014). <http://rhg.com/reports/high-tech-the-next-wave-of-chinese-investment-in-america>. Thilo Hanemann, *Chinese FDI in the United States: Q1 2014 Update* (Rhodium Group, May 8, 2014). <http://rhg.com/notes/chinese-fdi-in-the-united-states-q1-2014-update>.
9. "Chinese Investment in U.S. Surpasses American Investment in China," *Financial Review*, April 30, 2014. http://www.afr.com/pl/world/chinese_investment_in_us_surpasses_kJuD3uyytWpR6Fb7QuxuYJ.
10. Thilo Hanemann, *Chinese FDI in the U.S. in 2012: A Record Year amid a Gloomy FDI Environment* (Peterson Institute for International Economics, December 28, 2012). <http://blogs.piie.com/china/?p=2147>; *Foreign Direct Investment in the United States, 2013 Report* (Organization for International Investment, 2013). http://www.oii.org/sites/default/files/FDIUS_2013_Report.pdf.
11. Thilo Hanemann and Cassie Gao, *Chinese FDI in the US: 2013 Recap and 2014 Outlook* (Rhodium Group, January 7, 2014). <http://rhg.com/notes/chinese-fdi-in-the-us-2013-recap-and-2014-outlook>.
12. U.S. Census Bureau, "Foreign Trade." <http://www.census.gov/foreign-trade/top/dst/current/deficit.html>.
13. Alliance for American Manufacturing, "U.S. Trade Deficit with China Sets New Record in 2013," *Industrial Distribution*. <http://www.inddist.com/news/2014/02/us-trade-deficit-china-sets-new-record-2013>.
14. U.S. Census Bureau, "Foreign Trade." <http://www.census.gov/foreign-trade/top/dst/current/deficit.html>.
15. U.S. Census Bureau, "U.S. International Trade in Goods and Services." http://www.census.gov/foreign-trade/statistics/historical/exhibit_history.pdf.
16. Kemal Dervis, Joshua Meltzer and Karim Foda, *Value-Added Trade and Its Implications for International Policy* (Brookings Institution, April 2, 2013). <http://www.brookings.edu/research/opinions/2013/04/02-implications-international-trade-policy-dervis-meltzer>.
17. Alliance for American Manufacturing, *U.S. Trade Deficit with China Sets New Record in 2013* (Alliance for American Manufacturing, February 6, 2014). <http://www.inddist.com/news/2014/02/us-trade-deficit-china-sets-new-record-2013>.
18. Cynthia English, "Americans Split on Whether China's Economy Is Good for U.S.," *Gallup*, April 12, 2012. <http://www.gallup.com/poll/153860/americans-split-whether-china-economy-good.aspx>; Michael Lipin, "What Americans Think about China," *Voice of America*, May 12, 2014. <http://www.voanews.com/content/new-series-what-american-think-about-china-1913088.html>.
19. Andrew Beattie, "What is Comparative Advantage?" *Investopedia*, February 26, 2009. <http://www.investopedia.com/ask/answers/09/law-comparative-advantage.asp>; Roy J. Ruffin, "David Ricardo's Discovery of Comparative Advantage," *University of Houston*. <http://www.uh.edu/~rruffin/Ricardo's%20Discovery.pdf>.
20. Organization for Economic Development, "Trade and Jobs." <http://www.oecd.org/tad/tradeandjobs.htm>.
21. Derek Scissors, *The U.S. and China: Jobs, Trade, and More* (Heritage Foundation, October 1, 2012). <http://www.heritage.org/research/reports/2012/10/the-us-and-china-jobs-trade-and-more>.
22. Robert E. Scott, "The Trans-Pacific Partnership Could Be Much Worse than the Over-Hyped Korea Deal." (Economic Policy Institute, July 18, 2013). <http://www.epi.org/publication/trade-pacts-korus-trans-pacific-partnership/>.

23. Robert E. Scott, "Unfair China Trade Costs Local Jobs." <http://americanmanufacturing.org/content/unfair-china-trade-costs-local-jobs>.
24. U.S. Bureau of Labor Statistics, <http://data.bls.gov/pdq/SurveyOutputServlet>.
25. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, written testimony of Philip Levy, February 21, 2014.
26. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Peter K. Schott, February 21, 2014.
27. David H. Autor, David Dorn, and Gordon H. Hanson, *The China Syndrome: Local Labor Market Effects of Import Competition in the United States* (National Science Foundation, March 2011).
28. WTO, "Lamy: Better Statistics Today Will Contribute to Better Policies Tomorrow." http://www.wto.org/english/news_e/sppl_e/sppl261_e.htm.
29. "WTO, OECD Find U.S.-China Deficit Smaller under 'Value-Added' Approach," *World Trade Online*, January 22, 2013. <http://insidetrade.com/Inside-Trade-General/Public-Content-World-Trade-Online/wto-oecd-find-us-china-deficit-smaller-under-value-added-approach/menu-id-896.html>.
30. Sherry Stephenson, "Services and the Global Value Chain," *The Shifting Geography of Global Value Chains, Implications for Developing Countries and Trade Policy* (World Economic Forum, Global Agenda Council on the Global Trade System, 2012). http://issuu.com/ictsd/docs/wef_gac_globaltradesystems_report_2012; U.S.-China Economic and Security Review Commission, *Hearing on the Evolving U.S.-China Trade and Investment Relationship*, written testimony of Shang-Jin Wei, June 14, 2012.
31. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Peter K. Schott, February 21, 2014.
32. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Peter K. Schott, February 21, 2014.
33. "U.S. Manufacturing Employment 1970–2010, Down 34%," *Daily Kos*, December 19, 2010. <http://www.dailykos.com/story/2010/12/19/927976/-US-Manufacturing-Employment-1970-2010-down-34%>.
34. Robert E. Scott, *Costly Trade with China* (Economic Policy Institute, May 1, 2007). <http://www.epi.org/publication/bp188/>.
35. *Trading Economics*, "China Balance of Trade." <http://www.tradingeconomics.com/china/balance-of-trade>; Statistisches Bundesamt, *Foreign Trade: Ranking of Germany's Trading Partners in Foreign Trade* (Statistisches Bundesamt, March 27, 2014).
36. *Trading Economics*, "Euro Area Balance of Trade," 2014. <http://www.tradingeconomics.com/euro-area/balance-of-trade>; Eurostat, *EU28 Deficit in Trade in Goods with China Down to 62 bn euro in the First Six Months of 2013* Stat/13/172 (European Commission, November 19, 2013). http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/6-19112013-BP/EN/6-19112013-BP-EN.PDF.
37. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, written testimony of Peter K. Schott, February 21, 2014; Robert E. Lighthizer, *Submission before the Committee on Ways and Means, Hearing on China Trade and Industrial Policies* (U.S. House Ways and Means Committee, June 16, 2010). http://waysandmeans.house.gov/media/pdf/111/2010jun16_robertlighthizer_submission.pdf.
38. "China Becomes World's Largest FDI Recipient," *Xinhua*, October 24, 2012. <http://english.peopledaily.com.cn/90778/7988220.html>.
39. K.C. Fung, Hitomi Iizaka, and Sarah Tong, "Foreign Direct Investment in China: Policy, Trend and Impact," *China's Economy in the 21st Century* (Hong Kong Institute of Economic and Business Strategy, June 24–25, 2002). http://www.hiebs.hku.hk/working_paper_updates/pdf/wp1049.pdf.
40. Ministry of Commerce, People's Republic of China, "Statistics of FDI in China in January-December 2013." <http://english.mofcom.gov.cn/article/statistic/foreigninvestment/201402/20140200498911.shtml>.
41. Valentina Romei and Rob Minto, "Chart of the Week: Who Makes China's Exports—Local Companies or Foreign?" *Financial Times*, September 10, 2012. <http://blogs.ft.com/beyond-brics/2012/09/10/chart-of-the-week-who-is-making-chinas-exports/>.
42. Ministry of Commerce, People's Republic of China, "Statistics of FDI in China in January-December 2013." <http://english.mofcom.gov.cn/article/statistic/foreigninvestment/201402/20140200498911.shtml>.
43. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Oded Shenkar, February 21, 2014.
44. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, written testimony of Peter K. Schott, February 21, 2014.

45. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, written testimony of Peter K. Schott, February 21, 2014.
46. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, written testimony of Peter K. Schott, February 21, 2014.
47. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, written testimony of Peter K. Schott, February 21, 2014.
48. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Oded Shenkar, February 21, 2014.
49. U.S. Bureau of Labor Statistics, <http://data.bls.gov/timeseries/CES3000000> 01.
50. Office of the United States Trade Representative, *2013 Report to Congress on China's WTO Compliance*, December 2013.
51. Ramesh Adhikari and Yongzheng Yang, "What Will WTO Membership Mean for China and Its Trading Partners?" *Finance and Development* 39:3 (September 2002). <http://www.imf.org/external/pubs/ft/fandd/2002/09/adhikari.htm>.
52. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), p. 158.
53. Robert D. Atkinson, *Enough is Enough: Confronting Chinese Innovation Mercantilism* (Information Technology and Innovation Foundation, February 2012). <http://www2.itif.org/2012-enough-enough-chinese-mercantilism.pdf>.
54. Robert D. Atkinson, *Enough is Enough: Confronting Chinese Innovation Mercantilism* (Information Technology and Innovation Foundation, February 2012). <http://www2.itif.org/2012-enough-enough-chinese-mercantilism.pdf>.
55. Office of the United States Trade Representative, *2013 Report to Congress on China's WTO Compliance*, December 2013.
56. Hoo Tiang Boon, *The Growing Institutionalization of U.S.-China Relations* (East Asia Forum, August 3, 2013). <http://www.eastasiaforum.org/2013/08/03/the-growing-institutionalisation-of-us-china-relations/>.
57. Hoo Tiang Boon, *The Growing Institutionalization of U.S.-China Relations* (East Asia Forum, August 3, 2013). <http://www.eastasiaforum.org/2013/08/03/the-growing-institutionalisation-of-us-china-relations/>.
58. Derek Scissors, *Tools to Build the U.S.-China Economic Relationship*, Background No. 2590 (Heritage Foundation, August 8, 2011). http://thf_media.s3.amazonaws.com/2011/pdf/bg2590.pdf.
59. Derek Scissors, *Tools to Build the U.S.-China Economic Relationship*, Background No. 2590 (Heritage Foundation, August 8, 2011). http://thf_media.s3.amazonaws.com/2011/pdf/bg2590.pdf.
60. Derek Scissors, *Tools to Build the U.S.-China Economic Relationship*, Background No. 2590 (Heritage Foundation, August 8, 2011). http://thf_media.s3.amazonaws.com/2011/pdf/bg2590.pdf.
61. Derek Scissors, *Tools to Build the U.S.-China Economic Relationship*, Background No. 2590 (Heritage Foundation, August 8, 2011). http://thf_media.s3.amazonaws.com/2011/pdf/bg2590.pdf.
62. U.S. Government Accountability Office, *United States Has Secured Commitments in Key Bilateral Dialogues, but U.S. Agency Reporting on Status Should Be Improved*, GAO-14-102, February 11, 2014. <http://www.gao.gov/products/GAO-14-102>.
63. U.S. Government Accountability Office, *United States Has Secured Commitments in Key Bilateral Dialogues, but U.S. Agency Reporting on Status Should Be Improved*, GAO-14-102, February 11, 2014. <http://www.gao.gov/products/GAO-14-102>.
64. Aaron Stanley, "U.S. Challenges China over Compliance with WTO Ruling," *Financial Times*, January 13, 2014. <http://www.ft.com/cms/s/0/fb9a6b52-7c95-11e3-9179-00144feabdc0.html#axzz2yDpSsteJ>.
65. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Elizabeth Drake, February 21, 2014.
66. U.S. International Trade Administration, "Safeguards." http://www.trade.gov/maslian/tradedisputes-enforcement/tg_ian_002099.asp.
67. Sewell Chan, "U.S. Says China Fund Breaks Rules," *The New York Times*, December 22, 2010. <http://www.nytimes.com/2010/12/23/business/global/23trade.html?pagewanted=all>; "USTR Initiates Section 301 Investigation into China's Subsidies and Restrictive Practices on Green Technology Sector," *Mayer Brown*, October 18, 2010. <http://www.mayerbrown.com/publications/USTR-Initiates-Section-301-Investigation-into-Chinas-Subsidies-and-Restrictive-Practices-on-Green-Technology-Sector-10-18-2010/>.

68. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Elizabeth Drake, February 21, 2014.
69. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Elizabeth Drake, February 21, 2014.
70. “China’s Economy and the WTO, All Change,” *Economist*, December 10, 2011. <http://www.economist.com/node/21541448>.
71. Guonan Ma and Robert McCauley, Bank for International Settlements, “The Evolving Renminbi Regime and Implications for Asian Currency Stability.” <http://www.bis.org/publ/work321.pdf>; U.S. Department of the Treasury, *Report to Congress on International Economic and Exchange Rate Policies*, July 8, 2010. <http://www.treasury.gov/resource-center/international/exchange-rate-policies/Documents/Foreign%20Exchange%20Report%20July%202010.pdf>.
72. U.S. Department of the Treasury, *Report to Congress on International Economic and Exchange Rate Policies*, July 8, 2010. <http://www.treasury.gov/resource-center/international/exchange-rate-policies/Documents/Foreign%20Exchange%20Report%20July%202010.pdf>.
73. U.S. Department of the Treasury, *Report to Congress on International Economic and Exchange Rate Policies*, October 30, 2013. http://www.treasury.gov/resource-center/international/exchange-rate-policies/Documents/2013-10-30_FULL%20FX%20REPORT_FINAL.pdf.
74. Edward P. Lazear, “Chinese ‘Currency Manipulation’ is Not the Problem,” *Wall Street Journal*, January 7, 2013. <http://online.wsj.com/news/articles/SB10001424127887323320404578213203581231448?mg=reno64-wsj>.
75. International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restrictions*, August 2014. <http://www.imfbookstore.org/ProdDetails.asp?ID=AREAERALL&PG=1&Type=RLMc>.
76. Brain Palmer, “If Currency Manipulation Is so Great for Exports, Why Don’t We Do It?” *Slate*, October 17, 2012. http://www.slate.com/articles/news_and_politics/explainer/2012/10/china_currency_manipulation_how_does_it_harm_the_u_s_and_what_can_we_do.html.
77. U.S. Department of the Treasury, *Report to Congress on International Economic and Exchange Rate Policies*, April 15, 2014. http://www.treasury.gov/resource-center/international/exchange-rate-policies/Documents/2014-4-15_FX%20REPORT%20FINAL.pdf.
78. C. Fred Bergsten and Joseph E. Gagnon, *Currency Manipulation, the U.S. Economy, and the Global Economic Order*, Number PB12–25 (Peterson Institute for International Economics, December 2012). <http://www.iie.com/publications/pb/pb12-25.pdf>.
79. C. Fred Bergsten and Joseph E. Gagnon, *Currency Manipulation, the U.S. Economy, and the Global Economic Order*, Number PB12–25 (Peterson Institute for International Economics, December 2012). <http://www.iie.com/publications/interstitial.cfm?ResearchID=2302>.
80. C. Fred Bergsten and Joseph E. Gagnon, *Currency Manipulation, the U.S. Economy, and the Global Economic Order*, Number PB12–25 (Peterson Institute for International Economics, December 2012). <http://www.iie.com/publications/pb/pb12-25.pdf>.
81. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Robert Scott, February 21, 2014.
82. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Robert Scott, February 21, 2014.
83. The White House, *Remarks by the President at the Senate Democratic Policy Committee Issues Conference*, February 3, 2010. <http://www.whitehouse.gov/the-press-office/remarks-president-senate-democratic-policy-committee-issues-conference>; David E. Sanger, “With Warning, Obama Presses China on Currency,” *New York Times*, September 23, 2010. http://www.nytimes.com/2010/09/24/world/24prexy.html?_r=1&partner=rss&emc=rss.
84. “Obama Presses China’s Xi over Currency—White House,” Reuters, March 24, 2014. <http://www.reuters.com/article/2014/03/24/usa-china-currency-idUSL1N0MLORF20140324>.
85. “China, U.S. to Talk on Currency,” CNN, December 9, 2003. <http://www.cnn.com/2003/BUSINESS/12/09/china.us.wentrade.biz/>.
86. Wayne M. Morrison, “China’s Currency Policy: An Analysis of the Economic Issues.” <https://www.fas.org/sgp/crs/row/RS21625.pdf>.
87. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Elizabeth Drake, February 21, 2014.
88. Doug Palmer, “U.S. Turns Down China Currency Probes in Two Cases,” Reuters, August 31, 2010. <http://www.reuters.com/article/2010/08/31/usa-china-currency-idUSN3124941420100831>.

89. Congress Votes, Govtrack.US. <https://www.govtrack.us/congress/votes/111-2010/h554>; United States Senate, Legislation and Records. http://www.senate.gov/legislative/LIS/roll_call_lists/roll_call_vote_cfm.cfm?&congress=112&session=1&vote=00159.
90. American Manufacturing, "Senate TPP Currency Manipulation." <http://americanmanufacturing.org/files/SenateTPPCurrencyManipulation.pdf>.
91. Wayne M. Morrison, "China's Currency Policy: An Analysis of the Economic Issues." <https://www.fas.org/sgp/crs/row/RS21625.pdf>.
92. Edward P. Lazear, "Chinese 'Currency Manipulation' Is Not the Problem," *Wall Street Journal*, January 7, 2013. <http://online.wsj.com/news/articles/SB10001424127887323320404578213203581231448?mg=reno64-wsj>.
93. Dan Ikenson, "Foreign 'Currency Manipulation' Does Not Warrant Washington's Attention," *Forbes*, January 8, 2013. <http://www.forbes.com/sites/danikenson/2013/01/08/foreign-currency-manipulation-does-not-warrant-washingtons-attention/>.
94. Derek Scissors, *Tools to Build the U.S.-China Economic Relationship* (Heritage Foundation, August 8, 2011). <http://www.heritage.org/research/reports/2011/08/tools-to-build-the-us-china-economic-relationship>.
95. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Philip I. Levy, February 21, 2014.
96. Doug Guthrie, "Condemning China on Currency Will only Hurt U.S. Economy," *Forbes*, October 23, 2012. <http://www.forbes.com/sites/douguthrie/2012/10/23/condemning-china-on-currency-will-only-hurt-u-s-economy/>.
97. Stephanie Henry, U.S.-China Business Council, "Treasury: China Not a Currency Manipulator." <http://www.uschina.org/washington-update/treasury-china-not-currency-manipulator>.
98. Benjamin Carlson, "Good News: U.S. Exports to China Soar, Setting a New Record," *Global Post*, January 21, 2014. <http://www.globalpost.com/dispatch/news/regions/asia-pacific/china/140120/good-news-us-exports-china-soar-setting-new-record>.
99. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Oded Shenkar, February 21, 2014.
100. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Robert Scott, February 21, 2014.
101. Benjamin Carlson, "Good News: U.S. Exports to China Soar, Setting a New Record," *Global Post*, January 21, 2014. <http://www.globalpost.com/dispatch/news/regions/asia-pacific/china/140120/good-news-us-exports-china-soar-setting-new-record>.
102. The White House, "Executive Order—Establishment of the Interagency Trade Enforcement Center," February 28, 2012. <http://www.whitehouse.gov/the-press-office/2012/02/28/executive-order-establishment-interagency-trade-enforcement-center>.
103. Office of the United States Trade Representative, "ITEC Frequently Asked Questions." <http://www.ustr.gov/trade-topics/enforcement/itec/faq>.
104. "China—Certain Measures Affecting the Automobile and Automobile-Parts Industry," Dispute DS450, WTO. http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds450_e.htm.
105. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Elizabeth Drake, February 21, 2014.
106. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Elizabeth Drake, February 21, 2014.
107. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Elizabeth Drake, February 21, 2014.
108. U.S. International Trade Administration, "An Introduction to U.S. Trade Remedies." <http://enforcement.trade.gov/intro/>.
109. Derek Scissors, *Tools to Build the U.S.-China Economic Relationship*, Background No. 2590 (Heritage Foundation, August 8, 2011). http://thf_media.s3.amazonaws.com/2011/pdf/bg2590.pdf.
110. Edward A. Geltman and James P. Wehner, *Manufacturers outside U.S. Face Increased Threat of Private Litigation under 1916 Antidumping Act* (Squire, Sanders & Dempsey L.L.P., 2004). http://www.ssd.com/files/tbl_s29Publications%5CFileUpload5689%5C8859%5C1916%20Antidumping%20Act.pdf.
111. Chakravarthi Raghavan, "WTO Panel Rules against 1916 U.S. Anti-Dumping Law," *Third World Network*, April 2000. <http://www.twinside.org.sg/title/1916.htm>.
112. "United States Repeals Antidumping Act of 1916," *eBearing News*, December 14, 2004. <http://www.ebearing.com/news2004/121401.htm>.
113. U.S. Government Accountability Office, "Commerce Faces Practical and Legal Challenges in Applying Countervailing Duties," June 17, 2005. <http://www.gao.gov/products/GAO-05-474>.
114. U.S. Government Accountability Office, "Commerce Faces Practical and Legal Challenges in Applying Countervailing Duties," June 17, 2005. <http://www.gao.gov/products/GAO-05-474>.

115. Guobing Shen and Xiaolan Fu, "The Trade Effects of US Anti-dumping Actions against China Post-WTO Entry," *The World Economy* 37:1 (2014). <http://online.library.wiley.com/doi/10.1111/twec.12125/pdf>; Chad P. Brown, World Bank, "Global Antidumping Database." <http://econ.worldbank.org/ttbd/gad/>.

116. KPMG Global China Practice, State-Owned Entities: From Centrally-Planned Origins to Hybrid Market Competitors (KPMG, June 2013). <http://www.kpmg.com/CN/en/IssuesAndInsights/ArticlesPublications/Newsletters/China-360/Documents/China-360-Issue9-201306-State-owned-entities.pdf>.

117. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), p. 160.

118. Christian Tietje and Karsten Nowrot, *Myth or Reality? China's Market Economy Status under WTO Anti-Dumping Law after 2016*, Policy Papers on Transnational Economic Law, No. 34 (Transnational Economic Law Research Center, December 2011). <http://tietje.jura.uni-halle.de/sites/default/files/telc/PolicyPaper34.pdf>.

119. O'Connor European Lawyers, "The Myth of China and Market Economy Status in 2016." <http://worldtradelaw.typepad.com/files/oconnorresponse.pdf>.

120. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Eileen Bradner, February 21, 2014.

121. Elizabeth Drake (partner, Stewart and Stewart), telephone interview with Commission staff, March 27, 2014.

122. Dexter Roberts, "How China May Lose a Chance for Reform," *Businessweek*, October 11, 2013 <http://www.businessweek.com/articles/2013-10-11/chinas-third-plenum-get-ready-for-disappointment>.

123. Ève Cary, "Reforming China's State-Owned Enterprises," *Diplomat*, June 19, 2013. <http://thediplomat.com/2013/06/reforming-chinas-state-owned-enterprises/?allpages=yes>; "China Focus: China Pledges Further Reforms for State-Dominated Sectors," Xinhua, October 24, 2012. http://news.xinhuanet.com/english/indepth/2012-10/24/c_131928023.htm.

124. Arthur R. Kroeber, *Xi Jinping's Ambitious Agenda for Economic Reform in China* (Brookings Institution, November 17, 2013). <http://www.brookings.edu/research/opinions/2013/11/17-xi-jinping-economic-agenda-kroeber>.

125. U.S.-China Economic and Security Review Commission, *Hearing on Trends and Implications of Chinese Investment in the United States: Issues for Policymakers*, testimony of Willy C. Shih, May 9, 2013.

126. Arthur R. Kroeber, *Xi Jinping's Ambitious Agenda for Economic Reform in China* (Brookings Institution, November 17, 2013). <http://www.brookings.edu/research/opinions/2013/11/17-xi-jinping-economic-agenda-kroeber>.

127. Arthur R. Kroeber, *After the NPC: Xi Jinping's Roadmap for China* (Brookings Institution, March 11, 2014). <http://www.brookings.edu/research/opinions/2014/03/11-after-npc-xi-jinping-roadmap-for-china-kroeber>.

128. "China's State Sector Strikes Back," *Wall Street Journal*, June 6, 2013. <http://blogs.wsj.com/chinarealtime/2013/06/06/chinas-state-sector-strikes-back/>.

129. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Adam Hersh, February 21, 2014.

130. Content First, LLC, *Foreign Direct Investment in the United States, 2013 Report* (Organization for International Investment, 2013). https://www.ofii.org/sites/default/files/FDIUS_2013_Report.pdf.

131. Tazeem Pasha, *Foreign Direct Investment in the United States, Drivers of U.S. Competitiveness* (International Trade Administration, December 31, 2013). http://selectusa.commerce.gov/sites/selectusa.commerce.gov/files/documents/2014/january/2013-12-31_selectusa_report_-_fdi_in_the_united_states.pdf.

132. U.S.-China Economic and Security Review Commission, *Hearing on Trends and Implications of Chinese Investment in the United States: Issues for Policymakers*, written testimony of Elizabeth J. Drake, May 9, 2013; U.S.-China Economic and Security Review Commission, *Hearing on Trends and Implications of Chinese Investment in the United States*, written testimony of Derek Scissors, May 9, 2013; and Zhangqin, "Xinhua Insight: Twists and Turns for Chinese SOEs Abroad," Xinhua, September 28, 2012. http://www.china.org.cn/china/Off_the_Wire/2012-09/28/content_26662276.htm.

133. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Joel Backaler, February 21, 2014.

134. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Joel Backaler, February 21, 2014.

135. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Joel Backaler, February 21, 2014.

136. "China Says to Ease Restriction on Overseas Investments," Reuters, April 10, 2014. <http://in.reuters.com/article/2014/04/11/china-investmentgrade-idINDEEA3A02I20140411>.

137. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), p. 176.
138. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), p. 176.
139. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Willy C. Shih, February 21, 2014.
140. U.S.-China Economic and Security Review Commission, *Hearing on Chinese State-Owned and State-Controlled Enterprises*, written testimony of Timothy C. Brightbill, February 15, 2012. http://www.uscc.gov/sites/default/files/2.15.12brightbill_testimony.pdf.
141. U.S.-China Economic and Security Review Commission, *Hearing on Chinese State-Owned and State-Controlled Enterprises*, testimony of Timothy C. Brightbill, February 15, 2012.
142. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Willy C. Shih, February 21, 2014.
143. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), pp. 156–157.
144. The White House, “Foreign Direct Investment in the United States.” http://www.whitehouse.gov/sites/default/files/2013fdi_report_-_final_for_web.pdf.
145. Tazeem Pasha, *Foreign Direct Investment in the United States, Drivers of U.S. Competitiveness* (International Trade Administration, December 31, 2013). http://selectusa.commerce.gov/sites/selectusa.commerce.gov/files/documents/2014/january/2013-12-31_selectusa_report_-_fdi_in_the_united_states.pdf.
146. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), p. 183.
147. Zijiang Wu and Jonathan Browning, “Lenovo Heeds Jiang’s ‘Go Out’ Call in Second China M&A Wave,” *Businessweek*, March 26, 2014. <http://www.businessweek.com/news/2014-03-25/lenovo-heeding-jiang-s-go-out-call-in-second-china-wave-of-m-and-a>.
148. Thilo Hanemann and Cassie Gao, *Chinese FDI in the US: 2013 Recap and 2014 Outlook* (Rhodium Group, January 7, 2014). <http://rhg.com/notes/chinese-fdi-in-the-us-2013-recap-and-2014-outlook>.
149. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Joel Backaler, February 21, 2014.
150. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Joel Backaler, February 21, 2014.
151. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Adam Hersh, February 21, 2014.
152. Dexter Roberts, “How China May Lose a Chance for Reform,” *Businessweek*, October 11, 2013 <http://www.businessweek.com/articles/2013-10-11/chinas-third-plenum-get-ready-for-disappointment>.
153. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Willy C. Shih, February 21, 2014.
154. Zijiang Wu and Jonathan Browning, “Lenovo Heeds Jiang’s ‘Go Out’ Call in Second China M&A Wave,” *Businessweek*, March 26, 2014. <http://www.businessweek.com/news/2014-03-25/lenovo-heeding-jiang-s-go-out-call-in-second-china-wave-of-m-and-a>.
155. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Eileen Bradner, February 21, 2014.
156. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), p. 179.
157. Timothy C. Brightbill, Linda S. Chang, and Peggy A. Clarke, *Trade Remedies for Global Companies* (American Bar Association, 2006), p. 26. http://books.google.com/books?id=5LyLgAQw_YC&pg=PR2&lpg=PR2&dq=brightbill+clark+chang+trade+remedies+for+global+companies&source=bl&ots=DdyAQCeO_&sig=nKqbl_jO-VZSibsPIR77Y8ffM&hl=en&sa=X&ei=JaStU4PAA-qssAS334CYAQ&ved=0CCgQ6AEwAQ#v=snippet&q=industry%20support&f=false.
158. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Elizabeth Drake, February 21, 2014.
159. U.S. Department of Commerce and the President’s Council of Economic Advisors, “Foreign Direct Investment in the United States.” http://www.whitehouse.gov/sites/default/files/2013fdi_report_-_final_for_web.pdf; Rhodium Group, “China Investment Monitor.” <http://rhg.com/interactive/china-investment-monitor>.
160. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Economic Challenges*, testimony of Joel Backaler, February 21, 2014.
161. Derek Scissors, *China’s Global Investment Rises: The U.S. Should Focus on Competition* (Heritage Foundation, January 9, 2013). <http://www.heritage.org/research/reports/2013/01/chinas-global-investment-rises-the-us-should-focus-on-competition>.

162. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), pp. 188–189.

163. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), pp. 188–189.

164. David Shambaugh, *China Goes Global: The Partial Power* (New York, NY: Oxford University Press, 2013), p. 180.

165. “China 2013 Foreign Investment Inflows Hit Record High,” Reuters, January 16, 2014. <http://www.reuters.com/article/2014/01/16/us-china-economy-fdi-idUSBREA0F0EI20140116>.

166. Lin Yang, “Jobs From China? An Estimated 1 Million U.S. Jobs Supported by 2020,” *Forbes*, June 16, 2014. <http://www.forbes.com/sites/linyang/2014/06/16/jobs-from-china-an-estimated-1-million-u-s-jobs-created-by-2020/>.

SECTION 3: CHINA'S HEALTHCARE INDUSTRY, DRUG SAFETY, AND MARKET ACCESS FOR U.S. MEDICAL GOODS AND SERVICES

Introduction

The healthcare sector has played a marginal role in U.S.-China relations, but that is beginning to change. China has become the world's top producer of active pharmaceutical ingredients (APIs) and inert substances, as well as a significant exporter of medical products.¹ U.S. drug companies and distributors are sourcing a large share of ingredients and finished drugs from China and selling them in the United States. Concurrently, China is experiencing a major demographic and epidemiologic transition, challenging the nation's health care system. China's median age will exceed that of the United States within this decade, and the proportion aged 65 and above is projected to increase from 9 percent in 2013 to 25 percent by 2040, totaling 300 million.*² An older and wealthier population, with a rising incidence of non-communicable diseases, is seeking more frequent and better-quality treatment.³ U.S. companies that market drugs, medical devices, and healthcare services consequently view China as an important opportunity.⁴

To explore these issues, the Commission held a hearing in April 2014 on China's healthcare sector, drug safety, and the U.S.-China trade in medical products. Among the witnesses were Christopher J. Hickey, the U.S. Food and Drug Administration's (FDA) country director for the People's Republic of China; Rod Hunter, senior vice president for international affairs at PhRMA; and Karen Eggleston, fellow and director of the Asia Health Policy Program at the Shorenstein Asia-Pacific Research Center of Stanford University. The hearing built on the Commission's past work on healthcare, in particular the April 2010 commissioned report *Potential Health & Safety Impacts from Pharmaceuticals and Supplements Containing Chinese-Sourced Raw Ingredients*, authored by NSD Bio Group, LLC.⁵

The Commission determined that the Chinese government is stepping up efforts to fix the country's troubled healthcare system. In addition to promoting structural reforms, it invested over \$371 billion between 2009 and 2012, much of which has gone toward expanding public health insurance and building healthcare facilities in small towns and rural areas.⁶ The government is also taking preliminary steps to improve regulation of pharmaceutical production. Important measures include updating good manufacturing practices (GMP) legislation in 2011 and consolidating separate reg-

*The U.S. over-65 population is 14 percent. United States Census Bureau, "Quickfacts," <http://quickfacts.census.gov/qfd/states/00000.html>.

ulatory agencies into the China Food and Drug Administration (CFDA) in 2013.⁷

However, not all of China's healthcare reforms have succeeded, and serious problems remain. The government operates the largest hospitals and health insurers, thereby competing against the private sector and creating conflicts between government ownership and regulatory functions. Beijing also intervenes heavy-handedly in the healthcare market by controlling prices for drugs and devices, setting distorted fee schedules for medical providers, and determining which drugs are eligible for reimbursements from government-run insurers. Meanwhile, underfunded hospitals and doctors solicit bribes and overprescribe costly drugs and treatments to compensate for strict curbs on fees. Escalating costs, as well as rising utilization, are driving healthcare spending. Some frustrated patients have even taken violent action against doctors and nurses. Central directives to address these issues are often poorly designed or implemented unevenly by local governments.⁸

The goal of promoting indigenous producers has also impeded efforts to develop a well-regulated pharmaceutical industry. Although some private Chinese companies are competing fairly, the government is subsidizing domestic firms while inducing technology transfer from foreign drug and device makers.⁹ At the same time, China has become one of the prime sources of counterfeit and substandard drugs and drug ingredients. Fragmented supply chains, competition based primarily on pricing, and weak enforcement of standards encourage producers to cut corners.¹⁰

As producer and consumer, China now plays a central role in the global healthcare sector. For the United States, this presents opportunities as well as risks. Outsourcing production to China may help U.S. drug makers lower production costs but can compromise the safety of U.S. consumers. Tainted heparin products that originated in China claimed at least 81 U.S. lives and many sick patients in 2007–2008.¹¹ Since then, the FDA has enhanced its efforts to monitor drug safety in China, at the border, and in the U.S. market. Congress has passed new bills, such as the Food and Drug Administration Safety and Innovation Act (FDASIA) (2012) and Drug Quality and Security Act (DQSA) (2013), to enhance the agency's legal authority and operational capabilities over drug imports. Still, in view of China's vast industry and weak domestic regulation, U.S. consumers remain at risk. As of late September 2014, the FDA had just one part-time and two full-time drug inspectors stationed in China.¹²

U.S. companies looking to sell goods and services in China's healthcare sector also face market access barriers. Onerous clinical trials in China can delay the marketing of U.S. drugs by up to eight years. Uneven access to reimbursement lists makes U.S. drugs less affordable for Chinese patients.¹³ U.S. device makers likewise suffer from a number of regulatory hurdles that impact data protection and competitiveness.¹⁴ A recent crackdown on foreign drug makers on bribery charges has raised broader questions about whether U.S. companies can operate ethically in an authoritarian state plagued by widespread corruption.¹⁵

China's Pharmaceutical Exports: Public Health Risks and Policy Responses

China's Position in the Global Drug Industry

U.S. reliance on foreign medical products has increased substantially in the 21st century. The number of drugs from foreign sources for sale in the U.S. market doubled between 2001 and 2008, and today represents 40 percent of the market. Import reliance is even starker for APIs—some 80 percent are now sourced from abroad.¹⁶ This trend is reflected in U.S. imports from China. According to Dr. Hickey, the total number of shipments of FDA-regulated products from China increased from approximately 1.3 million entry lines (food, drugs and devices) in 2007 to almost 5.2 million in 2013.*¹⁷ Dr. Allan Coukell, a drug safety expert at the Pew Charitable Trusts, testified that about 40 percent of APIs used in the United States are sourced from China and India. The United States imported over 100 million kilograms of pharmaceutical goods from China in 2013, a close to 200 percent increase over the past decade.¹⁸ Charles Bell, a health expert at Consumers Union, told the Commission: “Over the last decade or so, a lot of the sourcing of dietary supplements and vitamin ingredients has shifted to China, following the pattern set by the drug industry.”¹⁹

Product-specific data substantiates these claims. Import statistics gathered by the U.S. International Trade Commission demonstrate that, although volumes fluctuate over time, a substantial share of U.S. non-prescription painkillers such as ibuprofen, acetaminophen, and aspirin, originates in China (see Table 1). The increase in China's share of antibiotics imports is striking, as is the reliance on China for organic glands used for organotherapeutic purposes. According to Chinese government sources, China's volume of production for a range of drugs has increased substantially since 2005 (see Table 2).

Table 1: U.S. Imports of Select Pharmaceuticals, Drug Ingredients, and Vitamins †
(kilograms thousands)

<i>Volume of Total U.S. Imports (kilograms thousands)</i>				
	1998	2003	2008	2013
Ibuprofen	415	1,492	3,017	3,837
Acetaminophen	1,488	2,291	3,040	1,941
Aspirin	2,034	4,314	4,663	4,453
Glands/organs for organotherapeutic uses	—	—	3,758	3,699
Antibiotics	8,455	5,752	6,759	8,233
Vitamin C	12,405	21,601	36,251	33,006
Vitamin D	306	583	1,195	1,246

* In this context, a “line” is an FDA entry line, which represents each portion of a shipment that an importer lists as a separate item on an entry document. According to Dr. Hickey, 3.4 million entry lines in 2013 were medical devices and 25,000 were drugs and biologics.

† HTS codes used for this table are: Ibuprofen (2916391500), acetaminophen (2924296210), aspirin (2918221000), glands and other organs for organotherapeutic uses, dried, whether or not powdered (30019001), antibiotics (all 10-digit codes under HTS 2941), vitamin C and its derivatives (2936270000), vitamins D and their derivatives (2936295020).

Table 1: U.S. Imports of Select Pharmaceuticals, Drug Ingredients, and Vitamins †—Continued
(kilograms thousands)

<i>China's Share of U.S. Imports (%)</i>				
	1998	2003	2008	2013
Ibuprofen	0.1%	6.2%	73.4%	70.3%
Acetaminophen	48.5%	65.1%	41.9%	44.7%
Aspirin	37.0%	39.7%	31.8%	28.6%
Glands/organs for organotherapeutic uses	—	—	69.4%	57.9%
Antibiotics	39.4%	26.3%	51.0%	70.4%
Vitamin C	64.7%	86.4%	90.1%	89.9%
Vitamin D	0.3%	16.5%	53.6%	83.4%

Source: U.S. International Trade Commission.

Table 2: Selection of Top Pharmaceuticals Products Produced in China (by Volume)
(tons)

	Tons		Compound annual growth rate (%)
	2005	2013	
<i>Antibiotics</i>			
Amoxicillin	7,765	14,401	8.0%
Penicillin K	362	4,396	36.6%
Ceftriaxone Sodium	1,320	4,009	14.9%
<i>Antipyretics and Analgesics</i>			
Paracetamol	44,244	64,485	11.4%
Ibuprofen	2,437	5,795	11.4%
<i>Antiparasitics, Vitamins, and Minerals</i>			
Vitamin C	80,804	107,042	3.6%
Vitamin E Powder	12,562	40,133	15.6%
Vitamin A Powder	2,259	5,804	12.5%
Vitamin B12	704	1,789	12.4%
<i>Drugs for Central, Alimentary, and Respiratory Systems</i>			
Caffeine	9,630	14,349	5.1%
Taurine, 2-Aminoethanesulfonic acid	2,141	12,159	24.2%
Piracetam	2,096	2,947	4.3%
Sodium Bicarbonate for Injection	733	1,450	8.9%
<i>Fluid, Electrolyte & Acid Base Balance and Anaesthetics</i>			
Sodium Chloride for Injection	16,239	32,189	8.9%
Dicalcium Phosphate	972	21,638	47.4%
Potassium Chloride for Injection	396	2,156	23.6%
<i>Antiallergic Agents, Enzymes, and Other Biochemicals</i>			
Phenylalanine	122	1,894	40.9%
Thiopropine	710	1,361	8.5%
Leucine	529	1,004	8.3%
<i>Other Substances</i>			
Glucose	255,308	304,388	2.2%
Glucose for Injection	78,153	88,972	1.6%
Xylitol	8,644	34,345	18.8%
Microcrystalline Cellulose	2,036	3,159	5.6%
Fructose	57	1,328	48.3%

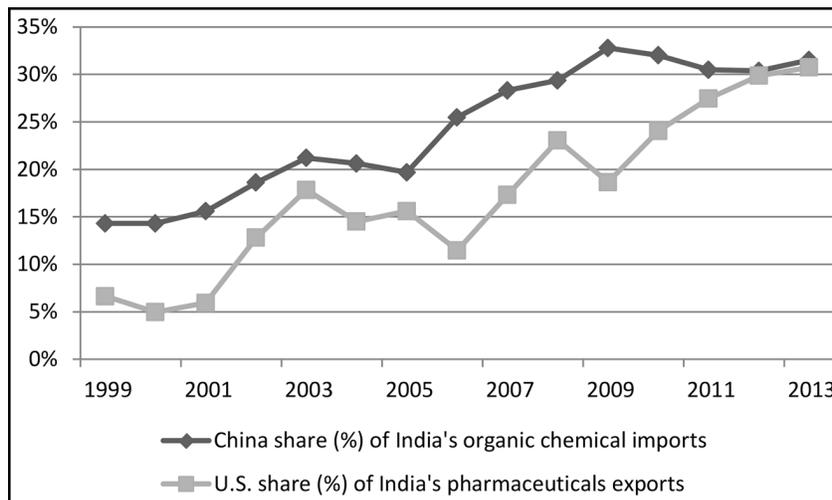
Source: China State Food and Drug Administration, via CEIC data.

The outsourcing of drug production to developing countries is not unique to China. U.S. and European drug makers today are manufacturing fewer small molecules in house and focusing instead on the higher-value development of biologics.* Much of their research and development (R&D) takes place in Boston, Geneva, and other “clusters of expertise.”²⁰ Producers across Asia have entered drug manufacturing, taking advantage of low labor costs, advances in transport and communications, and government policies that encourage value-added exports. India is now the preeminent supplier of generic drugs, serving as an export platform for U.S.-based multinationals, as well as Indian competitors.²¹ To regulate Indian drug exports to the United States more effectively, the FDA has established offices in New Delhi and Mumbai, and stationed one full-time medical products investigator in New Delhi.²²

However, China also occupies a distinctive position in global drug production. In contrast to India, its products tend to enter the value chain further upstream, or in a more preliminary stage—what experts call the “precursor supply chain.”²³ Precise evidence is hard to come by, but experts estimate that China is the top global manufacturer of APIs and drug dyes, binding agents, gel capsules, and other inert substances.²⁴ In a 2010 study of pharmaceutical executives by the consulting firm Axendia, 70 percent of respondents cited China as their top country source for pharmaceutical ingredients.²⁵ Research conducted at the Commission’s request by NSD Bio Group shows that the United States in 2008 was the top destination for China’s pharmaceutical raw material exports, with a 16.2 percent share. India ranked as China’s second-leading export destination.²⁶ Since India’s drug industry is export oriented, a substantial portion of Chinese-origin ingredients processed in India may be exported to the United States as part of finished drug products. Indian customs data show that China’s share of India’s organic chemical imports and the U.S. share of India’s drug exports have both risen over the past decade (see Figure 1).

*The bio/pharmaceutical industry discovers and develops both small molecule drugs (also referred to as New Chemical Entities or NCEs) and biomolecular drugs, also called biologics (also referred to as New Biological Entities or NBEs). While NCEs tend to be chemically synthesized and have a known structure, NBEs are complex mixtures that are not easily identified or characterized. Since the early 1980s, drug innovations for NCEs have leveled off while those for NBEs have increased. Biological products often represent the cutting-edge of biomedical research and, in time, may offer the most effective means to treat a variety of medical illnesses and conditions that have no other treatments available. U.S. Food and Drug Administration, “What Are ‘Biologics’ Questions and Answers.” <http://www.fda.gov/AboutFDA/CentersOffices/OfficeofMedicalProductsandTobacco/CBER/ucm133077.htm>; “Small Molecule Drugs versus Biomolecular Drugs (Biologics)” (James Samanen Consulting, 2014). <http://www.portfoliomangement-solutions.com/the-organization-of-pharmaceutical-rd/small-molecule-drugs-versus-biomolecular-drugs-biologics/>.

Figure 1: China Share of India's Organic Chemical Imports; U.S. Share of India's Drug Exports
(Share, %)



Source: India Ministry of Commerce and Industry, via CEIC.

China's Production of Counterfeit and Substandard Medicines

China is a prolific source of counterfeit and substandard medicines. Fake drug production is, of course, a global problem, not least in India.* Dr. Shaohong Jin, vice president of China's state-run National Institute for Food and Drug Control, maintains that the incidence of fake and substandard drugs in China has in fact declined: His tests of thousands of drug samples indicate that the share of failed drugs fell from 14 percent in 1998 to less than 5 percent in 2013.²⁷ However, there is alarming evidence that points in the other direction. In 2012, for example, Chinese authorities discovered 77 million gel capsules made from industrial waste.† Economist Ginger Zhe Jin told the Commission that fake drugs from China are making their way across the world. In a recent study, she sampled 1,437 drugs sold in 18 poor-to-middle-income countries. Drugs labeled "made in China" accounted for 6 percent of the total sample, but for 20 percent of the fake drugs in the sample.²⁸ The White House Office of National Drug Control Policy states that

*During a crackdown in May 2014, authorities in the United Kingdom seized millions of dollars worth of counterfeit and unlicensed medicines. Of these, 72 percent came from India and 11 percent from China. Margaret Davis, "Fake and Unlicensed Drugs Seized," *Press Association National Newswire*, May 22, 2014, via Factiva.

†Other prominent cases of drug safety lapses in China include: Xinfu Clindamycin Injections (2006); Qiqihar Counterfeit Armillarisin A Injections (2006); Shanghai Hualian Major Drug Production Quality Accident (2007); and Dalian Jingang Anti-Counterfeit Rabies Vaccines (2009). For an analysis of these cases, see NSD Bio Group LLC, *Potential Health & Safety Impacts from Pharmaceuticals and Supplements Containing Chinese-Sourced Raw Ingredients* (U.S.-China Economic and Security Review Commission, April 2010), pp. 35–40; Associated Press, "Tainted Drug Scandal: China Makes Arrests, Seizes 77 Million Capsules in Crackdown of Pills Made from Industrial Waste," April 23, 2012. http://www.huffingtonpost.com/2012/04/23/china-tainted-drugs_n_1444926.html.

China is among the countries producing precursor chemicals for the illicit narcotics trade.* Roger Bate, a counterfeit drug expert and Visiting Fellow at the American Enterprise Institute, says that China is “the largest manufacturer of fake drugs in the world.”²⁹

China has advantages in producing both legitimate and illegitimate drugs. The country’s large manufacturing industry and domestic consumer market facilitate economies of scale that lower costs. To promote goods for export, the Chinese government has for decades promoted foreign direct investment, along with loosely regulated special economic zones that move massive volumes of goods each day.³⁰ During the global financial crisis, the government provided generous export tax rebates to producers of active pharmaceutical ingredients, claiming that this would boost exports in “high value-added” industries.³¹

Protection of intellectual property is weak, which serves as a backdoor subsidy to Chinese companies that rely on piracy for profits. According to data from the World Customs Organization, collected from 121 countries in 2008, 65 percent of seized counterfeit shipments detected worldwide and 79 percent of counterfeits seized in the United States were shipped from mainland China. In the European Union, where sector-specific data is available, 6 percent of all seized counterfeits in 2008 were medicines.³²

China is a top producer of basic chemicals and agricultural products, which supply important drug ingredients to Chinese manufacturers. For example, over half of the global pig herd is based in China, providing a cheap and ready supply of porcine mucosate tissue for crude heparin, which is made into anticoagulant, or “blood thinner.” † China has overtaken the United States as the leader in global chemical shipments (see Figure 2). China’s exports of organic chemicals, the ones most commonly used in pharmaceuticals, grew from \$5.3 billion in 2004 to \$36.5 billion in 2013. Over the same period, the sales revenue of organic chemical producers in China increased from \$17 billion to \$241 billion. ‡³³

The agricultural and chemical industries are heavy polluters of air, water, and soil, and require commodity imports such as soybean feed and petrochemicals. In the interest of public health, domestic stability, and resource security, the Chinese government is taking measures to reform these industries.§ For the time being, though, many U.S. companies find it more expedient to source from China than to produce domestically in the United States.

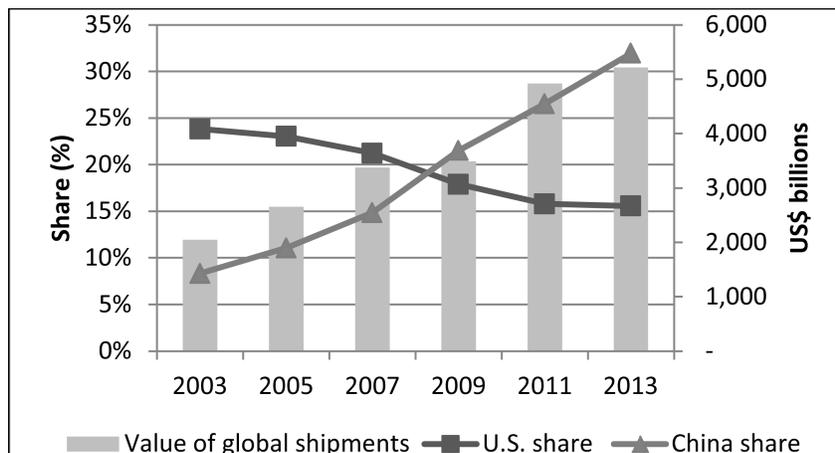
*The White House Office of National Drug Control Policy states: “Global efforts to prevent the diversion of methamphetamine precursors have made significant progress. This is a complex effort, requiring cooperation of the countries that produce these precursor chemicals—principally India, China, and Germany.” *Controlling Precursor Chemicals* (Washington, DC: The White House). <http://www.whitehouse.gov/ondcp/precursor-chemicals>.

† For more information, see U.S. Economic and Security Review Commission, *2013 Annual Report to Congress*, Chapter 1, Section 4.

‡ Export data denominated in current U.S. dollars. Sales revenue data in current renminbi, converted to U.S. dollars based on historic exchange rates (year-end 2004 and year-end 2013).

§ For more information on environmental issues in China, see U.S. Economic and Security Review Commission, *2014 Annual Report to Congress*, Chapter 1, Section 4.

Figure 2: Global Chemical Shipments, 2003–2013: China vs. the United States
(US\$ billions)



Source: American Chemistry Council. <http://www.americanchemistry.com/Jobs/EconomicStatistics/Industry-Profile/Global-Business-of-Chemistry>.

Detecting Harmful Drugs in a Complex Industry

Regulating China's vast drug industry is difficult. Production is extremely fragmented, with some 4,000 manufacturers of pharmaceutical products, about 400,000 retail pharmacy shops, and according to Chinese customs data, about 29,000 firms involved in exporting medical products.³⁴ Since most suppliers in China sell to other businesses downstream instead of directly to the consumer, they are easily missed by regulators. According to Dr. Hickey:

In China, whether they're manufacturers of active pharmaceutical ingredients or, for instance, workshops that do the rendering that creates crude heparin that goes into heparin, those kinds of sites are not accustomed to being inspected as much as let's say [generic drug producer] Ranbaxy in India. So there's less familiarity perhaps with how our inspections work and what our inspection regime is.³⁵

Criminals in China resort to a variety of ruses to avoid detection. According to Dr. Coukell, China hosts many "show and shadow factories," where the factory of record is not the actual origin of an active ingredient.³⁶ Packaging may also take place at a different location from production. Chinese counterfeiters sometimes claim on packages that the drug is "made in India," so that when quality issues are detected, Indian rather than Chinese producers are blamed. Dr. Bate's fieldwork has revealed that manifests at ports are frequently inaccurate, helping fake drugs from China to go undetected when they are unloaded in other parts of the world, particularly at transit ports.³⁷

While China has its fair share of outright criminal operations, many harmful products stem from *semi-legitimate* producers. Examples include licensed chemical producers who supply pharma-

ceutical ingredients that they are not licensed to produce; illegal producers that are owned by companies selling into the legitimate supply chain; and firms that produce legitimate products during the day shift and grey market products during a secret night shift. Suppliers may also adjust the level of quality based on the standards and detection capability of the customer and export market to minimize compliance costs.³⁸

When producers of harmful drugs are identified, it is hard to prove liability. In theory, experts distinguish “substandard” from “counterfeit” drugs; in practice, the distinction is blurred, since companies can claim that they unwittingly corrupted their products. Ingredients may contain residues of toxins, which could originate either from the production facilities themselves (e.g., trace elements of one production line spill over to another) or from a prior stage in the value chain (e.g., agrochemical residues). Moreover, companies may be caught unaware if contamination or counterfeiting was committed by their upstream suppliers.³⁹

When a harmful product reaches the end consumer, its effects vary widely. Most pernicious are cases where an incorrect formula of active ingredients is used. That is what occurred with tainted heparin in 2007–2008: the culprits used an extremely harmful substitute ingredient that was not detected by standard laboratory tests (see textbox). Other illegitimate products commonly seen in the market exert a subtler impact:

- *No active ingredients*: In this case, the patient thinks he/she is receiving effective medication and so foregoes corrective treatment until it is too late. This problem has arisen, for instance, with anti-malarial drugs sold in Africa;⁴⁰
- *Insufficient dosage*: In this case, the patient may develop resistance to the particular drug, making the patient less responsive to subsequent treatments. This problem is compounded among large populations since increasing resistance makes specific legitimate drugs, or even entire classes of them, useless;⁴¹
- *Trace amounts of dangerous substances*: Examples include heavy metals such as lead or cadmium that have been found in China’s contaminated soils. In this case, the damage to the user is cumulative, raising the probability of cancer and chronic degenerative illness. Similar problems arise with food imports from China;*
- *False packaging*: This can affect the quality of drugs in storage and processing, mislead users about ingredients and effects, and in the case of counterfeits, do grievous damage to the reputation of the real company.⁴²

Another challenge for regulators is to identify which types of drug products are most liable to be corrupted. Counterfeiters operate on a risk-return basis. The mimicking of higher-end products

* Over half of herbal dietary supplements tested in a Congressional investigation in 2010 contained trace amounts of lead and other contaminants. While the levels of heavy metals did not exceed levels that the investigators thought were dangerous, in 16 of 40 samples, the pesticide residues exceeded legal limits. U.S.-China Economic and Security Review Commission, *Hearing on China’s Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Charles Bell, April 3, 2014.

(e.g., a brand-name drug by a leading U.S. pharmaceutical company) offers a higher return but also a higher risk of detection, since the affected companies can afford superior supply chain monitoring. The faking of lower-end products, such as “made in India” generics, offers lower returns but also a lower risk of detection.⁴³ As Dr. Jin argued, any investment in enforcement by drug makers themselves has to be seen relative to the final consumer price of the drug. If margins are low or the cost of supervision cannot be passed on to the consumer, companies may lack the willingness or capability to properly monitor their supply chains.⁴⁴ According to Dr. Coukell, the likelihood of an active ingredient coming from China is higher in the case of a generic than a brand-name drug.⁴⁵

Counterfeiters often prefer to produce “lifestyle” drugs rather than the better regulated “lifesaving” drugs. Weight-loss pills, antihair loss agents, virility and muscle enhancing drugs, and other non-essential medical products have proliferated in recent years, as has the demand for vitamins and botanicals. According to Mr. Bell, the United States spends an estimated \$32 billion a year on dietary supplements, and six in ten Americans reportedly take dietary supplements on a regular basis. Since lifestyle drugs are rarely prescribed by doctors and pharmacists, consumers are more indiscriminately exposed than in the case of lifesaving drugs. Key facilitators of lifestyle drug sales—and other over-the-counter medications—are online pharmacies, which afford buyers privacy, choice, and convenience, but also make it difficult to certify the quality of the product and the integrity of the seller.⁴⁶ Chinese wholesalers, for instance, have set up websites that claim to be based in Canada.⁴⁷

The dangers of fake lifestyle drugs became apparent in a 2009 case involving a Texas emergency room doctor, who nearly died from tainted weight-loss pills he had purchased on eBay. The blue capsules were loaded with sibutramine, a prescription drug the FDA had warned was linked to heart attacks and strokes and subsequently pulled off the market. The FDA launched a long-term investigation. According to a May 2014 report, the FDA linked the fake pills to a Chinese national, Shengyang Zhou, who had sold them into the United States through a middleman. An agent from the FDA’s Office of Criminal Investigations, posing as a potential client, met with Zhou in Bangkok in 2010. The agent discovered that Zhou had made millions of dollars selling counterfeit drugs that he produced in a small factory operation in Southwest China. He had traveled frequently to the United States, purchasing real drugs that he used as a template to make authentic-appearing fakes.⁴⁸

Lessons from the Heparin Case

Between January 2007 and May 2008, at least 81 Americans died after taking contaminated heparin, a blood-thinning agent. Many other patients suffered from acute symptoms, such as breathing difficulties, plunging blood pressure, nausea, and ex-

Lessons from the Heparin Case—Continued

cessive sweating. Baxter International, Inc., the U.S. company selling the product, relied on a long and complex supply chain for the active ingredient that led back to China. Somewhere in that upstream supply chain, someone deliberately substituted over-sulfated chondroitin sulfate, a counterfeit and toxic ingredient, for crude heparin.⁴⁹

The case exposed troubling gaps in drug supply chain monitoring. Baxter began receiving heparin from a new Chinese plant in 2004. Wisconsin-based Scientific Protein Laboratories (SPL) was the API supplier to Baxter. But SPL had a joint U.S.-Chinese branch, Changzhou Scientific Laboratories (CZSPL), which purified pigs' intestines to make heparin. Baxter did not conduct its own audit of the heparin supplier CZSPL plant until 2007, relying instead on an earlier assessment by a different company. The FDA approved the plant as a supplier for Baxter without conducting a pre-approval inspection, in part because the agency confused the plant with another site in its database.⁵⁰ To make matters worse, CZSPL was licensed as a chemical manufacturer in China, not a pharmaceutical manufacturer, exempting it from the GMP standards enforced by China's State Food and Drug Administration (SFDA).⁵¹

The FDA and the U.S. National Institutes of Health eventually found suspect samples from six companies associated with the contamination over a period of several years.⁵² In March 2008, the FDA inspected the CZSPL facility in China for the first time. It found numerous violations of GMP standards, including scratched tanks with "unidentified material" sticking to their interiors and missing records for some sources of raw heparin.⁵³ Even at this stage, the Chinese government denied Baxter access to upstream workshops and consolidators, and refused the FDA access to two upstream consolidators of heparin as well.⁵⁴

The legal ramifications of the case proved costly for the U.S. pharmaceutical company but had minimal impact on China's heparin exporters. The victims of the contaminated product filed hundreds of lawsuits against Baxter. In the first decision in June 2011, a jury in Cook County, Illinois, awarded \$625,000 to the estate of a 63-year-old Chicago area man, Steven Johansen. The award was for the pain and suffering over a five-day period.⁵⁵ Chinese authorities acknowledged that heparin produced in China contained harmful ingredients but never accepted that the contaminated drug caused the deaths associated with Baxter's products in the United States.⁵⁶ China's heparin exporters appear to have recovered quickly from the scandal: the volume of annual exports fell to 65,087 kilograms in 2008, but has averaged 107,560 kilograms per year since then.⁵⁷

Drug Safety Regulation in China

The first line of defense for guaranteeing the safety of Chinese medical products is the Chinese government itself. The spread of

counterfeit and substandard drugs, however, indicates that Chinese regulators do not adequately meet their obligations. The evident failure to guarantee the safety of domestic drugs has compelled Chinese consumers to buy from abroad. According to Mr. Hunter: “[Because] of the weakness of the regulatory system, [Chinese] people don’t have the same assurance that Chinese-company-produced pharmaceuticals are of the same quality, even if it’s the same molecule.”⁵⁸

China only began to build an FDA-type regulatory system in the late 1990s. As Mr. Hunter acknowledged:

*One of the challenges that China has is building the state capacity of a modern regulatory state. Our experience [in the United States] is a relatively recent one of the last several decades that we’ve built an FDA capacity to the extent that it [is] now. China has to do this all within a period of a decade. [The CFDA] is not very well-resourced, either in terms of numbers of people or financially.*⁵⁹

Several capacity-building efforts are already underway. Since a Memorandum of Agreement was signed between the then-SFDA and the U.S. Department of Health and Human Services (HHS) in December 2007, U.S. regulators and corporations have lent support to China’s efforts.⁶⁰ Areas of progress include:

- *Bureaucratic consolidation:* China in 2013 reorganized disparate government agencies into the CFDA to better coordinate regulatory efforts. The FDA’s China Office has encouraged the CFDA to participate in the International Medical Devices Regulatory Forum, an important multilateral venue. The FDA’s Center for Devices and Radiological Health now meets regularly with its CFDA counterparts under the auspices of the Forum.⁶¹
- *New legislation:* China updated its GMP legislation under the “Good Manufacturing Practices for Pharmaceutical Products (2010 Revision),” which took effect in March 2011. The legislation was a coordinated effort by the then SFDA, the National Development and Reform Commission (NDRC), the Ministry of Industry and Information Technology (MIIT) and the Ministry of Health (MOH). According to Dr. Hickey, the Chinese regulators incorporated and implemented some of the U.S. FDA’s suggestions.⁶² The new GMP requires the manufacturers of sterile drugs to acquire the new GMP certificate by year-end 2013, and other drug manufacturers to be licensed by December 2015. Those who fail to meet the requirements face rejection of their new drug registration applications, and in the case of a pending registration application, suspension of the approval process.⁶³
- *Upgrading record-keeping systems:* At the 2009 Joint Commission on Commerce and Trade (JCCT) talks between the United States and China, China agreed to strengthen its oversight and enforcement of APIs and counterfeit pharmaceuticals by establishing a Drug Master File system; enforcing record-keeping requirements for companies that manufacture and sell APIs; and regulating unregistered Chinese companies adver-

tising and marketing APIs at foreign trade shows and on the Internet.⁶⁴

- *Personnel training*: The FDA is training CFDA regulators. For example, an expert from FDA's China Office recently instructed over 1,000 Chinese inspectors on how to conduct inspections based on the new GMP standards China enacted in 2011.⁶⁵
- *Joint enforcement and information sharing*: The FDA has held formal monthly meetings with its Chinese counterparts since 2008. The two sides discuss strategy and regulatory issues, collaboration and joint capacity building, and emerging issues of bilateral concern. Informal communication also takes place on a day-to-day basis. In addition, CFDA inspectors now regularly observe FDA inspections in China, and since 2012, the FDA's Office of Criminal Investigations has worked closely with CFDA to strengthen U.S.-China collaboration in the fight against Internet-based illegal distribution of falsified, counterfeit, and adulterated goods. In December 2013, Hong Kong, U.S., and European authorities jointly raided 700 counterfeit websites worldwide.⁶⁶ The Customs Administration of China also announced in 2012 its intention to carry out a global operation, in conjunction with the World Customs Organization, to combat illicit drugs and chemical substances being transported by post and express carrier.⁶⁷

It is questionable, however, whether these efforts will tangibly improve drug regulation in China. First, the new GMP standards may not be well adapted to China. According to one industry journal, cash-strapped drug manufacturers, lacking in technical support and intrinsic capacity, have adopted a "wait-and-see attitude" toward the new legislation, or worse yet, abandoned plans to apply for the new GMP certificate by the 2015 deadline.⁶⁸ For similar reasons, the CFDA has had difficulty enforcing record-keeping requirements and regulating unregistered Chinese companies advertising and marketing APIs overseas.⁶⁹ The FDA also informed the Commission that China has made slow progress in implementing its 2009 JCCT commitments:

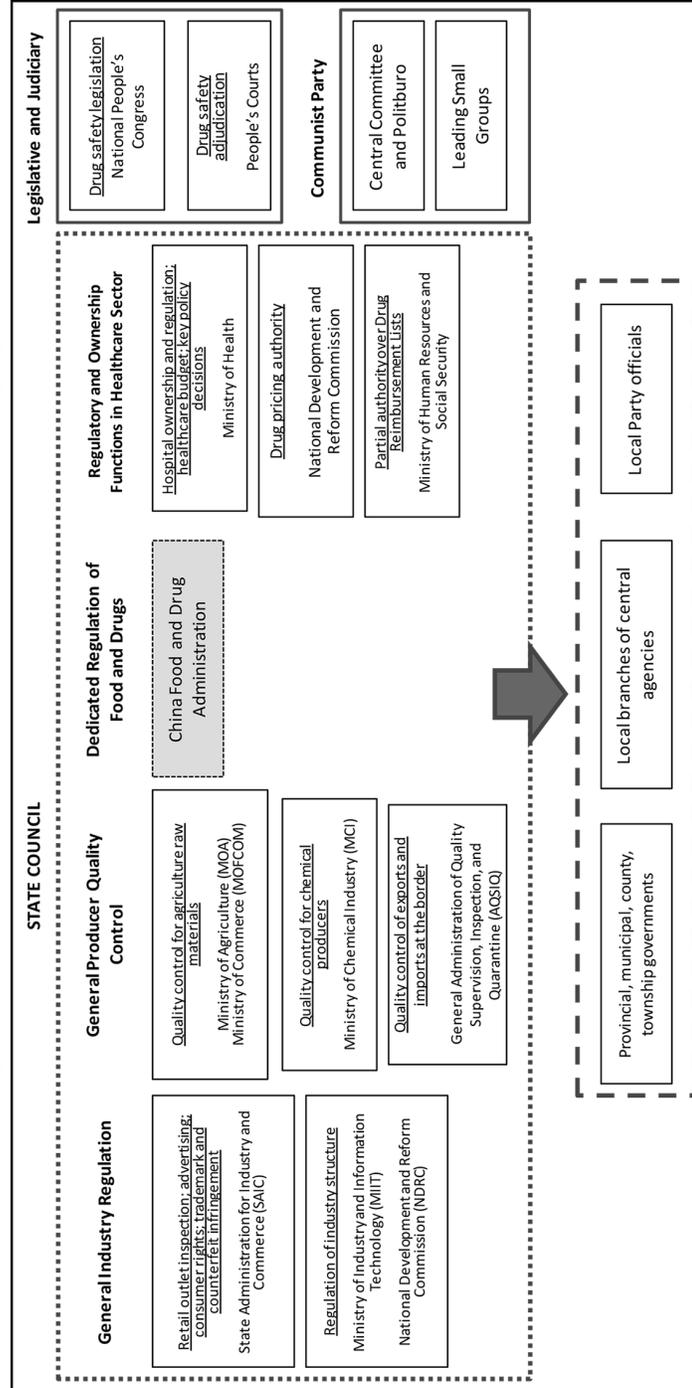
While the China Food and Drug Administration aims to establish a Drug Master File system, it has not done so to date. Through China's current implementation of new requirements for Good Manufacturing Practices for drugs, it is in the early stages of implementing the commitment to enforce requirements for record keeping. . . . China has not yet made significant strides in regulating unregistered Chinese companies that advertise and market APIs at foreign trade shows or on the Internet.⁷⁰

According to Dr. Bate, China's GMP legislation does not clearly define at what point in the supply chain manufacturers are obliged to comply. A process may be GMP-certified based solely on final process in final location, without compliance by earlier suppliers.⁷¹ Dr. Jin told the Commission that dietary supplement facilities are subject only to voluntary GMP standards.⁷²

Second, in China's fragmented and authoritarian political structure, conflicts of interest frequently contribute to regulatory failure. At the central level, this is illustrated by the uncertain status of China's food and drug regulator, the CFDA. The CFDA's predecessor, the State Food and Drug Administration (SFDA), was one of the U.S.-type regulatory bodies that the Chinese government created in the 1990s.⁷³ Revelations of corruption, however, resulted in the execution of the head of the SFDA in 2007 and placement of the agency under the supervision of the MOH in 2008.⁷⁴ A Product Quality and Food Safety Leading Small Group was set up the same year to coordinate government agencies in addressing major issues related to product quality and drug safety.⁷⁵ The creation in 2013 of the CFDA—a ministerial-level agency directly answerable to the State Council—signaled a reversion to the earlier policy of having an independent food and drug regulator. Yet it left many bureaucratic dilemmas unresolved. For instance, the scores of pharmaceutical producers in China that are registered as “chemical producers” are answerable to the Ministry of Chemical Industry. The same goes for ingredients sourced from the agriculture sector, which are monitored by the Ministry of Agriculture and Ministry of Commerce. In regard to drug exports and imports, the CFDA has usurped some functions of the General Administration of Quality Supervision, Inspection, and Quarantine (AQSIQ), but the AQSIQ is still a ministerial-level department that reserves the right to inspect production facilities (see Figure 3).⁷⁶

In addition to infighting among agencies, drug regulators in China are too decentralized. There are about 400 CFDA staff in Beijing, compared to approximately 200,000 local food and drug regulators in 31 provinces, 2,321 counties, and 339 municipalities.⁷⁷ Because some localities (e.g., Shanghai municipality) are better able to enforce GMP standards, counterfeiters may migrate to other jurisdictions that are less vigilant.⁷⁸ Where local regulators are underpaid and overloaded with applications, they become susceptible to bribes from drug producers seeking expedited approvals.⁷⁹

Figure 3: Overview of Chinese Government Agencies Involved in Drug Regulation



Because regulators rely on local governments for funding, their work may be compromised by vested interests, or face capacity constraints. Fiscal decentralization policies enacted in 1994 have left local governments with limited taxation and borrowing authority but an inordinate share of government spending on public services. According to a World Bank study, governments at the county level accounted for half of healthcare expenditures in China in 2007.⁸⁰ Recent changes to the Party cadre evaluation system have introduced novel performance metrics that emphasize local welfare;* yet the overarching concern of cadres is to collect taxes and fees to meet spending obligations.† There is thus an incentive to support rather than punish local drug and chemical enterprises that boost the economy and generate tax revenue.⁸¹ In Shanxi province, for example, the China Centers for Disease Control and Prevention in 2010 appointed a private entrepreneur to head up their Biological Product Distribution Center and allowed his own company (not licensed to handle vaccines) to monopolize vaccine distribution in the province.⁸² If a safety lapse occurs, cadres come under greater pressure to maintain social stability. Yet in such cases, there is still an incentive either to cover up the incident or to “pass the buck,” since the cadres wish to remain in favor with the higher-ranking officials who determine their career advancement.⁸³

The tendency of local governments to shirk responsibility is apparent in cases of epidemic outbreaks. According to Dr. Yanzhong Huang of the Council on Foreign Relations, China has made significant strides in terms of disease surveillance and risk communication since the severe acute respiratory syndrome (SARS) outbreak ‡ a decade ago. But communication between local and central authorities is not always smooth. After the H7N9 outbreak § in 2013, the Shanghai municipal government and the Shanghai Cen-

* Since the 11th Five-Year Plan (2006–2010), the Chinese government has adjusted the cadre evaluation system to incorporate more qualitative performance metrics, such as energy efficiency and environmental governance. Alex L. Wang, “The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China,” *Harvard Environmental Law Review* 37 (2013): 36–440.

† In a groundbreaking study, the political scientist Victor Shih and his colleagues find “no evidence that strong growth performance was rewarded with higher party ranks at any of the post-reform party congresses. Instead, factional ties with various top leaders, educational qualifications, and *provincial revenue collection* [emphasis added] played substantial roles in elite ranking, suggesting that promotion systems served the immediate needs of the regime and its leaders, rather than encompassing goals such as economic growth.” Victor Shih, Christopher Adolph, and Mingxing Liu, “Getting Ahead in the Communist Party: Explaining the Advancement of Central Committee Members in China,” *American Political Science Review* 106:1 (2012): 166–187.

‡ The U.S. Centers for Disease Control and Prevention define SARS as follows: “Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by a coronavirus, called SARS-associated coronavirus (SARS-CoV). SARS was first reported in Asia in February 2003. The illness spread to more than two dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained. Since 2004, there have not been any known cases of SARS reported anywhere in the world. The content in this Web site was developed for the 2003 SARS epidemic.” U.S. Centers for Disease Control, “Severe Acute Respiratory Syndrome (SARS).” <http://www.cdc.gov/sars/>.

§ The U.S. Centers for Disease Control and Prevention defines H7N9 as follows: “H7N9 is the designation for one subtype of influenza viruses that is sometimes found in birds, but that does not normally infect humans. Like all influenza A viruses, there also are different strains of H7N9 ... While H7N9 viruses had never before been detected in people, from March 31 through April 30, 2013, China reported more than 126 cases of human infection with this new H7N9 virus ... Most of these infections are believed to result from exposure to infected poultry or contaminated environments, as H7N9 viruses have also been found in poultry in China. While some mild illnesses in human H7N9 cases have been seen, most patients have had severe respiratory illness, with about one-third resulting in death.” U.S. Centers for Disease Control, “H7N9: Frequently Asked Questions.” <http://www.cdc.gov/flu/avianflu/h7n9-faq.htm>; and U.S. Centers for Disease Control, “Avian Influenza A (H7N9) Virus.” <http://www.cdc.gov/flu/avianflu/h7n9-virus.htm>.

ter for Disease Control and Prevention (CDC) were able to identify a novel type of flu virus but waited two weeks before communicating with the central CDC in Beijing. During the hand, foot, and mouth disease outbreak in 2008, the Anhui provincial government waited two weeks to communicate the problem and send samples of the virus to the central CDC.⁸⁴ Local CDCs in sensitive border regions and minority areas, such as Xinjiang Autonomous Region and Yunnan Province, are reluctant to divulge information on infectious diseases.⁸⁵

Even where the government has acted decisively to combat counterfeiting, it has done so via sporadic crackdowns. After scandals involving tainted pharmaceutical, milk, and pork products were revealed in 2007, a nationwide counterfeit food and drug sweep went after scores of producers, and lasted until around 2009.⁸⁶ The recurrence of food and drug safety incidents since then, however, suggests that these law enforcement efforts came up short.

Inconsistent enforcement is compounded by shortcomings in China's legal system. As the U.S. Trade Representative's annual report on China's World Trade Organization (WTO) compliance details, China has a history of weak enforcement against counterfeiting and intellectual property theft.⁸⁷ In 2009, China's Supreme People's Court issued a new judicial interpretation that raised the penalties—including lengthy jail sentences—for manufacturers of counterfeits in cases where their products cause severe harm to public health.⁸⁸ Although it is difficult to assess the application of this specific law, a study of China's 2009 Food Safety Law, conducted by John Balzano of Yale University Law School, suggests potential pitfalls. Disputes invoking the Food Safety Law are frequently dismissed by the courts because a product's origin is difficult to trace or its specific defects are obscure. More often than not, reported cases are against retailers of food products rather than the counterfeiters themselves, because of the lack of access to evidence or in-depth discovery procedures. Among the tort cases studied by Dr. Balzano, none of those allowed in court involved death or serious injury, presumably because such cases would be politically sensitive. In none of the tort cases were punitive damages awarded.⁸⁹

These judicial procedures are emblematic of the absence of checks and balances in China's political system. Dr. Jin argued that local governments "have an incentive to try to minimize the exposure of [drug safety] problems, and the whistleblowers or even sometimes the victims have been discouraged, harassed, or jailed for merely exposing the problem."⁹⁰

According to Dr. Bate, private investigators in China avoid publicity and contact with foreigners for fear of being punished by the government.⁹¹ Mr. Bell said he felt "some obligation to speak out for the right of Chinese civil society to do what we're doing here [in the United States]. You need to have watchdogs, and you need to have whistleblowers."⁹²

U.S. Regulation of Drug Imports from China

Safety lapses in the pharmaceutical industry have become a global concern. In the United States, the 2007–2008 heparin scandal drew wider attention to the issue. Several hearings on drug safety have since been held in Congress, including by the House Energy

& Commerce Committee (April 2008 and March 2014) and the Senate Committee for Health, Education, Labor, and Pensions (September 2011). A landmark report issued by the Institutes of Medicine of the National Academies in 2013 called for tougher standards and regulations to avert an impending crisis.⁹³ Finding concrete solutions at the international level, however, has been difficult. There is disagreement on whether “counterfeit” should be defined merely as a product that violates intellectual property rights—a definition preferred by major pharmaceutical companies—or also incorporate broader concepts of public health. Although drug safety is an issue that affects patients in all countries, some governments view anticounterfeit efforts foremost as a threat to affordable generic drugs or to the growth of their domestic pharmaceutical industries.⁹⁴

In this context, the U.S. FDA, U.S. companies, and regulators elsewhere have begun to tackle drug safety on numerous fronts. In addition to supporting Chinese regulatory authorities, the FDA relies on two “layers of defense”: its inspectors on the ground in China and its regulators back in the United States.

The FDA’s Work in China

Based on a bilateral agreement signed in December 2007, the FDA now operates three field offices (Beijing, Shanghai, Guangzhou) in China. The U.S. agency has been working with the Chinese government to train local regulators and to share information. Drug inspections carried out by the FDA in China averaged 79 per year in 2011 to 2013, compared to 19 inspections in 2007. In fiscal year 2013, the FDA’s China office received \$10 million in additional federal funding and was authorized to increase its staff size from 13 people (eight U.S. civil servants and five Chinese staff) to 27 people, which includes nine additional drug inspectors.⁹⁵

Given China’s vast drug industry, these measures are only preliminary steps. According to Dr. Hickey’s testimony, the FDA currently has just one part-time and two full-time drug inspectors based in China. Even the increase in staff size proposed in fiscal year 2013 proved difficult to implement due to China’s reluctance to grant the necessary work visas. Although the FDA notified the Chinese government as early as February 2012 of its intention to hire more inspectors, China delayed issuing the visas.⁹⁶ The FDA told the Commission in September 2014:

There are currently two visa applications pending with the Chinese Government for staff members who were hired for the FDA China Office in FY 2012 and FY 2013. In discussions connected with the December 2013 visit to Beijing by Vice President Joe Biden, the Chinese Government assured FDA that it would begin granting visas for an increased number of U.S. food and drug CSOs [Consumer Safety Officers] stationed in China. These new FDA staff, however, have still not received visas.⁹⁷

Limited in terms of manpower, the FDA also faces restricted access to Chinese manufacturing sites. Said Dr. Hickey:

When we’re operating overseas, whether it’s in China or India or anywhere else, we don’t have the same authority

*to enter a premises that we do in the United States. ... As a result, in the vast majority of cases when we're doing inspections in China or in India or elsewhere, we are notifying firms in advance and working to schedule those inspections in advance. ... We do reserve the right, and we have, in a handful of cases, done inspections unannounced as we would in the United States.*⁹⁸

Changes in U.S. Product Safety Regulation

The FDA issued a landmark report in 2011 on improving U.S. supply chain security, titled *Pathway to Global Product Safety and Quality*. The report signaled a shift away from the frequency of inspections toward *risk-based* surveillance.⁹⁹ A program called PREDICT forms the foundation of this new surveillance system. It collects data on individual producers—including those registered in China—from a variety of federal agencies, corporations, and foreign governments to calculate a customized risk score for every line in an entry. PREDICT score calculations are based on numerical weights, which factor in inherent risk, data anomaly, and data quality rules as well as the compliance history of firms and products associated with the line. Application of rules results in the generation of a cumulative score for a specific line. The higher the score, the greater the identified risk and likelihood that the product will be put on import alert and detained at the border. Each line receives a percentile rank based on all other lines screened over the past 30 days.¹⁰⁰

PREDICT does not assign risk based on specific countries where the FDA carries out field assignments. However, a substantial number of FDA import alerts are specific to a country or area. For China, as of September 24, 2014, there were nine country-wide import alerts for particular products. According to Dr. Hickey, an exporter that has been placed under import alert usually stops sending products to the United States, because such an exporter is unwilling to meet the extensive requirements for readmission.¹⁰¹

In 2012–2013, Congress also passed two pieces of legislation that significantly enhance the FDA's legal authority and operational capability. The first is the Food and Drug Administration Safety and Innovation Act (FDASIA), signed into law on July 9, 2012. Under this law, the FDA has the following rights:

- To administratively detain drugs, meaning the FDA has the authority to halt the movement of drugs while investigating and determining the appropriate response. Products may also be refused admission into the U.S. market, unless the importer is able to demonstrate that the product is in compliance with relevant laws and regulations. Dr. Hickey has argued that this new authority better enables the FDA to better prevent “port shopping,” as well as to refuse exports from a Chinese manufacturing site that “delays, limits, or refuses inspection.”*¹⁰²
- To make explicit that industry compliance with GMP standards includes managing upstream risks, which would also include inputs sourced from China. FDASIA also requires drug

*Port shopping refers to the practice of selecting ports that are understaffed or otherwise ill-equipped to conduct rigorous inspections.

importers to register with the FDA, and adhere to Good Importer Practices (GIP). The FDA has indicated that it expects to propose a GIP rule by April 2015, and finalize it by January 2017.¹⁰³

- To share confidential information with other foreign regulators; enter into agreements to recognize inspections by foreign regulators that are capable of conducting inspections that meet U.S. standards; and use the results of these foreign inspections as evidence of compliance with U.S. law.¹⁰⁴
- To collect user fees from industry to fund reviews of innovator drugs, medical devices, generic drugs and bio-similar biological products.¹⁰⁵ According to Dr. Hickey, these user fee acts have greatly enhanced the FDA's ability to carry out risk-based assessments.¹⁰⁶

The Drug Quality and Security Act (DQSA), signed into law on November 27, 2013, further supports the FDA's mandate. Title II of DQSA outlines critical steps to build an electronic, interoperable system to identify and trace certain prescription drugs as they are distributed in the United States. The new "track and trace" system will enable verification of the legitimacy of the drug product identifier down to the package level, enhance detection and notification of illegitimate products in the drug supply chain, and facilitate faster recalls of drug products. Dr. Coukell explained that, four years from now, every package of prescription drugs in the United States will have a unique serial number that can be checked against a database. Faking a serial number requires far greater skill than faking packaging.¹⁰⁷

In spite of these legislative and regulatory improvements, unsafe drugs are still entering the United States from China. Risk-based surveillance represents an innovative step, but may not suffice to offset the low frequency of inspections at the border and overseas. A 2010 report by the Government Accountability Office reported that the FDA inspected fewer than 11 percent of the plants on its own list of high-priority sites.¹⁰⁸ Moreover, according to Dr. Bate, the laboratory tests currently required by the FDA and U.S. Pharmacopeia are insufficient to uncover trace amounts of harmful residues. Until recently, so-called "rapid dye tests" were only able to detect products that contained no active ingredients, not ones that contained inadequate levels of ingredients, which can be just as harmful.¹⁰⁹

Dietary supplements remain under-regulated as well. Mr. Bell told the Commission that, among the 465 adulterated drugs and supplements recalled in the United States between January 2004 and December 2012, over half were dietary supplements. His research demonstrates, however, that the FDA has done a poor job taking dangerous supplements off the market.¹¹⁰

Actors at the local level in the United States also share the blame for lapses in drug safety. In its 2011 study "After Heparin: Protecting Consumers from the Risks of Substandard and Counterfeit Drugs," Pew Charitable Trusts found that many safety lapses occur through the redistribution of drugs among small wholesalers, national and regional wholesalers, and hospitals and pharmacies.¹¹¹ Individual states retain the power to grant licenses to

intermediaries between manufacturers and retailers. In states where regulation is lax, individuals with little or no pharmaceutical qualifications are able to set up drug wholesale businesses, usually online. Some states previously were reluctant to implement “e-pedigree”^{*} systems, suggesting that nationwide adoption of unique serial numbers in the coming years will not be easy.¹¹²

Industry self-regulation is on the increase, led by Rx360, a non-profit consortium that includes the largest U.S. drug manufacturers and suppliers. The consortium is developing a shared audit program and disseminates risk information to its members.¹¹³ Even so, Dr. Bate alleges that 90 percent of Chinese drug substances bought by Western purchasers are only audited *after* purchase. U.S. and European pharmaceutical companies are misinformed about the identity of the manufacturing site of 39 percent of the drug substances they purchase from China. A mere 6 percent of suppliers in China provide impurity profiles[†] to their U.S. customers. U.S. companies frequently fail to verify the GMP certifications of new suppliers before entering into contracts, and background checks on suppliers-of-suppliers are even rarer.¹¹⁴ When a safety lapse does occur, companies may delay a recall out of fear that it will damage their reputation, even though a delay can lead to heavier losses once the problem is exposed.¹¹⁵

Drug safety experts also question whether the right lessons have been learned from the heparin incident. As Dr. Coukell acknowledged:

*Heparin was a wake-up: All of a sudden, we realized we had risks that we weren't thinking about, we weren't aware of, we needed to make some changes. . . . So if that was the sort of level of awareness of branded pharma at that stage, it's reasonable to assume that there are companies that are less sophisticated, that are store brands, that have less skin in the game, that just have not taken those steps now, and have frankly less incentive to do so.*¹¹⁶

China's Healthcare Challenges and Reforms

China's Healthcare Market Potential

Alongside its role as a pharmaceutical exporter, China is also becoming a major healthcare market. China's healthcare spending, public and private, amounted to \$357 billion in 2011.¹¹⁷ That is still far from the \$2.8 trillion spent in the United States in 2012,¹¹⁸ but China could catch up with the U.S. market sooner than ex-

^{*}An electronic pedigree is an e-document that provides data on the history of a particular batch of a drug. It satisfies the requirement for a 'drug pedigree' while using a convenient electronic form.

[†]Various regulatory authorities such as the International Conference on Harmonization (ICH), the U.S. FDA, and the Canadian Drug and Health Agency (CDHA) are emphasizing purity requirements and the identification of impurities in APIs. The various sources of impurity in pharmaceutical products include reagents, heavy metals, ligands, catalysts, other materials like filter aids, and charcoal, as well as degraded end products obtained during and after manufacturing of bulk drugs. The different pharmacopoeias such as the British Pharmacopoeia, United States Pharmacopoeia, and Indian Pharmacopoeia are slowly incorporating limits to allowable levels of impurities present in APIs or formulations. Various methods are used to isolate and characterize impurities in pharmaceuticals. Kavita Pilaniya et al., "Recent Trends in the Impurity Profile of Pharmaceuticals," *Journal of Advanced Pharmaceutical Technology and Research* 1:3 (July–September 2010): 302.

pected. McKinsey & Company projects the country's healthcare spending to reach \$1 trillion in 2020.¹¹⁹ Benjamin Shobert, a healthcare consultant and member of the National Bureau of Asian Research, forecasts China's over-the-counter and branded generic market to expand from \$23 billion in 2010 to \$369 billion in 2020. That would make China the second-largest pharmaceutical market after the United States.¹²⁰

China's burgeoning healthcare market signals a transition to a mature economy. China's fertility rates have declined precipitously, owing not only to urbanization and rising incomes, but also to the lasting effects of the One-Child Policy. Average Chinese are living longer lives and are less prone than their grandparents to contract infectious diseases.¹²¹ China's healthcare system must now adjust to an aging demographic, which entails treatment of chronic diseases and provision of long-term care. A 2013 study, for example, showed that China in 2010 had more people living with Alzheimer's disease than any other country—and twice as many cases of dementia as the World Health Organization (WHO) thought.¹²² Over the next two decades, the WHO predicts the number of non-communicable diseases among Chinese over age 40 to rise substantially (see Table 3).¹²³

Table 3: Projected Cases of Non-Communicable Diseases in China, 2010–2030

(Cases millions)

	2010	2020	2030	Compound annual growth rate	
				2010–2020	2020–2030
Myocardial infarction	8.1	16.1	22.6	7.1%	3.4%
Stroke	8.2	21.4	31.8	10.1%	4.0%
COPDs	25.7	42.5	55.2	5.2%	2.6%
Lung Cancer	1.4	4.6	7.4	12.6%	4.9%
Diabetes Mellitus	36.2	52.1	64.3	3.7%	2.1%
Total	79.6	136.7	181.3	5.6%	2.9%

Source: Adapted from the World Bank, "Toward a Healthy and Harmonious Life in China" (2011), p. 2.

Urbanization and rising incomes are also spurring China's healthcare sector. Just half of China's population officially resides in cities, and given that urban residents currently spend twice as much on healthcare as rural residents, health spending will probably increase along with urbanization. China's economic growth is slowing but has created a middle-income class of some 300 million people. Household consumption growth, though low as a share of gross domestic product (GDP), is outpacing other large economies. At the same time, the healthcare sector is still underdeveloped relative to wealthier countries. The ratio of healthcare spending to GDP was 5.2 percent in 2013, compared to an Organization for Economic Cooperation and Development (OECD) average of 9.5 percent. As of 2012, China had 1.8 physicians per 1,000 people, a figure that ranged from 2 to 4.3 in OECD countries. Similarly,

there are only 3.7 hospital beds per 1,000 people—European Union countries average greater than six.¹²⁴

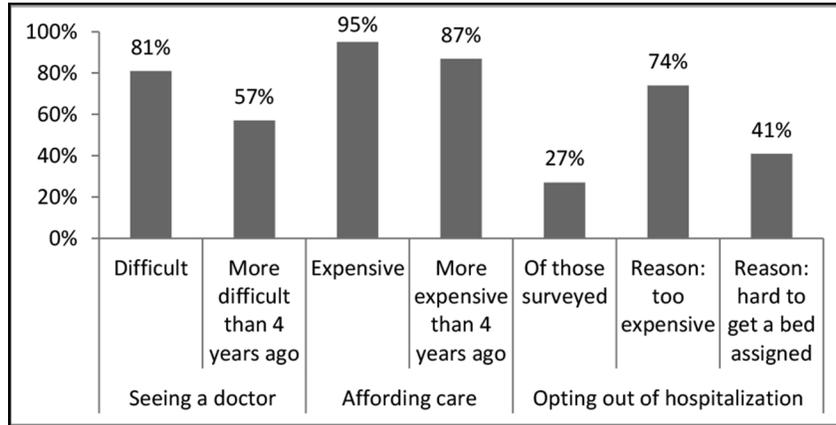
China's policy priorities appear to be aligning around healthcare. In 2009, the government released a long-awaited healthcare reform bill, the product of three years of deliberation by the senior party leadership. The bill sets out five ambitious goals: to extend basic government-subsidized health insurance; expand the population health benefit package; strengthen primary care; control the price of essential drugs at grassroots service providers; and reform government-owned hospitals.¹²⁵ Dr. Huang estimated that the Chinese government invested over \$371 billion in healthcare between 2009 and 2012, which accounted for 5.7 percent of total fiscal spending.¹²⁶ In China's 2014 central government budget, healthcare is among the fastest growing items, along with national defense and social security, and surpasses spending on science and technology.¹²⁷ Mr. Hunter told the Commission that the government's extension of public health insurance, attaining 95 percent of China's population in 2011, will help drive healthcare spending.¹²⁸ At the Third Plenum of the 18th Party Congress, held in November 2013, the government offered further suggestions for healthcare reform.*

Systemic Challenges: Unaffordable and Low-Quality Care

China's healthcare system still has many failings. One indicator of the system's own troubled health is the rapid rise in costs, which have consistently outpaced per capita income growth, making care less and less affordable. According to a 2008 estimate, the average treatment cost for an inpatient stay is equivalent to 60 percent of China's annual per capita income. Another study found that rising healthcare expenditures in the early years of the 21st century led to the impoverishment of 67.5 million people.¹²⁹ "Inaccessible and unaffordable healthcare" is perennially cited as a top concern in China's social surveys;¹³⁰ an October 2013 survey revealed that such sentiments have not changed much since the recent healthcare reforms were implemented (see Figure 4). Many ordinary patients choose either to forego treatment or to resort to traditional Chinese medicine, a cheaper alternative.

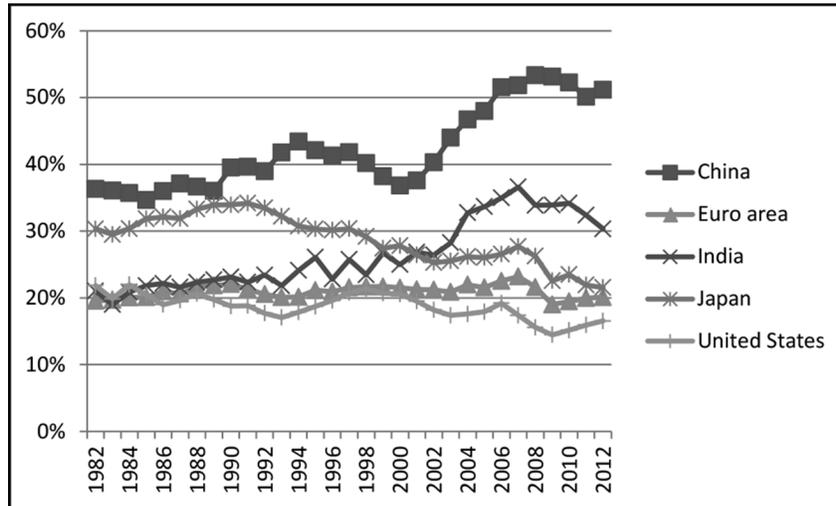
* Important policy suggestions set out in the Third Plenum Decision include: (1) integrate medical services across regions and rural and urban areas, especially at the grassroots level; (2) pay medical staff based on performance and skill, and allow physicians to practice in many locations; (3) allow private providers to be incorporated as designated locations for medical insurance and give priority to non-profit medical institutions; (4) reform the method of paying for medical insurance; (5) expand medical insurance to cover catastrophic diseases.

Figure 4: Public Opinion on Healthcare in China (October 2013)



Source: Horizon Research Consultancy Group, via Yanzhong Huang, "What Money Failed to Buy: The Limits of China's Healthcare Reform," Council on Foreign Relations, March 4, 2014.

Figure 5: Gross Savings Rates by Country



Source: World Bank.

High healthcare costs also damage China's economy. Households accumulate excessive savings to make up for rising costs, hampering growth (see Figure 5). As the workforce share of the population peaks and the ratio of retirees to workers increases, China can ill afford to finance exorbitant healthcare costs. Chinese workers, many of them single children, are forced to support not only themselves but also their dependents (see textbox, "China 'Getting Old before Getting Rich'"). Stated Dr. Huang:

So this is what I call the schizophrenic situation the Chinese government has to face: On the one hand, they have the incentive to lower the prices to rein in the rapid increase of healthcare costs. On the other hand, they have strong incentives to promote the healthcare industry. That means high healthcare costs because they say, “well, healthcare spending is only [5] percent of total GDP, but the world average is about 9 percent, so we still have a lot of room to improve.”¹³¹

China “Getting Old before Getting Rich”

China’s labor force is peaking and its “first demographic dividend” is ending. This may impact economic growth. Fewer workers will be forced to finance more dependents, while the government will have to divert more resources from capital spending (on items such as infrastructure) to current spending on healthcare. In a 2008 study of 40 countries, China is the only one in which retirees are funded almost entirely from labor income, due to a shortage of public retirement funds and non-monetary assets.¹³²

China’s life expectancy is primarily increasing among people aged 60 or older, who contribute little to productivity gains in the labor market. Due to the One-Child Policy, which was relaxed only recently,* many single adult children have to foot the medical bills of their parents and grandparents (representative of the “4–2–1” family structure). Changing social norms place additional strains on China’s healthcare market. Parents of migrants take care of their grandchildren in rural villages while their children work in the cities. In return, migrants earn higher wages and use surplus income to support their parents in old age. This “implicit social contract,” however, is falling apart due to the decline in filial piety values and the strains of the “4–2–1” family structure. Urbanization also weakens traditional problem-solving capacities in rural areas that facilitate care for the sick, elderly, and unemployed.¹³³

Higher costs have not translated into better quality or efficiency in delivering care. Academic studies show that, relative to Europe and the United States, China’s hospitals have low rates of staff productivity and are inefficient in terms of the time and cost required to cure illnesses. Smaller hospitals and local clinics have low bed occupancy rates.¹³⁴ China has more magnetic resonance imaging (MRI) machines per million people than middle-income countries like Thailand and Mexico; yet qualified staff is in short supply, especially at lower-level facilities.¹³⁵ While underproviding basic services, doctors routinely induce demand among wealthy and well-insured patients by over-prescribing expensive drugs and treatments, and prolonging inpatient stays. According to a 2010 es-

*As of this year, China will allow families in urban areas to have two children if one parent is a single child. Previously, both parents had to be single children to do this.

time, “supplier-induced demand” accounts for over 20 percent of China’s healthcare spending.*¹³⁶

Compounding subpar care at hospitals is deficient preventive care. China’s urban residents on average consume more calorie-rich diets and engage in less physical activity than 30 years ago.¹³⁷ According to the WHO, 61 percent of China’s adult males smoke.† About one in every seven Chinese has high blood pressure (hypertension),¹³⁸ and according to a nationwide survey released in September 2013, China accounts for one in three diabetes sufferers globally.¹³⁹ Based on a 2012 study by the U.S. National Institutes of Health, lung cancer accounts for a quarter of China’s cancer illnesses, with a much higher incidence than in the United States.¹⁴⁰ Meanwhile, mining, industry, and traffic accidents persist—China led the world with 275,983 traffic fatalities in 2010 (approximately twice the per capita rate as the United States, which had 32,788 fatalities).¹⁴¹

Equally taxing on health is the state of the environment. Drinking water is rendered unsafe by manure runoff, chemical residues, and other pollutants.¹⁴² According to an April 2013 study in a British medical journal, outdoor air pollution caused 1.2 million deaths in China in 2010, nearly 40 percent of the global total. In a March 2014 report, the World Bank projected that the environmental effects of urban sprawl will cost China \$300 billion a year in premature deaths, birth defects, and other health-related problems.¹⁴³ Where preventable illnesses do not result in death, they cause an increase in disability-adjusted life-years, which reduces a person’s ability to participate productively in society.

Infectious diseases in China have resurged as well. Stated Dr. Eggleston: “The nature of disease in China has changed from a primary burden of infectious disease to a disease burden dominated by chronic, non-communicable diseases . . . but with important lingering problems from endemic and reemerging infectious diseases such as hepatitis (a primary cause of liver cancer), multi-drug-resistant tuberculosis, and HIV/AIDS.”¹⁴⁴ A new strain of avian influenza (H7N9) resulted in 132 infections and 44 deaths in the spring of 2013, primarily in China.¹⁴⁵ Sexually transmitted diseases are spreading in border regions and major industrial centers where migrant laborers, female sex workers, and intravenous drug use are common.¹⁴⁶ Not least, the overuse of antibiotics in Chinese hospitals has reduced antimicrobial effectiveness,‡ posing a threat to global public health.¹⁴⁷

*Supplier-induced demand is not unique to China. The medical scholar Milton Roemer first proposed this hypothesis in 1961 from the observation that areas with greater hospital bed supply showed greater hospital use. The basic theory is that because doctors have more medical knowledge than their patients, patients depend on their doctors for treatment decisions, and doctors might exploit this situation by suggesting higher reimbursement procedures or by providing excessive care. A 1989 study, for example, demonstrated that Caesarean sections provided \$500 more in income to physicians than vaginal delivery. Kim Beomsoo, “Do Doctors Induce Demand?” *Pacific Economic Review* 15:4 (October 2010): 554–555. For a discussion of this problem in the United States, see Craig L. Garthwaite, “The Doctor Might See You Now: The Supply Side Effects of Public Health Insurance Expansions,” *American Economic Journal: Economic Policy* 4:3 (2012): 190–215.

† This figure is based on adjusted prevalence estimates for WHO member states. World Health Organization, *Report on the Global Tobacco Epidemic* (2013), p. 276.

‡ An antimicrobial is an agent that kills microorganisms or inhibits their growth.

Accounting for the Problems in China's Healthcare System

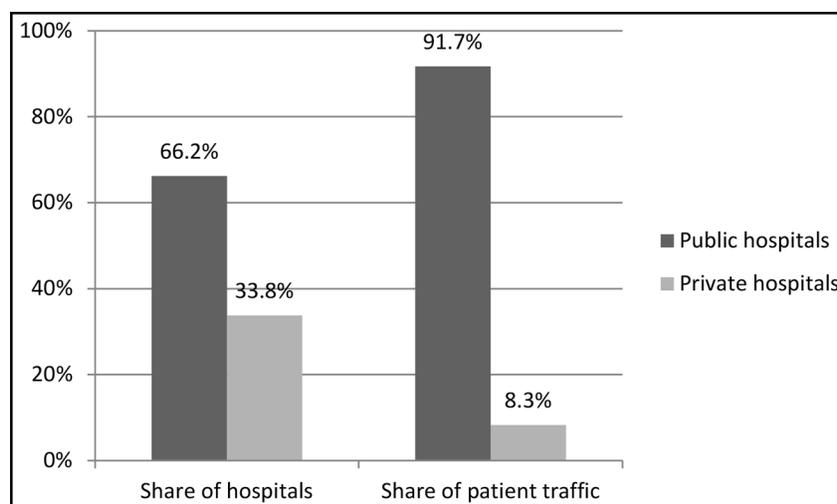
Why has China's healthcare system underperformed in terms of cost and delivery? Certainly, administering healthcare in a large developing country is challenging. Experts also disagree on what the ideal healthcare policy should look like. What is clear is that China's market reforms have not done enough to improve healthcare. Mao-era China (1949–1976) lacked modern medical infrastructure and qualified professionals, but basic care was affordable.¹⁴⁸ From 1960 to 1980, China's average life expectancy increased by 24 years, compared to a world average of 11 years.¹⁴⁹ Since then, a series of misguided policies has slowed down progress in public health indicators and made the healthcare system resistant to meaningful reform.

The Government as Owner and Regulator

Private healthcare provision in China has moderately expanded since the government introduced market-oriented reforms in the 1980s. Every third provider in China today is in private hands (either for-profit or non-profit). In December 2010, China enacted new policies to encourage private investment in hospitals; for example, the approval process for opening new joint venture hospitals was shifted from central to provincial authorities.¹⁵⁰ The official target is for private hospitals to handle 20 percent of in-patient and out-patient traffic by 2015.¹⁵¹

Nonetheless, over 90 percent of China's patient traffic in 2010 went through public hospitals (see Figure 6). Private providers in China tend to be much smaller than public hospitals in terms of total assets, staff, beds, and equipment, and deal mainly with specialized cases, like skin disease and sexually transmitted diseases, rather than general acute cases.¹⁵²

Figure 6: Private vs. Public Hospitals: Share of Patient Traffic, 2010
(584 million hospital visits; 20,918 hospitals)



Source: Jing Ulrich et al., "Medicine for the Masses-China's Healthcare Reform: Progress and Future Steps," J.P. Morgan Hands-On China Report (J.P. Morgan, October 10, 2011), p. 3.

Dr. Eggleston, citing field research she conducted in Chinese hospitals, said that private and public providers both suffer from policy distortions in the healthcare system. Privatization in and of itself is not the solution.*¹⁵³ What is clear is that the playing field is not level; private providers confront a series of regulatory hurdles. Because they tend to be ranked lower in China's hospital accreditation system—over which local governments have considerable discretion—private providers have difficulty attracting the best doctors.† Since doctors are licensed to work only at one hospital, they prefer larger public providers, which offer greater incentives for career progression, as well as welfare benefits. Private providers frequently resort to hiring retired healthcare workers, which may undermine their service quality and reputation.¹⁵⁴ Patients are discouraged from seeking private care because many such providers are not under contract with government insurers.¹⁵⁵

Meanwhile, the 2009 healthcare reforms have done little to upgrade the public healthcare bureaucracy. Dr. Eggleston and her colleagues note that “Ministry of Health, military, and [state-owned] enterprise hospitals all provide similar services, increasing competition but also contributing to excess capacity and lack of coordinated care.”¹⁵⁶ The MOH exercises conflicting roles as regulator, manager, owner, and financier of state-owned healthcare providers.¹⁵⁷ According to Dr. Huang, MOH opposition was a key reason why pro-market measures were watered down in China's 2009 healthcare bill.¹⁵⁸ Beyond the MOH, regulation is divided into silos. For example, the CFDA issues drug approvals, but drug pricing authority rests with the NDRC, China's premier industrial planning body. Health insurance is administered separately by the MOH for rural areas and the Ministry of Human Resources & Social Security for urban areas.¹⁵⁹

Insurance Coverage and the Referral System

Before market reform, rural cooperatives (under the Cooperative Medical Scheme, or CMS) and urban work units bore most healthcare costs. Although this system extended privileges to party cadres and urban workers, most Chinese had access to basic treatment and preventive care. Market reforms, however, gradually dissolved cooperatives and work units, while failing to account for migrant workers who fell through the cracks. The result was a rapid in-

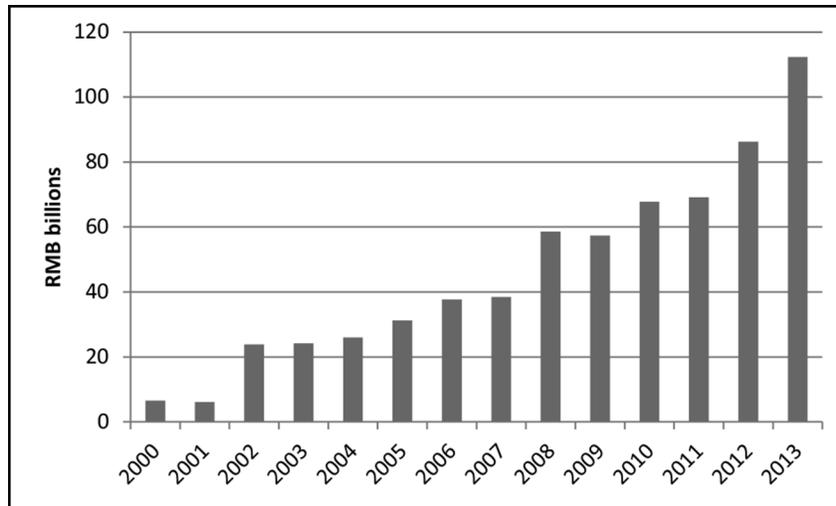
*A study carried out by Dr. Eggleston and her colleagues in Guangdong, one of China's wealthiest provinces, shows that private providers account for a disproportionate share of outpatient surgery, a niche market for patients seeking care at bargain prices. The same Guangdong study also finds that mortality rates—a common metric of quality—do not statistically differ between government and non-government hospitals of similar size, accreditation level, and patient mix. The scholars conclude that “changes in ownership type alone are unlikely to dramatically improve or harm overall quality.” Karen Eggleston et al., “Comparing Public and Private Hospitals in China: Evidence from Guangdong,” *BMC Health Services Research* 10:76 (2010): 1–11.

†According to Dr. Eggleston: “Chinese hospital accreditation began in 1989 with a system established by the Ministry of Health. This system defines three hospital grades (3, 2, and 1) based on infrastructure and administrative level and three within-grade levels (A, B, and C) based on evaluation by a committee established by the local health bureau. Since 2005, the hospital accreditation system rates hospitals according to a wider range of criteria, including ‘scientific management,’ patient safety, and service quality, and allows for rewards (e.g., government budgetary subsidies) and sanctions (e.g., fines or risk of closure) . . . The national accreditation guidelines give local governments considerable discretion in implementation, which limits comparability across regions. Many provinces do not include the private sector, and few include [township health centers] and village clinics.” Karen Eggleston et al., “Health Service Delivery in China: A Literature Review,” *Health Economics* 17 (2008): 160.

crease in out-of-pocket spending, which skewed delivery toward urban areas, the wealthy, and party cadres.*¹⁶⁰

Since the 1990s, the government has taken measures to improve coverage, primarily through government-run insurance programs. In 1998, the government introduced basic medical insurance for urban employees (UEBMI), based on payroll taxes paid by the employer and employee. The proceeds were divided into individual accounts for outpatient care and pooled risk accounts for inpatient and catastrophic needs. This was followed in 2004 by the introduction of a new CMS (NCMS) for rural residents, based on a small premium that is matched by the central and local government. A similar system of basic medical insurance was introduced for urban residents (URBMI) in 2007.¹⁶¹ Insurance coverage was ratcheted up under the 2009 healthcare spending plan. While the majority of Chinese was uninsured before 2008, about 95 percent are covered by government insurance plans today. The bulk is enrolled in the rural NCMS, which counted nearly a billion members by 2010.¹⁶² Expanded coverage is reflected as well in the value of total health insurance premiums, which grew from virtually zero in the year 2000 to over RMB 100 billion (about \$17 billion) last year (see Figure 7).

Figure 7: Total Health Insurance Premiums in China
(current RMB billions)

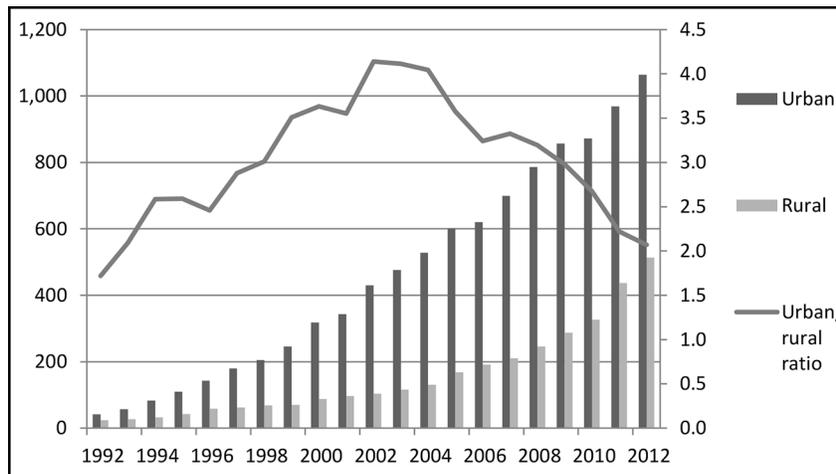


Source: China Insurance Regulatory Commission, via CEIC.

* Said Dr. Huang: "At the provincial level, the provincial leaders certainly have access to good healthcare for free. They have the Provincial People's Hospitals for each province. In some provinces, they also have the military hospitals that provide similar service. ... Despite the healthcare reform, there's still a percentage of basically what we call 'cadres,' the government officials [that] can access healthcare for free. ... There may be a couple million, eight million or so, of the government officials. They have free access to healthcare. But there's also a hierarchy in terms of what kind of services you have free access to." U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.

Relative to other parts of the reform agenda, insurance coverage has had moderate success in increasing access and reducing costs. The share of private spending on healthcare has declined sharply, from a peak of 60 percent in 2001 to 35 percent in 2011. Reimbursement rates for inpatient treatment expenses increased from 50 percent in 2008 to 75 percent in 2013.¹⁶³ City dwellers a decade ago spent four times as much on healthcare as their rural counterparts; in 2012, they spent only twice as much (see Figure 8).^{*} At the National People's Congress meetings in March 2014, Premier Li Keqiang announced that the annual government subsidy for basic medical insurance premiums for the NCMS and URBMI would be raised again to RMB 320 (\$52) per capita, from RMB 120 (\$20) in 2010.¹⁶⁴

Figure 8: Per Capita Healthcare Spending in China
(in RMB)



Note: RMB in current prices.

Source: China National Bureau of Statistics, via CEIC data.

However, insurance expansion has not been a panacea. Said Dr. Huang:

The problem is that [the official coverage rate] includes 200 million migrant workers who are nominally covered in the countryside, but because they live and they work in the cities, they actually are not covered because their health insurance schemes so far are not portable. ... If you [dis]count these 200 million migrant workers, the actual coverage rate is about 87 percent.¹⁶⁵

Insurance coverage is also shallow. According to Dr. Eggleston, the NCMS and URBMI, which are voluntary government-sub-

^{*}Convergence between rural and urban spending power generally indicates a decline in rural-urban inequality. In the healthcare sector, however, rural spending may be attributed to induced demand or high costs, so that convergence with urban spending levels is not necessarily a measure of success.

sitized programs, have lower premiums and less generous benefit packages than the mandatory and longer-standing insurance programs for urban employees and government workers. Some provinces are merging the NCMS and URBMI to widen risk pooling and thereby deepen benefit packages, but these reforms are at an early stage.¹⁶⁶ At present, according to Dr. Huang, most benefit packages fail to cover dental care and many of the effective medicines for treating non-communicable diseases.¹⁶⁷

Paradoxically, the expansion of insurance coverage has also compelled patients to seek too much inpatient care. The hospital bed utilization rate surged from 36 percent in 2003 to 88 percent in 2011, worsening the overcrowding at large hospitals.¹⁶⁸ A root cause is the absence of a functioning referral system. Before market reform, Communist China's healthcare system was built on a three-tiered hierarchy of government-run providers,* with separate systems for urban and rural areas. Local clinics, which focused on preventive care, were the first resort for the sick, who could only visit larger hospitals with an official doctor's referral. Although the basic three-tier system is still in place, patients can now choose to forego local providers in favor of larger hospitals, as long as they can afford the cost. This has reduced the use, quality, and reputation of local clinics.†

The bias of patients toward larger hospitals has also affected government efforts to build out local clinics. In the government's 2009–2011 healthcare budget, 71 percent of supplier-side spending went toward upgrading or constructing medical facilities, primarily in rural areas. The result was 2,000 new county hospitals (China has 2,859 counties); 29,000 new and 5,000 upgraded township hospitals; and thousands of clinics.¹⁶⁹ According to Dr. Huang, “the county hospital is extremely crowded, but at the township health center you stay an entire day and won't see that many people actually seeking care . . . despite the fact that the government has invested billions of dollars trying to strengthen the grassroots level healthcare institutions.”¹⁷⁰

Financing and Payment of Providers

On the supply-side of the healthcare sector, market reforms led to changes in the way China's providers are financed and paid. In the prereform period, central government funding, particularly in urban areas, was the primary source of provider income. Beginning in the 1980s, however, decentralization forced local governments to shoulder most of the funding burden, widening disparities between rich and poor regions. Overall subsidies were reduced as well; in 2009, the government health budget accounted for less than 10 percent of the actual costs of hospitals. The smaller pot of government funding was heavily skewed toward larger hospitals, even though

* In rural areas, the hierarchy is village clinics (tier-1), township health centers (tier-2), and county hospitals (tier-3). In urban areas, the hierarchy is urban health centers (tier-1), district hospitals (tier-2), and city hospitals (tier-3).

† Researchers from Stanford University conducted a study of 44 township health centers in 2005 to 2008. They found that rural health insurance “did not increase the overall number of patients served or the likelihood that a sick person would seek care at a township center.” Kimberly S. Babiarz et al., “China's New Cooperative Medical Scheme Improved Finances of Township Health Centers But Not the Number of Patients Served,” *Health Affairs* 31:5 (2012): 1065; Karen Eggleston et al., “Health Service Delivery in China: A Literature Review,” *Health Economics* 17 (2008): 151.

these facilities are less cost effective and prevention oriented than primary care units.¹⁷¹

While forced to generate their own revenue, healthcare providers in China have been squeezed by distorted fee schedules and price controls. The government, on one hand, has forced providers to offer essential treatments and drugs at below marginal cost; on the other hand, it has deregulated prices for costlier treatments and permitted hospitals. Hospitals not only prescribe their own drugs, but also charge markups on the drugs they sell. Providers thus have a perverse incentive to undersupply basic drugs and services, and oversupply costlier ones. Alternatively, they can raise the quantity of drugs and services provided to make up for the low prices of basic services. A 2010 study found that the average Chinese hospital depends on drug sales for 45 percent of its revenue, and for every four doctors employs one pharmacist. As Dr. Eggleston has noted, once patients choose to receive treatment at a certain provider, they have little choice about what goods and services they will consume, and rely on doctors to determine what is right for them.¹⁷² Over time, patients have come to expect drug prescriptions as part of their treatment. According to a 2008 study, China's spending on medicines accounts for 40 percent of total health expenditure, compared to 16 percent in OECD countries.¹⁷³

A further perverse incentive has to do with how government-run insurers pay providers. Because Chinese insurers use a "fee-for-services" system without adequate safeguards, providers are able to charge excessive fees retroactively, based on services rendered. Insurers in most advanced economies adopt sophisticated managed care systems to contain costs, such as diagnostic-related groups (pay providers based on prospective costs for a given treatment); capitation (pays providers a set amount for each enrolled person assigned to them, whether or not that person seeks care); or a fixed pool of funds (pay providers a fixed sum based on average case load, case mix, and other criteria).¹⁷⁴

Reforms have done little to alter costly incentives. Although government funding for healthcare has increased, only a small share of these funds has gone toward subsidizing the day-to-day operations of hospitals. Local governments, which contributed some three-quarters of the \$371 billion in investments in 2009–2012, have become reluctant to pick up the tab, especially in poor regions that are short of revenue. Vague directives from Beijing, which grant local authorities autonomy to experiment with healthcare reforms, have resulted in uneven implementation and regulatory uncertainty. Many providers pocket the funds from the government and use them as "seed money" to buy expensive equipment and ramp up capacity to offer specialized services. Recent data indicates that hospital revenue still depends heavily on drug revenue and expensive treatments.¹⁷⁵ Although pilot programs have tried out sophisticated payment systems, fee-for-services remains the norm.¹⁷⁶

The government is attempting to control drug prices by establishing an essential drugs formulary (the National Essential Drugs List, EDL) and forbidding markups. But this strategy has backfired. Government subsidies meant to compensate for the loss in drug revenue have been grossly insufficient, because policymakers

underestimated the hospitals' original markup rates, which in many cases exceeded the legal rate. Larger hospitals have used their political leverage to continue charging markups for lucrative drugs, while shirking MOH standards for prescribing a certain volume of essential drugs. The brunt of the reform has thus fallen on the already unpopular grassroots providers, who have responded to the no-markup policy by reducing their drug inventories, reinforcing the incentive of patients to seek care at larger providers.¹⁷⁷ According to Xiaoqing Lu Boynton, a China healthcare expert at Albright Stonebridge Group, forcing down drug prices has also caused shortages in drug production for domestic consumption. Chinese drug makers, many of them small private firms, do not see why they should produce drugs that offer scant profits.¹⁷⁸

The Medical Profession

A key reason why doctors overprescribe drugs and treatments is that they earn low base salaries. Doctors rely on fee-based revenue, and in many cases, are rewarded by hospital administrators based on the revenues they bring in rather than the efficacy of treatment. Bribes are another form of income. Said Ms. Boynton: "Patients who can afford bribery can get better care."¹⁷⁹

Only a small share of added government spending has gone toward raising medical workers' salaries. Hospital administrators, in turn, prefer to invest in physical assets, such as new machines. Since doctors cannot form independent unions, they lack bargaining power. Normally, they are licensed to work in just one hospital. According to Dr. Eggleston, the government hospital has to consent if its physician is going to go practice in a private hospital, "but then the government hospital manager doesn't necessarily have the incentive to let their best doctors do that."¹⁸⁰

Doctors in China are increasingly confronted by patients who are upset about the high cost and poor quality of care. According to Dr. Eggleston, patients have begun to disregard advice for taking drugs, assuming that profit-seeking is distorting the doctor's judgment.¹⁸¹ Worse yet, angry patients have resorted to violence. Murray Scott Tanner, a researcher at the Center for Naval Analysis, told the Commission that China's "medical disturbance" incidents, in which patients or their family members "violently beat, threaten, or curse medical personnel," increased from 10,248 in 2006 to 17,243 in 2010, and have "attracted the attention of party leaders and law enforcement officials."¹⁸² In 2006, the last year that MOH published statistics on hospital violence, attacks by patients or their relatives injured some 5,500 medical workers.¹⁸³ The government in March 2014 passed a new regulation requiring police, rather than in-house security services, to maintain the order and safety of hospitals.¹⁸⁴

Low pay, limited mobility, and difficult work conditions have reduced the supply of good doctors. According to a prominent epidemiologist who has done fieldwork in China, the medical profession is looked down upon by aspiring professionals.¹⁸⁵ As Mr. Shobert observed, "A doctor that graduates in Beijing for the first couple of years will make less money than if he were driving a taxi-

* For more information, see Chapter 2, Section 3, "China's Domestic Stability."

cab.”¹⁸⁶ According to Dr. Huang, the competitiveness of entering medical studies in China is considerably lower than in the United States, because the country’s best minds find better job prospects elsewhere. The quality of medical education is also inferior: “If you meet someone from China who claims that he’s an M.D., don’t think that it’s the same M.D. you find here in the U.S. because usually these are the people who . . . receive five years of medical training, basically on the undergraduate level.”¹⁸⁷

Young Chinese who graduate with a medical degree are reluctant to work in the countryside, especially at the township and village levels. As part of its effort to improve primary care, the government is launching a number of pilot programs to incentivize physicians from large hospitals to practice in local clinics. However, since physicians earn their main income from fees instead of salaries, working with poorer patients in under-used local clinics is not very attractive. According to Ms. Boynton, even in cities, doctors are unhappy, and are looking to either move abroad if they have the qualifications or switch to the hospital administrator side of the system.¹⁸⁸

Market Access for U.S. Medical Goods and Services

Why U.S. Companies Do Business in China’s Healthcare Sector

Major U.S. companies are cognizant of the problems in China’s healthcare system. And yet, the China market is now central to U.S. business strategy. Biopharmaceutical products represent a growing net export from the United States to China, increasing by 28 percent every year for the last ten years to \$1.4 billion in 2013.¹⁸⁹ Pfizer, the largest U.S. pharmaceutical company, claims it is “the top multinational R&D-based biopharmaceutical company in China.” Its China subsidiary has cumulative investments of \$1 billion; business operations in over 300 Chinese cities; four state-of-the-art manufacturing facilities; and over 9,000 employees (business, R&D, production and other areas).¹⁹⁰ Mr. Hunter, speaking on behalf of PhRMA’s member companies, said he expects his members’ presence in China to “only strengthen in time.” This presence is no longer limited to production and sales: International drug makers are now bringing as much as \$8 billion per year in R&D investment to China.¹⁹¹ United Family Healthcare, the healthcare services division of the U.S. company Chindex International Inc., is China’s largest foreign-invested healthcare provider.¹⁹²

A variety of factors explain this turn to the China market. As Mr. Shobert observed, “[China] is no longer just an alternative geography where you can find a lower-cost supply partner. It’s also somewhere you can sell into.”¹⁹³ China’s healthcare boom is also occurring at a time when mature markets are losing luster. After decades of escalating costs, healthcare providers in Europe, Japan, and the United States are under pressure to make care affordable. Governments and households, still hurting from the 2009 financial crisis, are eager to reduce their debt burdens by cutting the cost of healthcare goods and services. In parallel, there has been a precipitous decline in pharmaceutical R&D productivity since the 1980s.¹⁹⁴ According to Bain & Company, pharmaceutical companies

will lose more than \$100 billion in patent protection by 2015, as key patents expire.¹⁹⁵

U.S. companies could turn to other developing markets, but most are smaller and present their own regulatory challenges. Mr. Hunter argued that China is faring better than India: “People have talked . . . about the challenges to the Chinese system, but if you were just to turn a little bit farther to the West, you’d find a country of a similar size that is vastly worse off.” India spends only 1.5 percent of GDP on healthcare. Because most Indians are uninsured, at least 70 percent of spending is out of pocket. Rural residents barely have access to care. All told, China’s healthcare sector “is decades or at least a decade ahead.”¹⁹⁶ An additional advantage of operating in China is that it has a large aging population compared with other emerging markets.

Witnesses told the Commission that the risk of intellectual property (IP) theft is not sufficient reason to avoid the China market. Mr. Hunter noted that India has pursued an aggressive policy to market generic drugs and rewrite the World Trade Organization’s Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). Although patented drugs only account for 5 percent of the Chinese market, the figure is less than 1 percent in India.* China also helps U.S. pharmaceutical companies recoup R&D costs. Said Mr. Hunter: “If you don’t take your product to a market, you don’t work the patent in a market, and somebody else can use it. . . . It’s either you use it or lose it.” As for why U.S. drug makers would engage in R&D in China despite the risk of losing IP, Mr. Hunter pointed to China’s large pool of well-qualified scientists, and to the need to adapt U.S. drugs to Asia’s patient profiles.¹⁹⁷

Ralph Ives, executive vice president for global strategy and analysis at AdvaMed, acknowledged that IP theft is a concern in the medical device segment as well, especially when counterfeits do not perform like the original and put patient safety at risk. Yet such risks are mitigated by the innovation model of the medical device industry, which is different from pharmaceuticals. New medical devices come out about every 18 months, which reduces the incentive for counterfeit, since the fakes quickly become outdated. Higher value-added devices (e.g., implants) are usually sold in China through business-to-business transactions. That allows device makers to develop a direct relationship with doctors at hospitals, who themselves have an intrinsic interest in buying high-quality devices that are safe for their patients.¹⁹⁸

Closer analysis of market access issues, however, indicates that U.S. companies are incurring substantial risks by operating in China. Said Mr. Shobert:

In my [consulting] practice, we work pretty hard to get people to say no [to entering China], and that’s not because we’re fundamentally hostile to China, but simply [because]

*Stated Mr. Hunter: “India has had for some time a strong generics industry, and when it came time to implement its WTO obligations with TRIPS, the generics industry was very influential in the final drafting of the legislation that was passed in 2005, and it includes a series of provisions that undercut those commitments. We’ve seen in the case of India over the past two years either the disallowance or the attack in one form or another on the patents on some 15 products of which there are only 45 patented products in the market.”

*we want any new entrant to China to understand at the most basic level within their organization—and this goes all the way to the top, especially when you’re talking about compliance risk—selling into the healthcare economy in China is inherently a political act.*¹⁹⁹

China’s Medical Services Market

In contrast to drug and device makers, U.S. healthcare providers have yet to penetrate the Chinese market on a significant scale. They currently focus on delivering premium care to wealthy and privately insured patients in tier-1 cities like Shanghai and Shenzhen. But China’s need for high-tech facilities, as well as user-friendly spaces for the elderly, is raising demand for U.S. healthcare services. Given the current price pressures on drug makers, Bain & Company forecasts that hospitals will account for 40 percent of healthcare profit growth in China through 2020.²⁰⁰ Less than 2 percent of China’s senior population currently uses institution-based care, but more than 10 percent are willing to receive care in institutions.²⁰¹

Some promising projects are in progress. Medical device manufacturers across the world are vertically integrating into after-sales services, sometimes through in-house clinics. The U.S. company Chindex, for example, operates healthcare facilities across China, and also produces medical devices used in those facilities.²⁰² A Harvard-affiliated U.S. hospital, Brigham & Women’s, is reportedly exploring the “possibility of collaborating” with Evergrande Real Estate Group Ltd., a Chinese real estate company, to build a state-of-the-art hospital in China.²⁰³ In addition, the U.S. firm Henningson, Durham & Richardson signed an agreement with a Chinese company to jointly supply architectural planning and concept design for the proposed Beijing International Medical Center, a state-invested facility that aspires to become the largest healthcare education and research center in the world.²⁰⁴

Premier Li has also hinted that China will permit more “non-governmental capital” into the healthcare sector. In August 2014, the Ministry of Commerce and the National Health and Family Planning Commission announced a pilot program that will allow foreign investors in some parts of the country to set up new hospitals. The program will apply to Beijing, Tianjin, and Shanghai municipalities, as well as to the provinces of Jiangsu, Fujian, Guangdong, and Hainan. That followed a decision in July to let the German hospital operator Artemed Group establish China’s first hospital fully funded by foreign capital, based in the Shanghai Free Trade Zone.²⁰⁵

China's Medical Services Market—Continued

Despite these advances, it is uncertain whether foreign investors will be permitted to make full acquisitions of China's public hospitals. It may also prove difficult for U.S. companies to expand beyond the premium segment in the largest cities, if efforts to rein in healthcare costs put pressure on pricing and give preference to cheaper local providers. U.S.-style institution-based elderly care is too expensive for the mass of retirees and has been criticized by those who think the elderly should be cared for by their children, or at the very least receive community-based care.²⁰⁶

Corruption in the Chinese Healthcare System

The potential risks of operating in China were on display last year, when Chinese authorities began looking into allegations that the British drug maker GlaxoSmithKline (GSK) had funneled money through a local travel agency to pay bribes to doctors in return for prescribing its drugs. While the legal outcome dragged on, GSK reported that its third-quarter 2013 China sales fell 61 percent.²⁰⁷ In September 2014, a secret one-day trial was held in a Chinese court to adjudicate the case. GSK was fined nearly \$500 million, the highest fine on record against a foreign company. According to Xinhua, China's official news agency, the court also sentenced GSK's British former country manager and four other company managers to prison terms of up to four years. It suspended the sentences, however, allowing the defendants to avoid incarceration if they did not engage in further wrongdoing. GSK said in a statement that it "fully accepts the facts and evidence of the investigation, and the verdict of the Chinese judicial authorities."²⁰⁸

Other companies were targeted on bribery charges as well. The drug makers Sanofi (France), Bayer (Germany), AstraZeneca (United Kingdom—Sweden), and Eli Lilly and Company (United States), all reported visits from authorities to their China offices in August and September of 2013. Sanofi was accused of bribing over 500 Chinese doctors with \$277,600 in illicit payments.²⁰⁹ Nu Skin Enterprises, a listed U.S. company that develops personal care products and dietary supplements, was charged in January 2014 with operating an illegal pyramid scheme. The allegations were first lodged by *The People's Daily*, China's Party-run newspaper, which also accused Nu Skin of using direct-marketing methods "akin to brainwashing." Following publication of the report, China's State Administration for Industry and Commerce (SAIC) launched an investigation.²¹⁰

If a U.S. company had acted the way GSK did, it would likely have violated the U.S. Foreign Corrupt Practices Act, inviting substantial penalties in U.S. federal courts. In Ms. Boynton's opinion, the GSK case also signaled a sincere effort by the Chinese government to rein in escalating healthcare costs. The investigations put many foreign pharmaceutical companies in the spotlight but were not exclusively antiforeign. China National Pharmaceutical Group

Corporation (Sinopharm Group), China's largest state-owned drug distributor, was also targeted.²¹¹

Mr. Shobert, however, drew a negative conclusion from the GSK case. Although GSK did what it was accused of doing, the argument that the company behaved unethically is "convenient but not entirely accurate." He argued that bribery is a "reality of doing business" in China's healthcare sector:

*You pay this money to your doctor to be seen, and you pay that money to see a specialist, and you pay that money to jump to the front of the line. And you pay that money to get drugs that actually are high quality. Behind the scenes the same type of red envelope payments takes place between pharmaceutical sales representatives, dealers, [and] hospital administrators.*²¹²

Mr. Shobert further claimed that the GSK case is emblematic of aggressive tactics being taken by the Chinese government against foreign companies. The government not only seeks to benefit domestic companies, but also to promote the public perception that it is combating the escalation in healthcare costs. In 2012, the NDRC investigated four drug classes comprising over 500 different drugs, after which prices dropped by 17 percent. GSK reacted to the allegations in its case by agreeing to reduce its drug prices, as other foreign companies have done in response to the antimonopoly law.²¹³

These actions reflect the Chinese government's aggressive and prejudicial use of antitrust litigation. China's antimonopoly law, enacted in August 2007, is applied by the NDRC, the SAIC, and the Ministry of Commerce to hold companies accountable for anti-competitive agreements, abuse of a dominant position, or mergers that would lead to a dominant position. The law also calls for China to establish a review process to screen inward investment for national security implications.²¹⁴ The U.S. Trade Representative has complained that, even though the assets of state-owned enterprises account for 42 percent of the total assets of Chinese industrial enterprises, the market position of state-owned enterprises has been strengthened through administrative mergers that may not have been subject to review under the new antimonopoly law. At the same time, the law has been used as a pretext to block foreign investors, shielding selected Chinese domestic enterprises, even inefficient or monopolistic enterprises, from foreign competition.²¹⁵ The law has been applied with greater intensity in 2014, most recently against foreign automotive manufacturers.²¹⁶

Technology Transfer and Clinical Trials

Foreign drug makers are setting up state-of-the-art R&D facilities in China. This trend has coincided with government policies to spur innovation in the life sciences. In 2008, the Chinese government unveiled the New Drug Creation and Development Program, creating 20 incubator sites for life science innovation. The 12th Five-Year Plan (2011–2015) mandates that 4 percent of the country's GDP be derived specifically from the life science sector by 2015, and sets aside \$10 billion in funding. Said Mr. Shobert: "As

a result of China's goals, American companies have found they now must begin to allocate funding towards R&D directed specifically at bench science, product development and clinical trials completed in China." One example is Merck and Co.'s late 2011 announcement that it would be spending \$1.5 billion to improve its R&D capacity in China. Mr. Shobert argued that, just as China has conditioned market access on technology transfer in the renewable energy equipment sector, it is now doing so in life sciences, the next emerging industry.²¹⁷

In the near term, China is not expected to compete as a drug innovator. Only 9 percent of domestic pharmaceutical sales are attributed to non-generic brands. At \$150 billion, China's spending on drug R&D is only about one-third that of the United States.²¹⁸

Mr. Hunter told the Commission that his members are less concerned about China's state-led innovation efforts. He argued that it will be difficult for China to imitate the U.S. innovation system, which combines robust IP protection with synergistic relationships among the National Institutes of Health, U.S. universities, and pharmaceutical manufacturers. China's efforts to control drug pricing could also discourage capital-intensive drug innovation, and would have to be offset by substantial government subsidies. To the extent that China is innovating, it is doing so via its private sector; for example, the Chinese drug maker Tasly Phar. International Co. Ltd. has a cardiovascular product that is in phase III clinical trials in the United States.²¹⁹

Nonetheless, the Chinese government appears to be acquiring data from U.S. companies in ways that violate its WTO commitments. At the 2012 JCCT talks, China agreed to "define new chemical entities in a manner consistent with international research and development practices in order to ensure regulatory data of pharmaceutical products are protected against unfair commercial use and unauthorized disclosure."²²⁰ The impetus for this agreement stemmed from complaints that China is not providing six years of data protection to U.S. patent drugs, as is set forth in its WTO commitments. This problem is directly attributable to China's State Intellectual Property Office (SIPO), which uses a poorly defined phrase, "new chemical entity," that has allowed Chinese pharmaceutical manufacturers to receive approval from the CFDA before the six-year period of protection that China's IP laws establish.²²¹ The U.S. Trade Representative has also expressed concern with SIPO's interpretation of Article 26.3 and related provisions of China's Patent Law, which govern information disclosure requirements for pharmaceutical patent applications. SIPO: (1) requires the disclosure of more information than that sought by its counterparts in the United States; (2) requires all of this information be disclosed at the time of application, instead of permitting supplemental disclosure filings under appropriate circumstances; and (3) has retroactively applied the new standards in Article 26.3 to invalidate some older patents.²²²

A related concern is China's onerous clinical trial process. It takes an average of eight years for an existing U.S. patented drug to be re-patented in China, and therefore, to reach Chinese patients who could already be benefiting from innovative drugs available in the United States. For drugs that have a patent life of

around 15 years, this delay can substantially affect a drug maker's ability to recoup R&D costs. The Chinese government fails to compensate this loss by extending periods of market exclusivity. These delays are also damaging to China. For example, in the case of cancer, terminally ill patients may be denied access to state-of-the-art medications from the United States. Slow domestic clinical trials also hamper China's ability to participate in global R&D.²²³

Rather than simply registering a clinical trial with the government, U.S. drug makers must first apply for permission. This can be a drawn-out process, due to staffing limitations at the CFDA. Once clinical trials begin, they undergo the same process as a full approval; in contrast to most major economies that market U.S. drugs, China does not make adequate use of clinical trial data available for the same drug from the FDA.²²⁴ Chinese regulators have also been holding up or invalidating U.S. pharmaceutical patents by charging that the application contains insufficient information, without allowing companies to supplement information after the initial filing. At the 2013 JCCT talks, China "affirmed" that it would end this practice, and that it would "ensure that pharmaceutical inventions receive patent protection during examinations and re-examinations and before China's courts."²²⁵

According to Mr. Ives, clinical trials can delay the release of some U.S.-origin medical devices in China. FDA-approved products require re-approval by Chinese regulators, and the device has to be approved first by the FDA before it can begin the registration process in China. These regulatory hurdles could increase substantially under China's proposed amendment to the Medical Device Law, released in March 2014. The amendment could impose hundreds of new requirements on foreign device makers, including indigenous standards for serial number tracking.²²⁶

Distribution, Pricing, and Reimbursement

Once a U.S. drug or device hits the Chinese market, it faces further hurdles. To lower the cost of drugs, the MOH introduced a National Reimbursement Drug List (NRDL) in 2004, which designated 1,027 Western drugs eligible for reimbursement from state-run insurers and to be given preference by state-run hospitals.* In 2009, the same year that China greatly expanded health insurance coverage, an updated NRDL was published and supplemented by the Essential Drug List (EDL), a shorter compendium of generic drugs to be sold by grassroots providers at no markup.

The use of these lists has put U.S. drug makers in an uncomfortable position. While pricing and reimbursement lists are typically updated at least on an annual basis around the world, in China, the last update was in 2009. China's own laws dictate that updates should occur every two years. Effectively, all the U.S. drugs that have entered the market since then have not been eligible for reimbursement. Foreign drugs not on the lists can achieve moderate success in China, particularly for advanced treatments. Reimbursements can be negotiated individually with providers. But U.S. drug makers like Pfizer, Johnson & Johnson, and Merck derive signifi-

*These numbers exclude the traditional Chinese medicine products that account for over half of the NRDL.

cant sales from drugs that are on the lists.²²⁷ The drug list policy also harms Chinese patients who, in addition to not enjoying timely access to the latest drugs, may not get adequate reimbursement for them.

A revised NRDL, due out in 2014, could place additional foreign drugs to the list. U.S. drug makers, however, will be forced to participate in reimbursement drug bidding, an opaque process that varies by region and often favors the lowest bidder, while giving less consideration to quality or to the costs incurred in developing and producing the drug.²²⁸

Widespread state ownership of pharmacies and providers has further hindered the introduction and distribution of U.S. products. Small clinics, for instance, are expected to sell only the essential drugs on the EDL, excluding foreign drugs deemed “non-essential.” According to Marc de Garidel, CEO of French drug maker Ipsen, doctors at public hospitals can be “paid by the state” to refuse foreign drug makers’ sales representatives.²²⁹ In light of these risks, foreign drug makers have come to rely heavily on local pharmaceutical distributors to navigate the process. Getting these companies involved, however, siphons off profits that could be pocketed by the drug makers themselves. Conflict of interest is magnified in the case of Sinopharm Group, a Hong Kong-listed, central state-owned enterprise that distributes medicines and runs retail pharmacy chains, but also researches, develops, and manufactures its own medicines.²³⁰

The medical device sector faces a series of regulatory hurdles as well. The Chinese government has required hospitals and clinics to acquire medical devices at the provincial level. Foreign medical devices are frequently subject to price ceilings or are prevented from competing in local tendering.²³¹ U.S. government and industry representatives have opposed these practices since they were first instituted by the NDRC in 2006. Although China at the 2012 JCCT talks vaguely committed to “taking into account comments from the United States on this issue,” its amended Medical Device Law, released this year, appears to make matters worse. Said Mr. Ives:

*It is expected that the revision to this law will impact all aspects of China’s regulatory system (clinical trials, testing, inspections, evaluations, re-registration, post-market surveillance, etc.). We have already seen more than 20 new requirements with significant impact to our industry over the past year, and expect to see hundreds more as the revision is implemented.*²³²

Of particular concern to the device industry is China’s implementation of Unique Device Identifiers (UDI), a bar code that will be required on all medical technology products. The ostensible purpose of UDI is to improve patient safety by allowing regulators to identify devices throughout distribution and use, akin to “track and trace” technology being adopted in the United States. But while the U.S. rule is based on international standards—in conjunction with the International Medical Devices Regulators’ Forum—Mr. Ives expressed concern that China is contemplating a “home grown” UDI system that would not be consistent with the global approach. U.S.

device companies would spend huge sums to comply with China's indigenous standards throughout the supply chain.²³³

Implications for the United States

Healthcare, still a marginal issue in U.S.-China relations, has the potential to become a positive and stabilizing force, at a time when bilateral disputes in other areas remain unresolved. The FDA is building constructive relationships with its Chinese counterparts, as pandemics and food and drug safety issues have forged a stronger partnership under duress. On the corporate side, the sheer size of China's market has compelled U.S. drug and device makers to do business there. Sourcing cheap ingredients is an important motive, but so are China's large pool of patients and its deepening role in developing drug products for the Asian market. Net exports of biopharmaceuticals to China can help remedy the bilateral trade imbalance. U.S. companies can help China to upgrade its pharmaceutical production and inform regulators on best practices.

U.S. policy and corporate interests could complement China's objective to make healthcare provision equitable and efficient. Policy documents and statements, such as the Third Plenum Decision, suggest that the new party leadership is indeed interested in modifying existing market structures and regulatory frameworks to bridge rural-urban gaps, realign incentives for medical professionals, and permit a larger number of foreign and private companies into emerging market niches, such as long-term care. Lower rates of precautionary saving could raise consumption among Chinese households, and with it, consumer demand for U.S. goods and services.

The reality, however, is that China's healthcare system is in dire need of repair. The reforms undertaken in 2009 introduced generous fiscal spending but could not remedy escalating costs and distorted incentives that have taken root over decades. In this difficult environment, U.S. drug and device companies are struggling to market their latest cutting-edge products and to move beyond the richest Chinese consumers in tier-1 cities. They also face ethical dilemmas when dealing with regulators, competitors, partners, or clients who view corruption and bribery as part of doing business.

U.S. drug and device companies have made some use of the JCCT to address market concerns in China, but appear hesitant to rely too much on government-to-government negotiations. An example is the WTO's Agreement on Government Procurement (GPA), which China has not signed, and which could potentially resolve the issues that U.S. companies face at the local level in China. Mr. Hunter said: "I am not sure going to USTR [U.S. Trade Representative] to complain about GPA is the most effective means, but we certainly engage with [China's Ministry of Health], the relevant ministries, and at the provincial level to urge expeditious updates of the reimbursement list to begin that complicated process."²³⁴ Referring to counterfeiting in the device industry, Mr. Ives said that "so far, [our members] have not wanted to pursue [remedies] through the USTR." Device makers have preferred to raise their concerns with the relevant Chinese authorities.²³⁵ These

statements raise questions about the role the U.S. government should and can play in resolving market access issues.

At greatest risk, perhaps, are U.S. consumers who continue to purchase China-origin drug products, in many cases unknowingly. The FDA has made significant efforts since the 2007–2008 heparin scandal to remedy this problem but still faces a series of obstacles. In China, increasing the number of drug inspectors has taken over two years, and inspections of API suppliers are infrequent. U.S. taxpayer funds are being used to train CFDA regulators, while the FDA has not been granted sufficient work visas or permission to conduct unannounced inspections of drug facilities. Back in the United States, the new authorities and capabilities afforded by FDASIA and DQSA will take time to be fully adopted. Drug regulation is challenged by uneven state-level oversight of wholesalers, infrequent inspections at the border, and loopholes with regard to ingredients, dietary supplements, and lifestyle drugs.

Conclusions

- China today is the world's largest producer of active pharmaceutical ingredients and inert substances. In a 2010 study of pharmaceutical executives by the consulting firm Axendia, 70 percent of respondents cited China as their top source country for pharmaceutical ingredients. China's rise as a pharmaceuticals exporter has coincided with growing reliance on drug and drug ingredient imports in the United States, which is estimated to be the top importer of China's pharmaceutical raw materials. These trends are worrying because China, by some estimates, is also the world's leading supplier of fake and substandard drugs. Tainted heparin, which contained ingredients sourced from China, claimed at least 81 lives in the United States in 2007–2008. More subtle risks of unsafe drugs include inadequate dosages of active ingredients, impure ingredients, and false packaging.
- Since 2007, the Food and Drug Administration (FDA) has taken important steps to improve drug safety regulation. In China, the FDA is expanding its team of drug inspectors, increasing the frequency of inspections, and working closely with its Chinese counterparts at the China Food and Drug Administration. In the United States, Congressional legislation has given the agency more authority to hold companies accountable for their supply chain safety, collect user fees from companies to finance regulatory efforts, seize unsafe products at the border, and track-and-trace products via serial numbers. The agency has also transitioned to an electronic, risk-based surveillance system known as PREDICT.
- There is much work to be done to improve drug safety in the United States. Regulating China's vast drug industry, especially the production of precursor chemicals by semi-legitimate companies, is a severe challenge. China's own drug safety regulation is fragmented and decentralized and lacks civil society monitoring. The FDA's China offices have had trouble securing work visas for new inspectors and conducting unannounced factory inspections.

- Alongside its role as a pharmaceutical producer, China is undergoing an epidemiologic and demographic transition that is fundamentally changing the country's demand for healthcare. Chronic and non-communicable diseases are on the rise, due to an aging population and to a worrying decline in public health, caused by pollution, poor diet, and other factors. A more affluent and urbanized population is seeking better quality care. Some experts estimate China's healthcare spending to increase from \$357 billion in 2011 to \$1 trillion in 2020, making China the second-largest market after the United States.
- At present, China's healthcare market is ill equipped to meet the rise in demand for care. Relative to wealthier countries, doctors and hospital beds are in short supply. Healthcare spending is only 5 percent of gross domestic product, compared to an average of 9 percent in Organization for Economic Cooperation and Development countries. To remedy this situation, the Chinese government launched ambitious healthcare reforms in 2009 that aim to extend basic government-subsidized health insurance, expand the population health benefit package, strengthen primary care by constructing new clinics, control the price of essential drugs, and reform government-owned hospitals. Fiscal spending to support these reforms totaled some \$371 billion in 2009–2012.
- Not all of China's healthcare reforms have succeeded, and serious problems remain. Expanded insurance coverage has had some success in reducing rural-urban gaps and out-of-pocket spending. But the insurance coverage of migrant workers is not portable, and coverage is limited for costlier drugs and treatments. The absence of a functioning referral system has led to overcrowding in large hospitals and underutilization of local providers.
- On the supply side, most of China's public funding increases for healthcare have gone toward brick-and-mortar investments and new machines, rather than increases in doctors' salaries. Prices and fees are subject to government interference, which incentivizes doctors to undersupply basic services and oversupply costly drugs and treatments. The net result is that hospitals are short of qualified staff and rely excessively on drug revenues, while healthcare spending is rising on the back of escalating costs rather than improvements in care. Private sector providers operate on an uneven playing field and have done little to improve overall delivery.
- U.S. companies that market drugs, medical devices, and healthcare services view China as an important opportunity, not only to source cheap inputs, but also to market goods and conduct research and development. An important impetus to focus resources on China is slowing demand and changing regulation in the United States, as well as a lack of other markets that match China in terms of market size and level of development.
- Market access for U.S. drug and device makers remains restricted. Companies are concerned about being targeted by China's recent anticorruption drive and indiscriminate use of its antimonopoly law, which ostensibly aim to lower healthcare costs

but serve to disadvantage foreign companies. China's process for approving new drugs leads to excessive data transfers. Loopholes in China's intellectual property laws allow local drug makers to reproduce U.S. patent drugs prematurely. Onerous clinical trials, combined with state interference in tendering, pricing, and reimbursement, cause delays of up to eight years for state-of-the-art U.S. drugs, and make these drugs prohibitively expensive for ordinary Chinese patients. U.S. device makers are concerned as well about proposed amendments to China's Medical Device Law, published in March 2014. The amendment could impose hundreds of new requirements on foreign device makers, including indigenous standards for serial number tracking.

ENDNOTES FOR SECTION 3

1. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.
2. Karen Eggleston et al., "Will Demographic Change Slow China's Rise?" *Journal of Asian Studies* 72:3 (August 2013): 505; data from World Bank, <http://data.worldbank.org/indicator/SP.POP.65UP.TO.ZS>.
3. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Karen Eggleston, April 3, 2014.
4. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Ralph Ives, April 3, 2014; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Rod Hunter.
5. NSD Bio Group LLC, *Potential Health & Safety Impacts from Pharmaceuticals and Supplements Containing Chinese-Sourced Raw Ingredients* (U.S.-China Economic and Security Review Commission, April 2010).
6. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.
7. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.
8. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Karen Eggleston, April 3, 2014; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014; and U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Xiaoqing Lu Boynton, April 3, 2014.
9. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Ralph Ives, April 3, 2014; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Rod Hunter.
10. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Ginger Zhe Jin.
11. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.
12. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Christopher J. Hickey, April 3, 2014; Uchenna Alexander (Congressional Affairs Specialist, Office of Legislation, U.S. Food and Drug Administration), e-mail to Commission staff, September 24, 2014.
13. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Rod Hunter, April 3, 2014.
14. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ralph Ives, April 3, 2014.
15. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Benjamin Shobert, April 3, 2014.
16. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.
17. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.

18. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Allan Coukell, April 3, 2014.

19. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Charles Bell, April 3, 2014.

20. Ann Maruchek et al., "Product Safety and Security in the Global Supply Chain: Issues, Challenges, and Research Opportunities," *Journal of Operations Management* 29 (2011): 700–701; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

21. Heather Timmons, "A Pharmaceutical Future," *New York Times*, July 7, 2010, via Factiva.

22. U.S. Food and Drug Administration, "Global Engagement: U.S. Food and Drug Administration." <http://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/Reports/UCM298578.pdf>; Uchenna Alexander (Congressional Affairs Specialist, Office of Legislation, U.S. Food and Drug Administration), e-mail to Commission staff, September 24, 2014.

23. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Benjamin Shobert, April 3, 2014.

24. NSD Bio Group LLC, *Potential Health & Safety Impacts from Pharmaceuticals and Supplements Containing Chinese-Sourced Raw Ingredients* (U.S.-China Economic and Security Review Commission, April 2010), p. 1; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014.

25. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Allan Coukell, April 3, 2014.

26. NSD Bio Group LLC, *Potential Health & Safety Impacts from Pharmaceuticals and Supplements Containing Chinese-Sourced Raw Ingredients* (U.S.-China Economic and Security Review Commission, April 2010), p. 16.

27. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014.

28. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ginger Zhe Jin, April 3, 2014.

29. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014.

30. Fred. C. Bergsten et al., *China's Rise: Challenges and Opportunities*. (Peterson Institute, 2008), pp. 106–109; Shankar Gopalakrishnan, "Negative Aspects of Special Economic Zones in China," *Economic and Political Weekly*, April 28, 2007. <http://farmwars.info/wp-content/uploads/2011/06/Negative-aspects-of-SEZ-in-China.pdf>.

31. Shuang Lewis, "China to Increase Tax Rebates on Anti-HIV and Insulin API Exports," *Global Insight Daily Analysis*, October 24, 2008, via Factiva; "China Raises Export Tax Rebates of Some Antibiotic APIs," *Interfax China Business Newswire*, June 9, 2009, via Factiva.

32. United Nations Office on Drugs and Crime, *The Globalization of Crime: A Transnational Organized Crime Threat Assessment* (Vienna, Austria: United Nations Office of Drugs and Crime), pp. 177–178.

33. Data from the China General Administration of Customs and the China National Bureau of Statistics, via CEIC.

34. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ginger Zhe Jin, April 3, 2014.

35. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.

36. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Allan Coukell, April 3, 2014.

37. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014; Roger Bate, *Phake: The Deadly World*

of *Falsified and Substandard Medicines* (Washington, DC: The AEI Press, 2012), pp. 196–198.

38. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, oral and written testimony of Ginger Zhe Jin, April 3, 2014; Peter S. Goodman, "China's Killer Headache: Fake Pharmaceuticals," *Washington Post*, August 30, 2002; "Drug Piracy: A Wave of Counterfeit Medicines Washes Over Russia," *New York Times*, September 5, 2006, via Factiva; and Andrew Batson, "As China Reins in Piracy, Some Seek Faster Results," *Wall Street Journal*, November 27, 2006, via Factiva.

39. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Allan Coukell, April 3, 2014.

40. Ann Maruchek et al., "Product Safety and Security in the Global Supply Chain: Issues, Challenges, and Research Opportunities," *Journal of Operations Management* 29 (2011): 710; Agnes Binagwaho, Roger Bate et al., "Combating Substandard and Falsified Medicines: A View from Rwanda," *PLoS Med* 10:7 (2013): 1–3.

41. Lawrence O. Gostin, Gillian J. Buckley, and Patrick W. Kelley, "Stemming the Global Trade in Falsified and Substandard Medicines," *Journal of American Medical Association* 309:16 (April 24, 2013): 1693–1694.

42. Lawrence O. Gostin, Gillian J. Buckley, and Patrick W. Kelley, "Stemming the Global Trade in Falsified and Substandard Medicines," *Journal of American Medical Association* 309:16 (April 24, 2013): 1693–1694.

43. Nayanah Siva, "Tackling the Booming Trade in Counterfeit Drugs," *The Lancet* 376 (November 2010): 1726.

44. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ginger Zhe Jin, April 3, 2014.

45. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Allan Coukell, April 3, 2014.

46. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, oral and written testimony of Charles Bell, April 3, 2014; Roger Bate, *Making a Killing: The Deadly Implications of the Counterfeit Drug Trade* (Washington, DC: American Enterprise Institute, 2008), pp. 8–24.

47. Jill Wechsler, "Campaign Mounts to Curb Counterfeit Drugs; Manufacturers and Regulators Struggle to Control Phony Versions of Crucial Medicines," *BioPharm International*, September 1, 2012, via Factiva.

48. Jon Swartz and Elizabeth Weise, "Online Buyer, Beware of Fakes," *USA Today*, May 1, 2014, via Factiva.

49. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.

50. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.

51. Roger Bate, *Phake: The Deadly World of Falsified and Substandard Medicines* (Washington, DC: The AEI Press, 2012), p. 13.

52. Roger Bate, *Phake: The Deadly World of Falsified and Substandard Medicines* (Washington, DC: The AEI Press, 2012), p. 13.

53. NBC News, "Heparin Probe Reveals Global Drug Market Perils," April 13, 2008. <http://www.nbcnews.com/id/24015019/#.UtgSFPRDvmc>.

54. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.

55. "Nation's First Contaminated Chinese Heparin Case," China Weekly News via VerticalNews.com, June 21, 2011, via Factiva.

56. Roger Bate, *Phake: The Deadly World of Falsified and Substandard Medicines* (Washington, DC: The AEI Press, 2012), p. 14.

57. Data from China Administration of Customs, via CEIC.

58. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

59. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

60. NSD Bio Group LLC, *Potential Health & Safety Impacts from Pharmaceuticals and Supplements Containing Chinese-Sourced Raw Ingredients* (U.S.-China Economic and Security Review Commission, April 2010), p. 14.

61. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.

62. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.

63. Nadine He, "China Urges Pharmaceutical Manufacturers to Meet New GMP Standards," *ChemLinked*, January 17, 2013. <https://chemlinked.com/news/pharmaceutical/china-urges-pharmaceutical-manufacturers-meet-new-gmp-standards>.

64. U.S.-China Joint Committee on Commerce and Trade, "2009 Fact Sheet." <http://www.ustr.gov/about-us/press-office/fact-sheets/2009/october/us-china-joint-commission-commerce-and-trade>.

65. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.

66. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014; Jon Swartz and Elizabeth Weise, "Online Buyer, Beware of Fakes," *USA Today*, May 1, 2014, via Factiva.

67. "Illicit Trade Report 2012" (Brussels, Belgium: World Customs Organization, 2013), p. 63.

68. Nadine He, "China Urges Pharmaceutical Manufacturers to Meet New GMP Standards," *ChemLinked*, January 17, 2013. <https://chemlinked.com/news/pharmaceutical/china-urges-pharmaceutical-manufacturers-meet-new-gmp-standards>.

69. Roger Bate (Visiting Scholar, American Enterprise Institute), e-mail to Commission staff, August 20, 2014.

70. Uchenna Alexander (Congressional Affairs Specialist, Office of Legislation, U.S. Food and Drug Administration), e-mail to Commission staff, September 24, 2014.

71. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014.

72. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ginger Zhe Jin, April 3, 2014.

73. Yanzhong Huang, *Governing Health in Contemporary China* (New York: Routledge, 2013), pp. 112–134; Margaret Pearson, "The Business of Governing Business in China: Institutions and Norms of the Emerging Regulatory State," *World Politics* 57:2 (January 2005): 296–322.

74. Vivian Wu, "Food, Drugs Fall under Health Ministry's Charge: Regulatory Agency Integrated under Reform," *South China Morning Post*, September 3, 2008, via Factiva.

75. Dali Yang, "Total Recall," *National Interest*, March 1, 2008, via Factiva; Yanzhong Huang, *Governing Health in Contemporary China* (New York: Routledge, 2013), pp. 112–134.

76. APCO Worldwide, "Will China's Food Safety Law Make China's Food Safer?" April 2009. <http://www.apcoworldwide.com/content/contactus.aspx>; Vivian Wu, "Food, Drugs Fall under Health Ministry's Charge: Regulatory Agency Integrated under Reform," *South China Morning Post*, September 3, 2008, via Factiva; and Yanzhong Huang, *Governing Health in Contemporary China* (New York: Routledge, 2013), pp. 112–134.

77. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014.

78. Based on comments made by Dr. Christopher J. Hickey and other speakers at 50th Annual Meeting of the Drug Information Association, San Diego, California, June 18, 2014. <http://www.diahome.org/en-US/Flagship-Meetings/DIA2014/Meeting-Program/Find-Sessions-and-Presentations/Event-Details.aspx?productID=2972652&eventType=SESSION>.

79. Yanzhong Huang, *Governing Health in Contemporary China*. (New York: Routledge, 2013), p.124.

80. Christine Wong, "Toward Building Performance-Oriented Management in China: The Critical Role of Monitoring and Evaluation and the Long Road Ahead," *ECD Working Paper Series 27* (Washington, DC: World Bank, September 2012), p.6.

81. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ginger Zhe Jin, April 3, 2014.
82. Yanzhong Huang, *Governing Health in Contemporary China*. (New York: Routledge, 2013), p. 133.
83. Daniel Chinoy, "Black-Hearted Products: The Causes of China's Product Safety Problems," *Columbia East Asia Review* 2 (2009): 29–36.
84. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.
85. Information from a leading epidemiologist who briefed the Commission on August 19, 2014.
86. Roger Bate, *Phake: The Deadly World of Falsified and Substandard Medicines* (Washington, DC: The AEI Press, 2012), pp. 188–195.
87. U.S. Trade Representative, *2013 Report on China's WTO Compliance*, p. 4.
88. Shuang Lewis, "China Gets Heavy-Handed on Counterfeit Drugs," *IHS Global Insight Daily Analysis*, May 28, 2009, via Factiva.
89. John Balzano, "China's Food Safety Law: Administrative Innovation and Institutional Design in Comparative Perspective." *Asian-Pacific Law & Policy Journal* 13:2 (2012): 23–80.
90. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ginger Zhe Jin, April 3, 2014.
91. Roger Bate, *Phake: The Deadly World of Falsified and Substandard Medicines* (Washington, DC: The AEI Press, 2012), p. 183; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014;
92. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Charles Bell, April 3, 2014.
93. Lawrence O. Gostin, Gillian J. Buckley, and Patrick W. Kelley, "Stemming the Global Trade in Falsified and Substandard Medicines," *Journal of American Medical Association* 309:16 (April 24, 2013): 1693–1694.
94. Senate Finance Committee, *Hearing on Trade Enforcement*, testimony of Bart Peterson, June 25, 2014; Ann Capling and John Ravenhill, "Symposium: Australia–U.S. Economic Relations and the Regional Balance of Power Australia, the United States and the Trans-Pacific Partnership: Diverging Interests and Unintended Consequences," *Australian Journal of Political Science* 48:2 (2013): 184–196.
95. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.
96. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.
97. Uchenna Alexander (Congressional Affairs Specialist, Office of Legislation, U.S. Food and Drug Administration), e-mail to Commission staff, September 24, 2014.
98. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.
99. Congressional-Executive Commission on China, *Food and Drug Safety, Public Health, and the Environment in China*, written testimony of Steven M. Solomon, May 22, 2013; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.
100. Uchenna Alexander (Congressional Affairs Specialist, Office of Legislation, U.S. Food and Drug Administration), e-mail to Commission staff, September 24, 2014.
101. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.
102. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.

103. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.

104. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.

105. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Christopher J. Hickey, April 3, 2014.

106. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Allan Coukell, April 3, 2014.

107. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Allan Coukell, April 3, 2014.

108. U.S. Government Accountability Office, *Food and Drug Administration: Overseas Offices Have Taken Steps to Help Ensure Import Safety, but More Long-Term Planning Is Needed*, GAO-10-960 (October 25, 2010).

109. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014.

110. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Charles Bell, April 3, 2014.

111. Pew Health Group, *After Heparin: Protecting Consumers from the Risks of Substandard and Counterfeit Drugs* (Washington, DC, 2011), p.14.

112. Suchira Ghosh, "RFID Act of 2006 and E-Pedigrees: Tackling the Problem of Counterfeit Drugs in the United States Wholesale Industry," *Michigan Telecommunications and Technology Law Review* 13:2 (2006-2007): 577-600; Roger Bate, *Making a Killing: The Deadly Implications of the Counterfeit Drug Trade* (Washington, DC: American Enterprise Institute, 2008), pp. 25-38.

113. Rx360.org homepage. <http://www.rx-360.org/AboutRx360/tabid/55/Default.aspx>; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Allan Coukell, April 3, 2014.

114. Roger Bate, *Phake: The Deadly World of Falsified and Substandard Medicines* (Washington, DC: The AEI Press, 2012), pp. 177-182; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Roger Bate, April 3, 2014.

115. Ann Maruchek et al., "Product Safety and Security in the Global Supply Chain: Issues, Challenges, and Research Opportunities," *Journal of Operations Management* 29 (2011): 716-717.

116. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Allan Coukell, April 3, 2014.

117. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Benjamin Shobert, April 3, 2014.

118. CMS, "National Health Expenditures 2012 Highlights." <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/downloads/highlights.pdf>.

119. Franck Le Deu et al., "Health Care in China: Entering 'Uncharted Waters,'" McKinsey & Company (November 2012). http://www.mckinsey.com/insights/health_systems_and_services/health_care_in_china_entering_uncharted_waters.

120. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Benjamin Shobert, April 3, 2014.

121. Shanlian Hu et al., "Reform of How Health Care Is Paid for in China: Challenges and Opportunities," *Lancet* 372:9652 (2008): 1846.

122. Debora MacKenzie, "China's Alzheimer's Time Bomb Revealed," *New Scientist*, June 7, 2013. <http://www.newscientist.com/article/dn23673-chinas-alzheimers-time-bomb-revealed.html#.UzMLHPldXmc>.

123. The World Bank, "Toward a Healthy and Harmonious Life in China: Stemming the Tide of Non-Communicable Diseases" (2011), p. 2. http://www.worldbank.org/content/dam/Worldbank/document/NCD_report_en.pdf.

124. Jun Ma et al., *China: Themes and Strategy for 2014*, (Deutsche Bank, January 3, 2014), pp. 28-33.

125. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Karen Eggleston, April 3, 2014.
126. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Yanzhong Huang, April 3, 2014.
127. *Wall Street Journal*, "Beijing Plans to Spend \$2.45 Trillion This Year," March 5, 2014.
128. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.
129. Shanlian Hu et al., "Reform of How Health Care Is Paid for in China: Challenges and Opportunities," *Lancet* 372:9652 (2008): 1846–1847; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Karen Eggleston, April 3, 2014.
130. Karen Eggleston, "Healthcare for 1.3 Billion: China's Remarkable Work in Progress," *Miken Institute Review*, Second Quarter 2013.
131. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.
132. Qiulin Chen, Karen Eggleston, and Ling Li, "Demographic Change, Intergenerational Transfers, and the Challenges for Social Protection Systems in the People's Republic of China," in Park, Donghyun, Sang-Hyop Lee, and Andrew Mason, *Aging, Economic Growth, and Old-age Security in Asia* (Northampton, MA: Edward Elgar Publishing, 2012), pp. 161–202.
133. Karen Eggleston et al., "Will Demographic Change Slow China's Rise?" *Journal of Asian Studies* 72:3 (August 2013): 505–518.
134. Shanlian Hu et al., "Reform of How Health Care Is Paid for in China: Challenges and Opportunities," *Lancet* 372:9652 (2008): 1847–1848.
135. Karen Eggleston et al., "Health Service Delivery in China: A Literature Review," *Health Economics* 17 (2008): 151–152.
136. Christina Ho, "Health Reform and De Facto Federalism in China," *China: An International Journal* 8:1 (March 2010): 38–39.
137. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Karen Eggleston, April 3, 2014.
138. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Xiaoqing Lu Boynton, April 3, 2014.
139. Bloomberg, "China 'Catastrophe' Hits 114 Million as Diabetes Spreads," September 3, 2013. <http://www.bloomberg.com/news/2013-09-03/china-catastrophe-hits-114-million-as-diabetes-spreads.html>.
140. Yong-chuan Wang et al., "Comparison of Cancer Incidence between China and the USA," *Cancer Biol. Med.* 9:2 (June 2012): 128–132. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3643656/#:po=10.0000>; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.
141. *Global Status Report on Road Safety 2013: Supporting a Decade of Action* (Geneva, Switzerland: World Health Organization, 2013).
142. Mindi Schneider, *Feeding China's Pigs: Implications for the Environment, China's Smallholder Farmers and Food Security* (Institute for Agriculture and Trade Policy, May 2011), pp. 19–22.
143. *New York Times*, "Pollution Killed 7 Million People Worldwide in 2012, Report Finds," March 26, 2013. <http://www.nytimes.com/2014/03/26/world/pollution-killed-7-million-people-worldwide-in-2012-report-finds.html>; "Air Pollution Linked to 1.2 Million Premature Deaths in China," *New York Times*, April 1, 2013. http://www.nytimes.com/2013/04/02/world/asia/air-pollution-linked-to-1-2-million-deaths-in-china.html?_r=2&.
144. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Karen Eggleston, April 3, 2014.
145. Centers for Disease Control and Prevention, "Avian Influenza A (H7N9) Virus." <http://www.cdc.gov/flu/avianflu/h7n9-virus.htm>.
146. Information from a leading epidemiologist who briefed the Commission on August 19, 2014.

147. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Karen Eggleston, April 3, 2014.

148. Yanzhong Huang, *Governing Health in Contemporary China* (New York: Routledge, 2013), pp. 24–52; Zhe Dong and Michael R. Phillips, “Evolution of China's Health-Care System,” *Lancet* 372 (November 2008): 1715–1716.

149. Data from World Bank. <http://data.worldbank.org/indicator/SP.DYN.LE00.IN>.

150. Jing Ulrich et al., “Medicine for the Masses—China's Healthcare Reform: Progress and Future Steps,” *J.P. Morgan Hands-On China Report* (J.P. Morgan, October 10, 2011), p. 3.

151. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Xiaoqing Lu Boynton, April 3, 2014.

152. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Karen Eggleston, April 3, 2014.

153. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Karen Eggleston, April 3, 2014.

154. Karen Eggleston and Winnie Yip, “Hospital Competition under Regulated Prices: Application to Urban Health Sector Reforms in China,” *International Journal of Health Care Finance and Economics* 4:1 (2004): 347–348.

155. Karen Eggleston et al., “Health Service Delivery in China: A Literature Review,” *Health Economics* 17 (2008): 159.

156. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Karen Eggleston, April 3, 2014.

157. “Information from webinar presented April 20, 2012 by Double Helix, titled *Drug Policy Reform in China: Where Now and What Does It Mean for the Pharmaceutical Industry?*”

158. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Yanzhong Huang, April 3, 2014.

159. Shanlian Hu et al., “Reform of How Health Care Is Paid for in China: Challenges and Opportunities,” *Lancet* 372:9652 (2008): 1847–1848.

160. Zhe Dong and Michael R. Phillips, “Evolution of China's Health-Care System,” *Lancet* 372 (November 2008): 1715–1716.

161. Shanlian Hu et al., “Reform of How Health Care Is Paid for in China: Challenges and Opportunities,” *Lancet* 372:9652 (2008): 1847–1848; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Xiaoqing Lu Boynton, April 3, 2014.

162. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Xiaoqing Lu Boynton, April 3, 2014.

163. Karen Eggleston, “Health Care for 1.3 Billion: An Overview of China's Health System,” *Asia Health Policy Program Working Paper* 28 (January 2012): 17; Shan Juan, “Medical Reform Must Be Rational,” *China Daily*, March 10, 2014. http://www.chinadailyasia.com/news/2014-03/10/content_15123737.html.

164. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.

165. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written and oral testimony of Karen Eggleston, April 3, 2014.

166. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.

167. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Yanzhong Huang, April 3, 2014.

168. Jing Ulrich et al., “Medicine for the Masses—China's Healthcare Reform: Progress and Future Steps,” *J.P. Morgan Hands-On China Report* (J.P. Morgan, October 10, 2011), pp. 2–3.

169. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.

170. Yuanli Liu, "Reforming China's Healthcare: For the People by the People?" *Lancet* 373 (January 2009): 282; Shanlian Hu et al., "Reform of How Health Care Is Paid for in China: Challenges and Opportunities," *Lancet* 372:9652 (2008): 1848; and Zhe Dong and Michael R. Phillips, "Evolution of China's Health-Care System," *Lancet* 372 (November 2008): 1715–1716.

171. Karen Eggleston and Winnie Yip, "Hospital Competition under Regulated Prices: Application to Urban Health Sector Reforms," *International Journal of Health Care Finance and Economics* 4:1 (2004): 343–344; Karen Eggleston et al., "Comparing Public and Private Hospitals in China: Evidence from Guangdong," *BMC Health Services Research* 10:76 (2010): 3; and U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Yanzhong Huang, April 3, 2014.

172. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Ginger Zhe Jin, April 3, 2014.

173. Karen Eggleston et al., "Health Service Delivery in China: A Literature Review," *Health Economics* 17 (2008): 154–155.

174. Karen Eggleston et al., "Health Service Delivery in China: A Literature Review," *Health Economics* 17 (2008): 154–155.

175. Christina Ho, "Health Reform and De Facto Federalism in China," *China: An International Journal* 8:1 (March 2010): 38–53; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Yanzhong Huang, April 3, 2014.

176. Xiaoqing Lu Boynton, Olivia Ma, and Molly Claire Schmalzbach, *Key Issues in China's Health Care Reform: Payment System Reform and Health Technology Assessment* (Center for Strategic and International Studies, December 2012).

177. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Yanzhong Huang, April 3, 2014; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Benjamin Shobert, April 3, 2014.

178. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Xiaoqing Lu Boynton, April 3, 2014.

179. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Xiaoqing Lu Boynton, April 3, 2014.

180. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Karen Eggleston, April 3, 2014.

181. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Karen Eggleston, April 3, 2014.

182. U.S.-China Economic and Security Review Commission, *Hearing on Stability in China: Lessons from Tiananmen and Implications for the United States*, written testimony of Murray Scott Tanner, May 15, 2014.

183. Sharon LaFraniere, "Chinese Hospitals Are Battlegrounds of Discontent," *New York Times*, August 11, 2010. http://www.nytimes.com/2010/08/12/world/asia/12hospital.html?_r=0.

184. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Xiaoqing Lu Boynton, April 3, 2014.

185. Information from a leading epidemiologist who briefed the Commission on August 19, 2014.

186. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Benjamin Shobert, April 3, 2014.

187. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.

188. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Xiaoqing Lu Boynton, April 3, 2014; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.

189. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Rod Hunter, April 3, 2014.

190. Pfizer.com, "Pfizer in China." http://www.pfizer.com.cn/pfizer-china/about_pfizer_china_en.aspx.

191. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

192. United Family Healthcare, "About Us." <http://www.ufh.com.cn/en/about-us/>.

193. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Benjamin Shobert, April 3, 2014.

194. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Benjamin Shobert, April 3, 2014.

195. George Eliades et al., *Healthcare 2020* (New York: Bain & Company, 2012), p. 1.

196. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

197. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

198. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ralph Ives, April 3, 2014.

199. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Benjamin Shobert, April 3, 2014.

200. George Eliades et al., *Healthcare 2020* (New York: Bain & Company, 2012), p. 3.

201. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014.

202. United Family Healthcare, "About Us." <http://www.ufh.com.cn/en/about-us/>.

203. John Lauerman and Michael McDonald, "Harvard-Linked Hospital Eyes Expansion with China Billionaire," Bloomberg, February 17, 2014.

204. U.S. Department of Commerce, *Fact Sheet: 24th U.S.-China Joint Commission on Commerce and Trade (JCCT) Signings* (December 20, 2013). <http://www.commerce.gov/news/fact-sheets/2013/12/20/fact-sheet-24th-us-china-joint-commission-commerce-and-trade-jcct-signin>.

205. Fanfan Wang, "China to Allow Foreign Ownership of Hospitals," *Wall Street Journal*, August 27, 2014. <http://online.wsj.com/articles/china-to-allow-foreign-ownership-of-hospitals-1409133296>.

206. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Yanzhong Huang, April 3, 2014; U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Karen Eggleston, April 3, 2014.

207. Drew Armstrong, "China's Pharma Potential Diminished," *Bloomberg Businessweek*, November 14, 2013.

208. Keith Bradsher and Chris Buckley, "China Fines GlaxoSmithKline Nearly \$500 Million in Bribery Case," *New York Times*, September 19, 2014. http://www.nytimes.com/2014/09/20/business/international/gsk-china-fines.html?_r=0.

209. Reuters, "China Investigates France's Sanofi for Alleged Bribery: Xinhua," August 10, 2013, via Factiva; *China Economic Review*, "China Investigates Bayer for Alleged Wrongdoings," September 16, 2013. <http://www.chinaeconomicreview.com/china-investigates-bayer-alleged-wrongdoings>.

210. *Wall Street Journal*, "Communist Party Paper Alleges U.S. Company Is Operating Pyramid Scheme," January 16, 2014, via Factiva.

211. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Xiaoqing Lu Boynton, April 3, 2014.

212. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Benjamin Shobert, April 3, 2014.

213. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Benjamin Shobert, April 3, 2014.

214. Slaughter and May, "Competition Law in China," January 2014. <http://www.slaughterandmay.com/media/879862/competition-law-in-china.pdf>.

215. U.S. Trade Representative, *2013 USTR Report to Congress on China's WTO Compliance* (December 2013), pp. 69, 79.

216. Colum Murphy, "China Regulator Finds Evidence of Mercedes-Benz Monopolistic Behavior," *Wall Street Journal*, August 18, 2014. <http://www.marketwatch.com/story/china-regulator-finds-evidence-of-mercedes-benz-monopolistic-behavior-2014-08-18>.

217. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written and oral testimony of Benjamin Shobert, April 3, 2014.

218. Drew Armstrong, "China's Pharma Potential Diminished," *Bloomberg Businessweek*, November 14, 2013.

219. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

220. U.S. Department of Commerce, *Fact Sheet: 23rd U.S.-China Joint Commission on Commerce and Trade* (December 19, 2012).

221. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

222. U.S. Trade Representative, *2013 USTR Report to Congress on China's WTO Compliance* (December 2013), p. 108.

223. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

224. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

225. U.S. Trade Representative, *2013 USTR Report to Congress on China's WTO Compliance* (December 2013), p. 5.

226. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ralph Ives, April 3, 2014.

227. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014; IMS, *The 2009 Revision of the National Reimbursement Drug List* (Beijing: IMS Intelligence Applied, 2009).

228. Jing Ulrich et al., "Medicine for the Masses—China's Healthcare Reform: Progress and Future Steps," *J.P. Morgan Hands-On China Report* (J.P. Morgan, October 10, 2011), pp. 6–7; IMS, *The 2009 Revision of the National Reimbursement Drug List* (Beijing: IMS Intelligence Applied, 2009).

229. Drew Armstrong, "China's Pharma Potential Diminished," *Bloomberg Businessweek*, November 14, 2013.

230. See Sinopharm Group homepage. <http://www.sinopharm.com/p391.aspx>.

231. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ralph Ives, April 3, 2014.

232. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Ralph Ives, April 3, 2014.

233. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, written testimony of Ralph Ives, April 3, 2014.

234. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Rod Hunter, April 3, 2014.

235. U.S.-China Economic and Security Review Commission, *Hearing on China's Healthcare Sector, Drug Safety, and the U.S.-China Trade in Medical Products*, testimony of Ralph Ives, April 3, 2014.

SECTION 4: U.S.-CHINA CLEAN ENERGY COOPERATION

Introduction

The United States and China have a long history of bilateral clean energy cooperation, both through official channels and among private and nongovernmental actors. Both nations have seen some benefits from the technology-sharing relationship as have neighboring nations whose skies and waterways have been subject to increasing levels of pollution from the rapidly industrializing China. After a slow start, the benefits of some of the cooperative energy programs are only now being recognized. Future efforts, particularly in joint research and development, will require more assessment and measurement of progress if the many programs are to retain public and industry support.

This section, which draws from the April 25 Commission hearing on U.S.-China clean energy cooperation and other sources, continues the Commission's examination of China's rapidly growing domestic energy needs, its attempts to implement clean energy policies, and the opportunities and challenges that exist for bilateral cooperation in these areas. This section will focus on the facilitation by the governments of the United States and China of cooperative activities aimed at improving the efficiencies of conventional energy sources such as coal, natural gas, and nuclear.* Through several case studies, this section explores the role of U.S. government agencies, universities, and businesses in this cooperation. The section concludes by assessing the implications of such cooperation for U.S. national interest.

U.S.-China Clean Energy Cooperation Policy

In a briefing to the Commission, Jonathan Elkind, acting assistant secretary for International Affairs at the U.S. Department of Energy (DOE), said the United States cooperates with China on clean energy both "because we need to and because we want to," pointing to shared interest in protecting the environment and creating business opportunities.¹ Indeed, the two countries share many energy and climate challenges. The United States and China lead in global energy consumption and rely on the abundant domestic coal resources to provide energy, which results in carbon dioxide (CO₂) emissions. China is the world's largest emitter of CO₂ (26 percent of world emissions in 2010), followed by the United States (17 percent),² and their joint efforts are necessary for suc-

*For a discussion of wind and solar industries see U.S. Economic and Security Review Commission, *2010 Annual Report to Congress*, November 2010, pp. 183-210. http://origin.www.uscc.gov/sites/default/files/annual_reports/2010-Report-to-Congress.pdf.

cessful global reduction. Both countries are investing in renewable resources, such as wind and solar, while also working on increasing efficiencies and reducing pollution by making conventional energy sources, such as natural gas and coal, cleaner.

China's environmental problems pose some of the most pressing challenges for Chinese leaders. The combination of its large population, rapid economic growth, and lax environmental enforcement has led China to consume more energy with each year and emit ever more toxins into the air and water. A major international study found that air pollution contributed to 1.2 million premature deaths in China in 2010.³

China's heavy reliance on coal for energy generation, industrial production, and heating is a major contributor to its environmental woes. While use of nuclear and renewable energy is growing rapidly, they remain minor energy sources, and are not expected to soon replace coal in a substantial way.⁴ According to latest data from the U.S. Energy Information Administration, coal supplied 69 percent of China's total energy consumption in 2011 (see Figure 1).⁵ The corresponding figure for the United States was far lower, at 20 percent.*

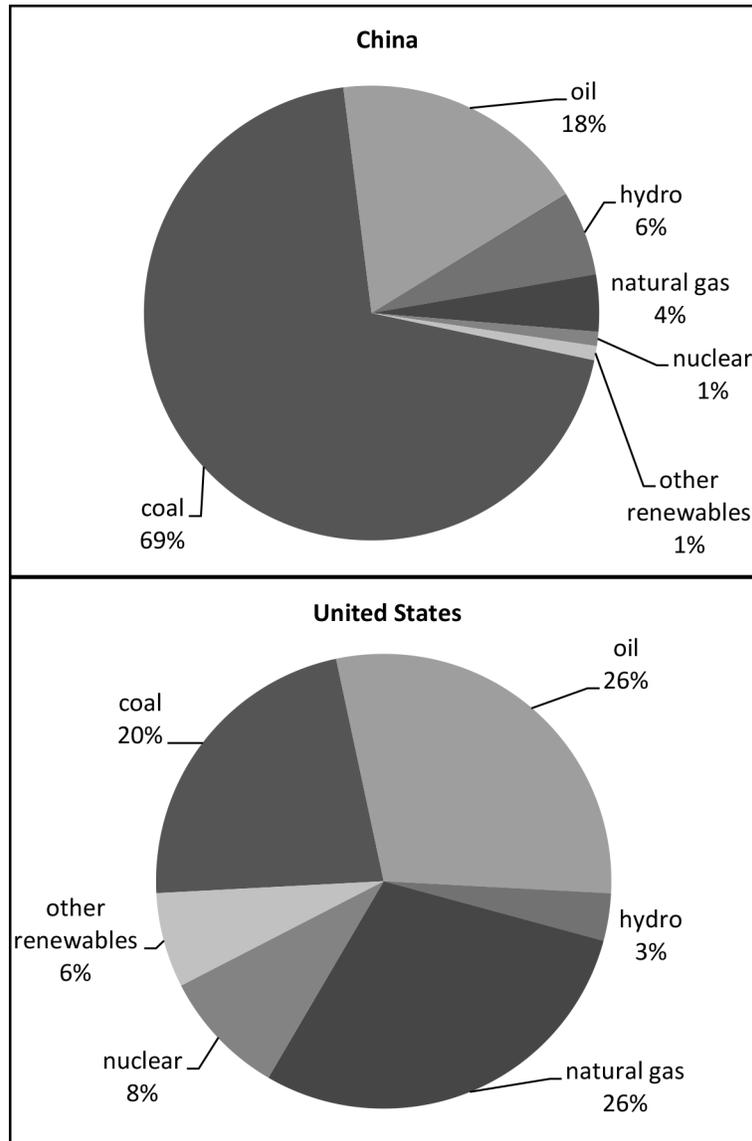
The Chinese leadership, through consecutive Five-Year Plans, has placed increasing emphasis on reducing pollution and energy consumption through regulation and promotion of clean energy and technologies.† China has stated it plans to cap coal use below 65 percent by 2017 and to raise non-fossil fuel energy consumption to 15 percent of the energy mix by 2020 (though consumption of coal will continue to rise in absolute terms).⁶ In addition, the 12th Five-Year Plan sets targets for increasing energy efficiency and carbon efficiency of the economy by 16 percent and 17 percent, respectively.⁷ The government reemphasized its commitment to promote an "ecological" civilization during the 2014 National People's Congress, promising to "declare war" on pollution and providing some concrete targets for reducing energy inefficiency.‡

Coal and peat also dominate China's electricity generation, accounting for almost 80 percent of China's electrical capacity in 2011. Although coal and peat are the largest fuel source for the U.S. electricity market, the energy mix is much more diversified (see Figure 2). Coal and peat account for only 43 percent of U.S. electricity generation.

*The United States holds the world's largest estimated recoverable reserves of coal and is a net exporter of coal. In 2012 U.S. coal mines produced more than a billion short tons of coal and more than 81 percent of this coal was used by U.S. power plants to generate electricity. <http://www.eia.gov/coal/>. According to EIA, in 2012 China was the third biggest market for U.S. coal (9 percent of the total) behind the Netherlands (12 percent) and UK (11 percent). In 2012, the U.S. was the eighth largest source of Chinese coal imports behind Indonesia, Australia, Mongolia, Russia, Vietnam, South Africa, and North Korea.

†For an in-depth analysis of Chinese government's policies supporting the clean energy sector, see U.S. Economic and Security Review Commission, *2010 Annual Report to Congress*, November 2010, pp. 183–210. http://origin.www.uscc.gov/sites/default/files/annual_reports/2010-Report-to-Congress.pdf.

‡For more details on the *2014 National People's Congress and the Government Work Report*, see Nargiza Salidjanova and Jacob Koch-Weser, *China's 2014 Government Work Report: Taking Stock of Reforms* (U.S.-China Economic and Security Review Commission, April 1, 2014). http://origin.www.uscc.gov/sites/default/files/Research/USCC%20Backgrounder_NPC%20scorecard.pdf.

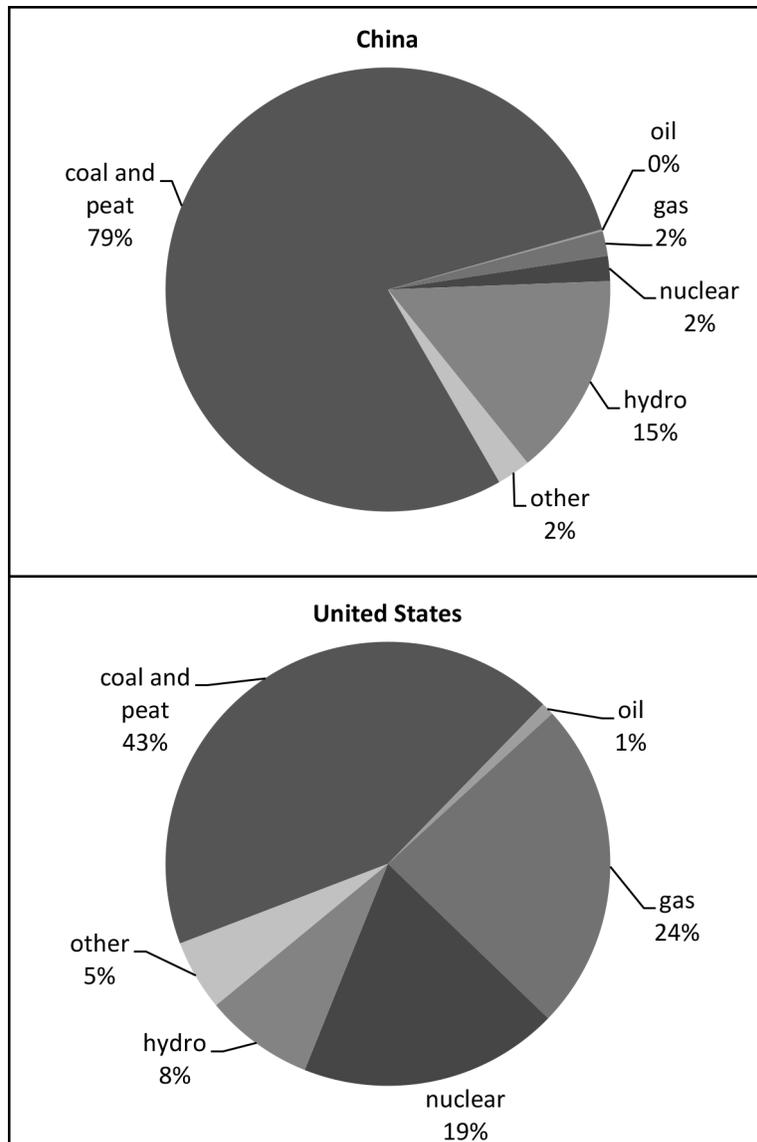
Figure 1: Total Energy Consumption by Type, 2011

Source: U.S. Energy Information Administration, *International Energy Statistics*.

China is the world's largest investor in clean energy (it surpassed the United States in 2012). In 2013 alone, China's combined public and private investment in that sector reached \$61.3 billion, or about one quarter of the \$254 billion world total.⁸ But even as China's spending on clean energy development surpasses all other nations, its consumption of fossil fuels is still growing much faster

than its consumption of clean energy. For every gigawatt (GW) of new solar capacity that China added in 2013, for example, China added 27 GW of new coal capacity.⁹

Figure 2: Total Electricity Generation by Source, 2011



Source: International Energy Agency. <http://www.iea.org/statistics/statisticssearch/>.

In 2013, U.S. public and private investment in clean energy totaled \$48.4 billion, the second largest national investment globally.¹⁰ The Obama Administration has set a goal for the United States to generate 80 percent of its electricity from clean sources by 2035,¹¹ and has sought to fund and incentivize an array of activities to help the country reach this milestone (U.S. Energy Information Administration estimates that coal-fired power plants will continue to be the largest source of electricity generation in the United States, though coal's share of total U.S. power generation will decline from 42 percent in 2011 to 38 percent in 2025 and 35 percent in 2040).¹² As clean energy alternatives have become more viable, the U.S. private sector has also deepened its investments, resulting in dynamic market growth and technological advancement.

With so much combined investment focused on clean energy, the potential opportunities for both countries are immense, and U.S. and Chinese governments have endorsed cooperation. Many experts argue that U.S.-China cooperative initiatives “could increase the capacity and reduce the cost of new energy technologies, which over the long term will produce economic, energy, and environmental security benefits on both sides of the Pacific.”¹³

At a 2011 Brookings Institution seminar, Zhou Dadi, vice chairman of the China Institute for Innovation and Development Strategy, urged cooperation because it “provides each side with access to the specialized expertise of the other ... increases the diversity of approaches that can be investigated ... and speeds up progress on both sides.”¹⁴ U.S. businesses are also interested in cooperation, given the substantial economic opportunities that exist in the clean energy field.¹⁵ At an energy cooperation event in Beijing in April 2013, Secretary of State John Kerry summed up the opportunities:

*The energy market that we are talking about here today, the energy market of the future, is a \$6 trillion market with five billion users today and growing to perhaps nine billion users over the next 40 years. This is the largest of all markets ever imagined on the face of this planet.*¹⁶

However, the tremendous opportunities of U.S.-China clean energy cooperation are tempered by significant obstacles, stemming primarily from China's lax protection of intellectual property rights and China's use of allegedly WTO-illegal subsidies to promote its clean energy sector.* The Chinese government's deployment of massive resources toward developing clean energy technologies—such as tax breaks, preferential financing, access to government contracts and other incentives—is a major challenge confronting proponents of U.S.-China clean energy cooperation, and may have damaging consequences for the U.S. energy sector and economy.¹⁷ As a result of the anticompetitive aspects of Chinese policies, U.S.-China trade disputes involving clean energy industries have proliferated.

*For an in-depth analysis of Chinese government's policies supporting the clean energy sector, see U.S. Economic and Security Review Commission, *2010 Annual Report to Congress*, November 2010, pp. 183–210. http://origin.www.uscc.gov/sites/default/files/annual_reports/2010-Report-to-Congress.pdf.

In 2010, the United States challenged China's Special Fund for Wind Power Manufacturing at the World Trade Organization (WTO). China's program gave domestic wind turbine manufacturers special subsidies, in violation of its WTO commitments.¹⁸ Following consultations with the United States, China agreed to end the subsidies program.¹⁹ In 2012, the U.S. International Trade Commission (ITC) found that cheap wind tower imports from China were having detrimental effects on U.S. manufacturers because Chinese wind tower companies were receiving countervailable subsidies and dumping (i.e., selling below cost of production) their products in the U.S. market.²⁰

The Chinese government's heavy subsidization of the domestic solar industry—which allowed Chinese solar manufacturers to sell their products below market value—has also led to U.S. trade action.²¹ In June and July 2014, the U.S. Department of Commerce announced preliminary countervailing (CVD) and antidumping (AD) duty investigations of imports of Chinese solar panels. U.S. Customs will begin collecting duties based on the preliminary rates of 18.56 to 35.21 percent in the CVD investigation and 26.33 percent to 165.04 percent in the AD investigation.²² The final determination is expected in December 2014.

This marks the latest step in a fight over low-cost solar panels from China. In 2012, Commerce imposed AD and CVD duties on imports of Chinese solar panels, in response to a petition by SolarWorld Americas, a U.S. subsidiary of a German solar company, and a coalition of other solar manufacturers, alleging WTO-illegal subsidies from the Chinese government to Chinese producers.²³

China asked the U.S. Department of Commerce for a suspension of the duties, and for a chance to negotiate a settlement. But while the U.S. government has not yet responded to China's request, SolarWorld Americas asked the U.S. Department of Commerce to increase the duties applied to Chinese solar products in response to Chinese military personnel hacking the company's computers.²⁴ The request follows the U.S. Justice Department's indictment of five members of the Chinese military for allegedly stealing documents and files from U.S. companies, including SolarWorld (for additional information on China's use of state-sponsored cyber-theft to promote domestic companies, see Chapter 1, Section 1 of this Report.)

Public-Private Partnerships

The two countries have been cooperating for over 30 years on environmental and energy efficiency initiatives, with much of the early agreements focusing more on establishing the basic frameworks for cooperation and on energy policy discussions (see Addendum I for a timeline of U.S.-China cooperation on clean energy and climate change). In the 2000s, clean energy and climate change mitigation emerged as leading topics of cooperation between China and the United States, culminating with a series of agreements signed in 2008–2009, which moved beyond discussion and into the realm of technical cooperation.

At the June 2008 Strategic Economic Dialogue, the United States and China signed the Ten Year Framework on Energy and Environmental Cooperation, establishing goals for cooperation on clean electricity, clean water, clean air, efficient transportation, and forest conservation. During President Obama's November 2009 trip to Beijing, he used this framework as the basis for establishing a number of initiatives to enhance U.S.-China cooperation on clean energy (see Table 1).

Table 1: Government-Sponsored U.S.-China Cooperation Initiatives Signed in 2009

Initiative	Chinese Body	U.S. Body	Description
U.S.-China Clean Energy Research Center (CERC)	Ministry of Science and Technology; National Energy Agency	Department of Energy	Establishes research center focused on developing energy efficiency, clean coal, and clean vehicle technologies, including carbon capture and storage.
U.S.-China Electric Vehicles Initiative	Various public and private entities	Various public and private entities	Includes joint standards development for electric vehicles, demonstration projects in China, creation of a research and development (R&D) and manufacturing roadmap, and public education projects.
U.S.-China Energy Cooperation Program (ECP)	Various public and private entities	Various public and private entities	Provides private sector money for work in China on renewables, smart grid, clean transportation, green building, clean coal, combined heat and power, and energy efficiency.
U.S.-China Renewable Energy Partnership	Various public and private entities	Various public and private entities	Fosters collaboration on advanced wind, biofuels, solar, and grid technologies, while expanding trade in these sectors through an annual U.S.-China Renewable Energy Forum.
21st Century Coal	Various public and private entities	Various public and private entities	Creates joint ventures and other public-private partnerships on clean coal, including carbon capture and near-zero emissions coal plants.
U.S.-China Energy Efficiency Action Plan	Various public and private entities	Various public and private entities	Develops energy efficient building codes and rating systems, benchmarks industrial energy efficiency, trains building inspectors and energy efficiency auditors for industrial facilities, and convenes a new annual U.S.-China Energy Efficiency Forum.

Table 1: Government-Sponsored U.S.-China Cooperation Initiatives Signed in 2009—Continued

Initiative	Chinese Body	U.S. Body	Description
Shale Gas Initiative	Various public and private entities	Various public and private entities	Enables both nations to use experience gained in the United States to assess China's shale gas* potential, conduct joint technical studies, and promote shale gas investment in China through the U.S.-China Oil and Gas Industry Forum, study tours, and workshops.

*Shale gas is natural gas trapped within shale formations. Although the complex geology of shale gas formations makes it more difficult to extract than conventional natural gas, recent advances in hydraulic fracturing (commonly called “fracking”) have enabled gas producers to extract shale gas economically. U.S. Energy Administration, “What is Shale Gas and Why is it Important?” December 5, 2012. http://www.eia.gov/energy_in_brief/article/about_shale_gas.cfm.

Source: The White House, U.S. Office of the Press Secretary, “U.S.-China Clean Energy Announcements,” November 17, 2009. <http://www.whitehouse.gov/the-press-office/us-china-clean-energy-announcements>.

U.S.-China government-facilitated collaboration takes many forms—from sponsoring workshops where U.S. and Chinese businesses and academics meet to discuss shared challenges to providing funding for projects. Most often, the collaboration is conducted through public-private partnerships, with the U.S. government providing resources or capacity building while academic institutions, nongovernmental organizations (NGOs), foundations, and the private sector join government-established frameworks. U.S.-based environmental NGOs have sizeable China programs and engage in cooperative activities with Chinese partners. These NGOs include the Natural Resources Defense Council, the Environmental Defense Fund, and the World Resources Institute.

One example of such public-private partnerships is work done by the U.S. Trade and Development Agency (USTDA), which focuses on trade capacity building initiatives, technical assistance, and pilot projects in the transportation, energy, information technology, and healthcare sectors. In 2013, USTDA completed 6 study tours and 16 workshops, conferences, and training programs for over 1,200 Chinese participants in the areas of transportation, energy, water and environment, healthcare and emergency response, and antimonopoly law. According to USTDA, its China projects have facilitated over \$8.1 billion in exports since 2001, including over \$960 million in new exports in 2013.²⁵ USTDA reports that in 2013, 21 percent of its total China portfolio was invested in the clean energy sector.

In her testimony before the Commission, USTDA Director Leocadia Zak highlighted the Energy Cooperation Program (ECP), which USTDA supports through grants for feasibility studies, technical assistance, and workshops.²⁶ ECP is a nongovernmental organization that includes over 45 U.S. companies across ten industry subsector working groups.²⁷ Several U.S. government agencies “support the ECP’s efforts to connect Chinese decision-makers to U.S. technical expertise in clean energy,” including the Department of Commerce and the Department of Energy, which joined USTDA in signing the Memorandum of Understanding (MOU) that created ECP in 2009.²⁸

Building on the work done by USTDA to enhance cooperation with Chinese government counterparts, ECP leverages private sector resources for project development work in China, encompassing renewable energy, smart grid, clean transportation, clean coal, and energy efficiency. To support ECP and promote clean energy development in China, USTDA has funded eight Chinese trade missions to the United States, seven pilot projects in China, and six workshops for Chinese public and private leaders.²⁹

U.S.-China Clean Energy Research Center (CERC)

CERC is the most ambitious U.S.-China program for joint research and clean energy development to come out of the November 2009 meeting between President Obama and President Hu. CERC is governed by a steering committee which includes ministerial or secretary level oversight from DOE and three ministries—the Ministry of Science and Technology (MOST), the National Energy Administration (NEA), the Ministry of Housing and Urban and Rural Development (MOHURD)—from the Chinese side. According to its steering committee, CERC’s goal is to

*accelerate the development and deployment of clean energy technologies for the benefit of both countries ... by providing a supportive platform for collaborative research, protecting intellectual property, and encouraging top scientists and engineers in both countries to join forces, learn from each other, and capitalize on unique assets and complementary strengths.*³⁰

CERC’s work was launched in January 2011, with the signing of joint work plans by the participants. Its three research priorities (the consortia) are advanced clean coal technologies, including carbon capture and storage (CCS),* clean vehicles (including advanced biofuels), and building energy efficiency (for a list of CERC projects, see Addendum II). As part of the program, DOE awarded grants to research teams led by West Virginia University on clean coal, the University of Michigan on clean vehicles, and Lawrence Berkeley National Laboratory on building energy efficiency. These U.S. teams conduct joint research with Chinese teams led by Huazhong University of Science and Technology on clean coal, Tsinghua University on clean vehicles, and the Ministry of Housing and Urban-Rural Development on building energy efficiency. CERC is funded in equal parts by the United States and China, with each consortium allocating a budget of \$50 million for the first five years (\$25 million provided by the national governments matched by \$25 million from industry, universities, research institutions, and other stakeholders).³¹ U.S. funds support only U.S. researchers and Chinese funds support only Chinese researchers.

On the U.S. side, each consortium is allocated \$2.5 million per year from DOE; this is matched equally by the academic and industrial participants. On the Chinese side, there is no matching requirement. According to Hwei Peng, the U.S. director of the CERC

*Carbon capture and storage (CCS) (or carbon capture and sequestration) is the process of capturing waste CO₂ from large sources, such as fossil fuel used in power generation and other industries, transporting it to a storage site, and depositing it where it will not enter the atmosphere.

clean vehicles consortium, Chinese industrial partners only provide guidance and in-kind contributions.³² In its 2012–2013 Annual Report, CERC reported its funding plan for the duration of the first five-year phase (see Table 2).

Table 2: Multi-Year Bilateral CERC Funding Plan

Funding Fiscal Year	United States		China	Totals
	DOE	Partners	MOST & Partners	
2010	\$7.5	\$3.8	\$0	\$11.3
2011	\$7.5	\$8.7	\$12.5	\$28.7
2012	\$5	\$9.4	\$22.3	\$36.7
2013	\$8.4	\$9.7	\$15	\$33.1
2014	\$7.5	\$8.2	\$15	\$30.7
2015	\$1.6	\$2.5	\$15	\$19.1
Totals	\$37.5	>\$37.5	>\$75	>\$150

Note: Shaded areas indicate planned spending.

Source: U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, p. C1.

Management of Intellectual Property under CERC

The nature of CERC’s work is collaborative, with several participants (academic, industry, or a combination) working on each project at the same time. As of July 2014, the CERC consisted of 75 individual projects within its three consortia, of which 58 were joint. For example, the Clean Vehicles Consortium’s work on advanced batteries is conducted by representatives from University of Michigan, the Ohio State University, Beijing Institute of Technology, and Tsinghua University. Managing intellectual property (IP) resulting from such cross-national joint work is a key challenge to overcome. One of CERC’s unique features is its Technology Management Plan (TMP), which was created to address IP concerns associated with joint research and development (R&D) activities. While the TMP does not add any new IP protections that the law does not otherwise provide, TMP establishes a framework to manage any IP developed under the CERC umbrella. The TMP states that the owners of background IP retain “all right [sic], title, and interest in their background IP” and they are not required to “license, assign or otherwise transfer” it, though using it may require an appropriate license.³³ For IP created by signatories from one country only, the TMP mandates that participants agree to negotiate in good faith terms of a nonexclusive license to the other participants.

Although common elements are shared in the plan framework, each consortium has a TMP to address the unique characteristics of its individual research.³⁴ To help researchers understand the TMPs and other IP laws and practices in each country, the U.S. DOE and China’s Ministry of Science and Technology carry out a continuing program of IP education and training. The program includes legal education, technical assistance, and a series of IP workshops for CERC participants.³⁵

While the TMP was designed to manage the joint ownership of IP resulting from CERC research activities, its utility is yet to be

tested in practice, because CERC is not yet producing inventions that were jointly developed by U.S. and Chinese participants.³⁶ Protection of IP is a crucial component of promoting collaborative innovation, yet lack of joint IP from CERC research projects points to a longstanding mistrust of China's lax IP protections. Joanna Lewis, an expert on China's energy policy at Georgetown University, noted that the TMP "does not seem to have sufficiently changed" behavior of CERC participants with regards to their willingness to share IP or co-develop IP with Chinese participants. U.S. participants are reluctant to share IP likely because "although the TMP provides IP protection on paper, in practice there is still much skepticism about its enforceability."³⁷

CERC Cooperation Case Study: Advanced Coal Technology Consortium (ACTC)

The Advanced Coal Technology Consortium (ACTC) is led jointly by James Wood, West Virginia University (WVU) and Zheng Chuguang, Huazhong University of Science and Technology. The U.S. side of the ACTC is headquartered in the WVU National Research Center for Coal and Energy, located in Morgantown, WV. The consortium consists of U.S. universities, national laboratories, and energy companies (see Table 3).

Table 3: CERC Advanced Coal Technology Consortium Current Members

U.S. Members	Chinese Members
West Virginia University (lead)	Huazhong University of Science and Technology (lead)
University of Wyoming	China Huaneng Group Clean Energy Research Institute
University of Kentucky	China University of Mining and Technology
Wyoming State Geological Survey	Harbin Institute of Technology
Indiana Geological Survey	Institute for Rock & Soil Mechanics, Chinese Academy of Science
Lawrence Livermore National Laboratory	Northwest University
Los Alamos National Laboratory	Research Center for Energy & Power, Chinese Academy of Sciences
National Energy Technology Laboratory	Shanghai JiaoTong University
U.S.-China Clean Energy Fund	Tsinghua University
World Resources Institute	Zhejiang University
American Electric Power	China Huaneng Group Power International, Inc.
Babcock and Wilcox *	China Power Engineering Consulting Group Corporation
Duke Energy, Inc.	China Power Investment Corporation

in the ACTC presents a unique opportunity for U.S. companies specializing in CCS and related clean coal research.⁴⁴

The ACTC's current research agenda is divided into seven themes to match the research interests and efforts of both the United States and China. These can be loosely categorized into three general areas: CCS; power generation; and coal conversion.⁴⁵ Jerald Fletcher, founding director of the ACTC noted in his testimony before the Commission that although both countries are engaged in all aspects of the research, "it has been clear from the beginning that the [United States] perceived the carbon management issues to be of the highest interest while China was most interested in the increasing efficiency and technical advances in power generation and coal utilization."⁴⁶

This mismatch in research interests is reflected in IP creation. Although several of the ACTC's projects have led to IP creation, none of the IP is jointly held by Chinese and U.S. partners. As of January 2013, ACTC participants had filed 15 patents (12 filed in China by Chinese ACTC members, and three filed in the United States by U.S. members).⁴⁷

According to CERC's U.S. Director Robert Marlay, as of July 2014, the ACTC had 39 research projects, 30 of which are joint research activities; some of which are highlighted here.⁴⁸

- *Clean Coal Conversion Technology Project* involves joint research, led by WVU and Zhejiang University, into developing new technology to convert conventional power plants into power plants that use waste heat and fuel combustion to produce chemicals and further byproducts from coal, making the overall coal power production process more efficient, reducing emissions, and increasing economic benefits. To date, researchers have successfully validated the theoretical modeling on a 1-megawatt pilot plant. Upon completion of the project, the newly developed technology is expected to reduce maintenance costs and greenhouse gas emissions by more than 25 percent, compared to conventional energy. Future plans include ACTC participant LP Amina building a demonstration project at a power plant in Shanxi, China.⁴⁹
- *CO2 Utilization Project* involves research, by the University of Kentucky and Duke Energy on the U.S. side and ENN Group and Zhejiang University on the Chinese, into developing an economically feasible technology to use CO2 to make biofuels. In a demonstration facility installed at Duke Energy's East Bend power plant in Rabbit Hash, Kentucky, CERC researchers feed to algae the CO2 captured after combustion. Eventually, the algae, which absorb the CO2, as do all plants, can be harvested for biogas fuels and animal feed. The research involves finding the optimum methods for growing and harvesting the oil from the algae, picking the best varieties of algae, and selecting the best types of growing media, such as ponds or closed-loop photobioreactors.⁵⁰
- *Advanced Power Generation Project* is led by LP Amina on the U.S. side and Tsinghua University on the Chinese side. Researchers designed and constructed a unique experimental sys-

tem to research pulverized coal combustion and developed a toolbox of energy conservation and emission reduction technologies for coal-fired power plants. Researchers investigated combustion characteristics of Xinjiang Houxun coal in advanced ultra supercritical (A-USC) boilers. Power plants equipped with A-USC boilers have the potential to dramatically improve efficiency and reduce emissions compared to existing coal-fired power plants. The development of improved A-USC boiler technologies was adopted as a national program in China.⁵¹

- *Post-combustion CO₂ Capture Project* is focused on developing new technologies to capture and dissolve captured CO₂, which will be used to lower energy costs related to the post-combustion capture process. The research is led by University of Kentucky and China Huaneng Group. Researchers completed the simulation of a 1 million ton/year post-combustion CO₂ capture system at Duke Energy's Gibson station, which revealed advantages over other methods. A two-phase solvent and a new catalyst family with record activity levels were also developed for the project.⁵²
- *CO₂ Sequestration and Storage Project* resulted in the publication of 11 peer-reviewed papers and conference papers on the storage and use of CO₂ in the Ordos Basin in China. Led by West Virginia University, University of Wyoming, Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Shenhua Group, and the Institute of Rock and Soil Mechanics (Chinese Academy of Sciences), the researchers initiated design, construction, and injection of CO₂ at a pilot project in China. They also assembled a large data set regarding the geologic structural framework of the Ordos Basin in China, as well as for the Wyoming and Illinois Basins in the United States. The significant opportunity for storage and use of CO₂ in the Ordos Basin complements opportunities that are being explored in the Wyoming and Illinois Basins.⁵³

Another U.S.-based ACTC participant, LP Amina, had begun cooperation with Gemeng International Energy Co. of Shanxi province, following a successful demonstration of an LP Amina technology process in China with the Zhejiang Energy Group. LP Amina's new technology, a coal classifier, prevented larger coal particles from entering the boiler, reducing nitrogen oxide emissions by up to approximately 15 percent, and reduced coal consumption and emissions. Despite the benefits, customers in the United States would not buy the new classifier because it was an unproven technology that demanded a substantial upfront investment.⁵⁴ After engagement in joint R&D and workshops convened by the CERC-ACTC, LP Amina partnered with Zhejiang Energy Group, which installed the converter at one of its power plants in Fengtai in the Anhui Province in eastern China. David Piejak, president of LP Anima in the United States, said that following the successful demonstration in China, LP Amina started marketing this technology to global companies, including plants in the United States.⁵⁵

CERC Cooperation Case Study: Clean Vehicles Consortium (CVC)

Huei Peng from the University of Michigan (Ann Arbor) leads the U.S. consortium, and Minggao Ouyang from Tsinghua University leads the Chinese consortium. Current CVC participants are listed in Table 4.

Table 4: CERC Clean Vehicles Consortium Current Members

U.S. Members	Chinese Members
University of Michigan (lead)	Tsinghua University (lead)
The Ohio State University	Beihang University
Massachusetts Institute of Technology (MIT)	Beijing Institute of Technology
Sandia National Laboratories	Chinese Academy of Sciences
Joint BioEnergy Institute	Hunan University
Oak Ridge National Laboratory	North China Electric Power University
Argonne National Laboratory	Shanghai Jiao Tong University
Aramco Services	Tianjin University
Delphi	Tongji University
Denso	Wuhan University of Technology
Eaton	Changzhou ECTEK Automotive Electronics Limited
Ford Motor Company	China Automotive Engineering Research Institute Co., Ltd.
Honda R&D Americas, Inc.	China Automotive Technology & Research Center
Huntsman International	China Potevio
PJM	Geely Group
TE Connectivity	JAC Motors
Toyota Motor Company, North America	Jing-jin Electric Co., Ltd.
	Keypower
	SAIC Motor.
	Shanghai General Motor Muling
	Tianjin Lishen Battery Joint-stock Co., Ltd.
	Wanxiang

Source: U.S.-China Clean Energy Research Center. http://www.us-china-cerc.org/Clean_Vehicles.html.

According to the testimony from Dr. Peng, the CVC's research projects officially started in 2011. Since then, joint research has been conducted in the following areas: advanced batteries and en-

ergy conversion, advanced biofuels and clean combustion, vehicle electrification, advanced lightweight materials and structures, vehicle-grid integration, and energy systems analysis. The CVC has been one of the most active consortia in terms of inventions. According to CERC U.S. Director Robert Marlay, as of July 2014, the CVC had 24 research activities, of which 16 were joint, some of which are highlighted here.⁵⁶

- *Degradation in Li-ion Batteries* is a project led by the Ohio State University, Tsinghua University, and Beijing Institute of Technology. The researchers explored ways to extend life and improve performance of lithium-ion (Li-ion) batteries, commonly used in hybrid and electric vehicles. The CVC researchers demonstrated a new design that minimizes this degradation in performance by applying a special polymer coating. The final outcome of this research is expected to be a development of a new battery cell for further studies.⁵⁷
- *Research into Materials Sourcing and Driving Behavior* is led by University of Michigan and Tsinghua University, in partnership with General Motors and Ford. CERC researchers used GPS tracking software on 1,000 vehicles to reveal that 60 percent of Beijing drivers travel fewer than 25 miles per day. By contrast, U.S. drivers log an average of 40 miles daily, which guided U.S. design criteria for battery-sizing of the Chevrolet Volt. Based on this new information, General Motors could downsize the Volt's battery in the Beijing market and still provide a level of service similar to that provided in the United States. Researchers simulated a Plug-in Hybrid Electric Vehicle similar to the Chevrolet Volt and examined the impact of vehicle component materials on lifecycle energy and emissions.⁵⁸
- *Vehicle Body Design Optimization*, a project led by University of Michigan, Tsinghua University, and Tongji University, explores a methodology for using lightweight materials in vehicle design. Further research is expected to explore the safety of newly designed vehicles, the effects of battery layouts on crashworthiness, and optimization of the vehicle's aerodynamic performance.⁵⁹
- *Electric Vehicle Charging Station Simulations* conducted by researchers at the Ohio State University and Tsinghua University was aimed at improving coordination between road networks and electricity systems. Researchers found that current strategies for determining the location of vehicle charging stations will result in significant inefficiencies, and proposed alternative solutions.⁶⁰

As of January 2013, participants in the CERC CVC had filed 12 patents in China and 11 in the United States, as well as 20 disclosures* in the United States. Although all of the patents filed in China were filed by Chinese participants, the 11 patents filed in the United States were also filed by Chinese participants. These fil-

*An invention disclosure is a document describing the invention, prepared by the scientist, investor, or a third party, which usually serves as a first step in the patenting process.

ings were related to patents that had first been filed in China. In contrast, U.S. participants filed no patents in China.⁶¹ Furthermore, none of the patents were filed jointly by U.S. and Chinese CERC participants. The lack of jointly-created IP and of U.S. inventions patented in China—features shared by all CERC consortia—point to the continued sensitivity over the capacity of Chinese law to protect IP and address violations.

The automotive industry is highly competitive and, although foreign brands or joint ventures have dominated the Chinese automotive market to date, Beijing is heavily invested in making China a world leader in the production and deployment of electric and hybrid vehicles.* This poses a significant competitive challenge to U.S. industrial partners in CERC—how to advance their own presence in China while maintaining an edge over Chinese competitors. According to Dr. Peng, the funding model for U.S. CERC ensures that all work supported by U.S. industrial membership fees is U.S.-only and does not have Chinese collaborators.⁶²

Unlike the CERC ACTC, where several industry partners joined to seek help with demonstrating a ready technology, the work done by CERC CVC participants is in the early stages of research, with commercialization years away.⁶³ Still, Dr. Peng noted in a 2013 CERC CVC progress report that U.S. industrial partners have requested a review of the implementation for all U.S. based tasks, with the goal of setting clear pathways towards commercialization.⁶⁴

U.S.-China Cooperation on Natural Gas

Although natural gas accounted for only 4 percent of China's energy consumption in 2011 (the most recent data available), the government has invested heavily in resource development and infrastructure. The 12th Five-Year Plan set a target to boost the share of natural gas to 8 percent of total consumption by the end of 2015 and to 10 percent by 2020. According to a 2014 report by the U.S. Energy Information Administration, China's technically recoverable shale gas reserves are 1,115 trillion cubic feet, the largest shale gas reserves in the world.⁶⁵

The government agenda for natural gas in China is ambitious, but it faces significant obstacles. China lacks technical experience and adequate infrastructure which, coupled with the difficult geology of Chinese reserves, makes recovery challenging. The Chinese shale gas revolution cannot progress without U.S. cooperation.⁶⁶

The United States and China are working together in both a governmental and private sector capacity. In 2009, Presidents Barack Obama and Hu Jintao announced the launch of the U.S.-China Shale Gas Resource Initiative with the goal of sharing information about shale gas exploration and technology to reduce greenhouse gas emissions, promote energy security, and create commercial op-

*The government established targets for pure electric and hybrid electric vehicles of 500,000 by 2015 and 5 million by 2020. Its "ten cities, thousand vehicles" program, launched the same, planned for ten cities to develop 1,000 electric vehicles each; by 2011, the list of cities had expanded to 25. Subsidies of 50,000–60,000 RMB (\$8,000–\$9,600) were offered to consumers who purchased the cars. Elizabeth Economy, "China's Round Two on Electric Cars: Will It Work?" *Asia Unbound* (Council on Foreign Relations), April 17, 2014. <http://blogs.cfr.org/asia/2014/04/17/chinas-round-two-on-electric-cars-will-it-work-2/>.

portunities. The U.S.-China Shale Gas Resource Initiative promotes information sharing and joint studies to provide U.S. commercial opportunities and increase the pace of development of shale gas in China.⁶⁷ Tours, workshops, and the U.S.-China Oil and Gas Industry Forum are functions of the Initiative used to increase investment in China's shale market. The U.S.-China Oil and Gas Industry Forum sponsors an annual meeting designed to bring industry players together to share information via technical presentations.⁶⁸ In September 2012, the forum sponsored a meeting focused on shale gas. DOE also has relevant work underway that focuses on issues under Annex III of the bilateral Fossil Energy Protocol.⁶⁹

Other examples of government-to-government collaboration include the U.S. Geological Survey and DOE's work with Chinese counterparts to develop estimates for China's shale gas resources.⁷⁰ USTDA has also contributed by partnering with China's NEA on a training program that included four short courses led by the Gas Technologies Institute and targeted attendees from the Chinese government and industry.⁷¹

These government-led activities notwithstanding, commercial activities have been the main avenue for information sharing and technology transfer in the shale gas sector. The U.S. technological edge makes U.S. companies valuable sources of fracking know-how for Chinese oil companies, and Chinese investment in the U.S. shale gas sector has been on the rise. Rhodium Group, a consultancy, shows that from 2000 to the first quarter of 2014, Chinese investors made over 100 deals, both greenfield and acquisition, in the U.S. energy sector, valued at nearly \$12 billion.⁷² In 2013 alone, China invested \$3.2 billion in the U.S. energy sector. Sinopec invested \$1 billion in Chesapeake Energy's oil and gas assets in Oklahoma; Sinochem bought the Wolfcamp shale field for \$1.7 billion from Pioneer Natural Resources, and CNOOC acquired Nexen's U.S. operations in the Gulf of Mexico.⁷³

The success of Chinese investors in the United States points to a troubling lack of reciprocity. As Sarah Forbes, senior associate at World Resources Institute, has pointed out, China prohibits foreign companies from fully entering this sector on their own, forcing them instead to form partnerships with Chinese entities.⁷⁴ Chinese companies face no such obstacles when they acquire assets in U.S. gas and oil companies working on shale projects. While Chinese capital helps U.S. companies to pursue the domestic energy projects driving the United States' move toward energy independence, they raise concerns about the long-term effects of technology transfer on U.S. economic competitiveness.

U.S.-China Cooperation on Civil Nuclear Energy

As a reliable non-fossil energy source, nuclear power plays a central role in China's plan to reduce its reliance on coal.⁷⁵ Although nuclear sources accounted for only 1 percent of China's total energy consumption in 2011 (the most recent data available), Chinese nuclear expansion plans are by far the most ambitious in the world. While China has 20 reactors online (accounting for about 2 percent of total generation capacity),⁷⁶ it has 28 reactors under construc-

tion (representing roughly 40 percent of reactor construction around the world),⁷⁷ and an additional 58 reactors are being planned.⁷⁸ China's installed nuclear capacity was 14.7 GW in 2013; the 12th Five-Year plan set a goal of 40 GW by the end of 2015 and 58 GW by 2020. In contrast, the United States has 62 commercial nuclear power plants with 100 nuclear reactors (with combined capacity of 101 GW) generating 19 percent of the country's electricity, behind coal and natural gas.

The Chinese government's plans for nuclear energy development emphasize self-reliance. Technology development, however, presents a major challenge for the Chinese nuclear sector, where a select number of state-owned nuclear companies have long struggled to develop advanced reactor technology based on older reactor imports.⁷⁹ As it has done in other industrial sectors, the government started obtaining foreign technology to rectify gaps in indigenous capability.

The United States and China have cooperated on nuclear energy for nearly 30 years, although for most of its history, the cooperation has focused primarily on strengthening safety. Under the U.S.-China Peaceful Uses of Nuclear Technology Agreement of 1998, DOE has provided nuclear safety, safeguards, and security training to Chinese regulators and technicians to ensure China meets the highest nuclear safety and nonproliferation standards. DOE's National Nuclear Security Administration has been collaborating with Chinese authorities on radioactive source security, nuclear safeguards, export controls, materials and waste management, emergency management, and the establishment of a center of excellence for nuclear security training.

The United States and China also participate in cooperative research in nuclear energy technology under the auspices of the U.S.-China Bilateral Civil Nuclear Energy Cooperative Action Plan, signed in 2007. Designed to "explore advanced nuclear fuel cycle approaches in a safe, secure and proliferation-resistant manner," the two countries cooperate in the areas of advanced fuel cycle technology, fast reactor technology, and small and medium reactors.⁸⁰

As with shale gas development, however, transfer of technology through commercial engagement dominates U.S.-China nuclear cooperation. In 2007, U.S.-based Westinghouse (owned by Toshiba Corp.) won the contract to build four AP1000 nuclear reactors in China. The deal included a technology transfer agreement that allowed China's State Nuclear Power Technology Corp., directly under China's State Council, to receive over 75,000 documents that relate to the construction of the AP1000 reactors.⁸¹ The first reactor built under this arrangement was expected to go on line in 2013, but construction delays and tougher safety checks pushed the start back several times—first to December 2014 and later to the end of 2015.⁸²

According to Jane Nakano, Energy and National Security Program fellow at CSIS, the construction of AP1000 reactors has been providing U.S. regulators and engineers with valuable first-hand observations that contribute to the overall improvement of work on nuclear safety.⁸³ China decided to begin construction on the AP1000 reactors before they were approved by the U.S. Nuclear

Regulatory Commission, essentially becoming a “pilot” for U.S.-designed reactors.

China has drawn technology from foreign partners (notably Russia and France) prior to the Westinghouse deal. In fact, the most common reactor type currently under construction is the CPR-1000, a Chinese development of French design. The intellectual property rights were retained by the French company Areva, however, which limited the overseas sales potential for the CPR-1000.⁸⁴ Because the sale of the AP1000 entailed a substantial IP transfer, it created a situation where Westinghouse bolstered the competitiveness of Chinese vendors. As Ms. Nakano notes in her testimony, the Chinese government has dedicated significant resources to “indigenize” most advanced nuclear technology, making development of a Chinese reactor based on the AP1000 one of the 16 “national projects” under China’s Medium- and Long-Term National Science and Technology Development Plan (covering 2006–2020).⁸⁵ According to various statements from Chinese nuclear regulators and operators, the intellectual property rights on “indigenous” reactor, CAP1400, reside with the Chinese entities, referring to their agreement with Westinghouse that reportedly “gave the Chinese domestic rights to much of the core AP1000 derivatives.”⁸⁶

As a consequence of using, adapting, and improving foreign technology, China is now self-sufficient in reactor design and construction, and is pursuing a policy of exporting nuclear technology.⁸⁷ China National Nuclear Corporation (CNNC) and China General Nuclear Power Group (CGN), China’s main nuclear operators, are working to find an international market for their reactors, mostly developed based on the CAP1400 reactor. In 2013, CNNC was contracted to build two reactors for a nuclear power project in Pakistan,* with the Chinese government committing to finance \$6.5 billion of the \$9.95 billion for the project.⁸⁸

United States and China also collaborate on the next generation of nuclear technologies. Under an MOU on Cooperation in Nuclear Energy Sciences and Technologies, which includes cooperation on nuclear fuel resources and nuclear hybrid energy systems,⁸⁹ DOE and the Chinese Academy of Sciences (CAS) are collaborating on a molten salt reactor† that could run on thorium. Thorium, a naturally-occurring radioactive metal, is an alternative to uranium, and is abundant in nature.⁹⁰

The first thorium reactor was designed and built at DOE’s Oak Ridge National Laboratory in the 1960s (the program was ultimately cancelled due to a preference for uranium-fueled reactors). The Chinese government made research into thorium-based reactors a priority and budgeted \$350 million to a project at the Shanghai Institute of Applied Physics, with the intention to “obtain full intellectual property rights on the technology.”⁹¹ The Chinese pro-

* Although the Nuclear Suppliers Group (NSG), of which China is a member, forbids the supply of nuclear power plants to non-members like Pakistan without approval, China has argued that its agreement with Pakistan for cooperation in civil nuclear technology was signed before China joined the NSG. NSG has not censured China for the deal. See Saurav Jha, “With Reactor Deal, China and Pakistan Seek to Reshape Global Nuclear Governance,” *World Politics Review*, November 5, 2013. <http://www.worldpoliticsreview.com/articles/13349/with-reactor-deal-china-and-pakistan-seek-to-reshape-global-nuclear-governance>.

† Unlike the pressurized water cooling system most often used in traditional uranium-fueled reactors, molten salt reactors are an experimental class of nuclear fission reactors in which the primary coolant is a molten salt mixture, which reduces the risk of meltdowns.

gram is headed by Jiang Mianheng, son of the former Chinese president Jiang Zemin, who in 2010 brokered a cooperative agreement between DOE (primarily Oak Ridge National Laboratory) and CAS.⁹² In 2011, DOE gave a \$7.5 million grant for related research led by MIT in collaboration with the University of California at Berkeley and the University of Wisconsin at Madison. Westinghouse has been tapped as a commercial partner,⁹³ but no U.S. government program currently exists to develop thorium reactors.

Implications for the United States

To the extent that China's investment in clean energy leads to reduced emissions of CO₂ and other pollutants of water, air, and soil, U.S. public and private cooperation with China on development of clean energy has positive outcomes for all nations. China is a global leader in clean energy investment, and Chinese funding could be used to boost technologies that are not cost effective in the short run. Moreover, the combined work of U.S. and Chinese researchers can magnify progress made individually. Intangible benefits, such as building trust and mutual understanding, are also valuable and will likely lead to future collaboration.

China's lack of strong IP standards and potential for future competition with U.S. renewable energy companies remain primary challenges to closer cooperation. Analysts and policymakers continue to fear that China could reap the benefits of cooperation at the expense of U.S. industry and workers.⁹⁴ Although much of the current friction has been concentrated in the renewable energy sector, the Chinese government has deployed massive resources to promote the clean energy sector as well, which may result in additional anticompetitive or illegal practices. In 2012, the U.S. Department of Commerce applied antidumping and countervailing duties on Chinese solar panels after U.S. solar companies successfully argued that Chinese manufacturers were unfairly subsidized by the Chinese government.⁹⁵ In a separate case, American Superconductor Corp. (AMSC) sued Sinovel, a Chinese wind turbine manufacturer, through the Chinese courts for up to \$1.2 billion of damages for theft of IP.⁹⁶ The U.S. Department of Justice charged Sinovel (along with two of its employees and a former employee of an AMSC subsidiary) with stealing trade secrets from AMSC, causing an alleged loss of more than \$800 million to the company. The case is still pending.⁹⁷

CERC's efforts are still too new to comprehensively assess. Under CERC, the policy dialogue, capacity building, and technology transfer are supplemented with joint R&D and new technologies. The Technology Management Plan set up by CERC is one example of an attempt to alleviate concerns over protection of IP. However, to date, most CERC participants still tend to design collaborative projects only around less sensitive research topics and little of the new IP generated through CERC activities has come from collaborative efforts—an indication that China's history of poor IP protection continues to have a chilling effect on cooperation.

Dr. Lewis noted that many of the truly collaborative and international projects under CERC do not deal in true R&D activities, but rather less sensitive research areas, such as technology mod-

eling and policy analysis.⁹⁸ Experts working on other collaborative efforts have reached the same conclusion. For example, Valerie Karplus, project director of the China Energy and Climate Project at MIT, echoed Dr. Lewis's assessment. The China Energy and Climate Project collaborative team studies energy and environmental policy decision making in China, in most cases employing open-source modeling tools, which eliminates common IP- or competition-related concerns associated with U.S.-China cooperation on clean energy.⁹⁹ Focusing on building trust might be a good option in the short term, but work needs to be truly collaborative in the long run to ensure that benefits accrue equally to all participants.

For U.S. energy companies, lack of consistent U.S. government policy and secure funding for new technologies means that they have to seek research or implementation opportunities elsewhere. According to Dr. Lewis, for almost all of the U.S. business participants in CERC "one of the biggest advantages of participating ... was to gain leverage for technology demonstration projects."¹⁰⁰ Many industry CERC participants have invested their own money in the collaborations "far in excess of government support because government involvement provided leverage for project approvals, and many CERC collaborations were perceived to have current or future commercial value."¹⁰¹

Despite some positive trends, all too often, U.S.-China collaboration continues to default to the transfer of U.S. technology to China. Collaboration on shale gas and nuclear power exemplify this trend. Investment by Chinese companies in U.S. shale points to the unequal access U.S. energy companies have in China, even as their Chinese counterparts do not have similar restrictions in the United States. In civil nuclear energy, too, the collaboration seems to have consisted solely of a transfer of U.S. intellectual property to China, which is now building its own reactors.

So many collaborative initiatives with overlapping priorities exist in the government-sponsored arena alone (see Addendum I) that it becomes difficult to track spending, mark progress, and identify redundancies. When various academic and industry initiatives (many receiving public money) are added to the mix, the task of separating successful and useful initiatives from the wasteful ones becomes even more challenging.

Another challenge to productive collaboration is getting participants to move from discussion to action. In her assessment of U.S.-China cooperation on clean coal and CCS, Kelly Sims Gallagher, director of the Center for International Environment and Resource Policy at Tufts University, said that although bilateral work on technical research continues to become more robust, "the problem remains of too many meetings and not enough concrete projects."¹⁰² Still, CERC is only halfway through its first five years, and will likely be renewed for a second five-year phase (2016–2020).

Conclusions

- The United States and China share similar challenges in their quest for clean energy. Both countries are leading global emitters

of greenhouse gasses and could benefit from cooperation on issues related to climate change and environmental protection.

- The United States and China have been cooperating for over 30 years on environmental and clean energy initiatives, with much of the early agreements focusing more on establishing the basic frameworks for cooperation and on energy policy discussions. In the 2000s, clean energy and climate change mitigation emerged as leading topics of cooperation between China and the United States, culminating in 2009 with the establishment of the Clean Energy Research Center (CERC), a joint research initiative.
- The CERC facilitates joint research and development on clean energy technology by teams of scientists and engineers from the United States and China. Funded in equal parts by the United States and China, CERC has participation from universities, research institutions and industry. CERC's three research priorities (the consortia) are advanced clean coal technologies, clean vehicles, and building energy efficiency.
- While Chinese CERC participants have been filing patents in China and in the United States, to date, there have been no jointly-created intellectual property (IP) and no U.S. inventions patented in China, suggesting that China's history of lax protection of IP dampens enthusiasm for collaboration.
- While collaboration under CERC is research-driven, U.S.-China cooperation on shale gas development is more commercial, largely involving investment by Chinese companies in U.S. shale assets in order to acquire technology and know-how.
- Similar to shale gas, U.S.-China cooperation on civil nuclear energy involves a sale of technology to China, supplemented by nuclear safety, safeguards, and security training to Chinese regulators and technicians to ensure China meets the highest nuclear safety and nonproliferation standards.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979–2014**

Year	Initiative	Participants	Purpose/Description
1979	Scientific and Technology Cooperative Agreement	Official bilateral governmental agreement established by President Carter and Vice Premier Deng Xiaoping	Began with a focus on high-energy physics and then served as an umbrella for 30 subsequent bilateral environment and energy protocols. Extended for 5 years.
1979	MOU for Bilateral Energy Agreements	U.S. DOE and the China State Development Planning Commission (SDPC)	Led to 19 cooperative agreements on energy, including fossil energy, climate change, fusion energy, energy efficiency, renewable energy, peaceful nuclear technologies, and energy information exchange.
1979	Atmosphere and Science and Technology Protocol	NOAA and Chinese Meteorological Administration	Promotes bilateral exchange on climate and oceans data, research, and joint projects.
1983	Protocol on Nuclear Physics and Magnetic Fusion	DOE and State Science and Technology Commission (SSTC)	Pursues the long-term objective to use fusion as an energy source.
1987	Annex III to the Fossil Energy Protocol Cooperation in the Field of Atmospheric Trade Gases	DOE and State Science and Technology Commission (SSTC)	Cooperative research program on the possible effects of CO ₂ on climate change.
1988	Sino-American Conference on energy demand, markets and policy in Nanjing	Lawrence Berkeley National Laboratory (LBNL)/ DOE and State Planning Commission (SPC)/ Energy Research Institute (ERI)	Informal bilateral conference on energy efficiency that led to an exchange program between ERI and LBNL, and the first assessment of China's energy conservation published by LBNL in 1989.
1992	U.S. Joint Commission on Commerce and Trade	U.S. Department of Commerce (DOC)	Facilitates the development of commercial relations and related economic matters between the U.S. and China. The JCCT's Environment subgroup supports technology demonstrations, training workshops, trade missions, exhibitions and conferences to foster environmental and commercial cooperation.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
1993	U.S. Commercial Mission to China	DOE and DOC	For U.S. companies to promote their electric power technology services in China. Industry representatives identified a potential for \$13.5 billion in U.S. electric power exports between 1994–2003 (not including nuclear power), equating to 270,000 high-salary U.S. jobs and an opportunity for introducing cost-effective, environmental sound U.S. technologies into China's electric power industry.
1993	Establishment of the Beijing Energy Efficiency Center (BECon)	ERI, LBNL, Pacific Northwest National Laboratory (PNNL), WWF, EPA, SPC, SETC, SSTC	The first nongovernmental, non-profit organization in China focusing on promoting energy efficiency by providing advice to central and local government agencies, supporting energy efficiency business development, creating and coordinating technical training programs, and providing information to energy professionals.
1994	Annexes to the fossil energy protocol	DOE and SSTC	(1) To make positive contributions towards improving process and equipment efficiency, reduce atmospheric pollution on a global scale, advance China's Clean Coal Technologies Development Program, and promote economic and trade cooperation beneficial to both parties. (2) Cooperation in coal-fired magnetohydrodynamic (MHD) power generation.
1994	China's Agenda 21 Document Released	SSTC and China's National Climate Committee	Lays out China's request for international assistance on environmental issues. The U.S. agreed to support China through DOE's Climate Change Country Studies and Support for National Actions Plans programs.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979–2014—Continued**

Year	Initiative	Participants	Purpose/Description
1995	Series of DOE bilateral agreements signed by Secretary of Energy Hazel O'Leary	<i>Bilateral agreements on energy between DOE and ministries as noted below:</i> (1) MOU on bilateral energy consultations (with SPC) (2) Research on reactor fuel (with China Atomic Energy Authority) (3) Renewable energy (with Ministry of Agriculture) (4) Energy efficiency development (with SSTC) (5) Renewable energy technology development (with SSTC) (6) Coal bed methane recovery and use (with Ministry of the Coal Industry) (7) Regional climate research (with the China Meteorological Administration) <i>Also established</i> • Plan for mapping China's renewable energy resources (with SPC) • Strategies for facilitating financing of U.S. renewable energy projects in China (with SPC, Chinese and U.S. Ex-Im Banks) • Discussions for reducing and phasing out lead gasoline in China (DOE & EPA with China's EPA & SINOPEC)	
1995 (some annexes in 1996)	Protocol for Cooperation in the Fields of Energy Efficiency and Renewable Energy Technology Development and Utilization	DOE and various ministries	This Protocol has seven annexes that address policy; rural energy (Ministry of Agriculture); large-scale wind systems (with SEPA); renewable energy business development (with SETC) and geothermal energy; energy efficiency (with SPC); and hybrid-electric vehicle development. Ten teams of Chinese and U.S. government and industry representatives work under this protocol focusing on: energy policy, information exchange and business outreach, district heating, cogeneration, buildings, motor systems, industrial process controls, lighting, amorphous core transformers, and finance.
1995–2000	Statement of Intent for Statistical information exchange (later became a Protocol)	DOE and China's National	Consisted of five meetings to discuss energy supply and demand and exchange information on methods of data collection and processing of energy information.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
1997	U.S.-China Forum on Environment & Development	Established by Vice President Al Gore and Premier Li Peng	Venue for high-level bilateral discussion on sustainable development. Established four working groups: energy policy, commercial cooperation, science for sustainable development, and environmental policy. Three priority areas for cooperative work: urban air quality; rural electrification; and clean energy and energy efficiency.
1998-on-going	Agreement of Intent on Cooperation Concerning Peaceful Uses of Nuclear Technology	DOE and SPC	Paved the way for the exchange of information and personnel, training and participation in research and development in the field of nuclear and nuclear non-proliferation technologies.
1997	Energy and Environment Cooperation Initiative (EECI)	DOE and SPC	Targeted urban air quality, rural electrification and energy sources, and clean energy sources and energy efficiency. Involved multiple agencies and participants from business sectors, and linked energy development and environmental protection.
1997	U.S.-China Energy and Environmental Center	Tsinghua University and Tulane University, with DOE and SSTC/MOST	An initiative centered at Tsinghua and Tulane Universities co-funded by DOE and MOST to: (1) provide training programs in environmental policies, legislation and technology; (2) develop markets for U.S. clean coal technologies; and (3) help minimize the local, regional and global environmental impact of China's energy consumption.
1998	Joint Statement on Military Environmental Protection	U.S. Secretary of Defense and Vice-Chairman of Chinese Central Military Commission	MOU provides for the exchange of visits by high-level defense officials and the opening of a dialogue on how to address common environmental problems.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
1999	U.S.-China Forum on Environment & Development	The U.S. Ex-Im Bank, DOE, the China Development Bank, and the SDPC	The second meeting of the Forum in Washington, co-chaired by Vice President Al Gore and Premier Zhu Rongji. Two key agreements that came out of the meeting related to renewable energy included a MOU for the establishment of a \$100 Million Clean Energy Program to accelerate the deployment of clean U.S. technologies to China in the area of energy efficiency, renewable energy, and pollution reduction, and a Statement of Intent on Cleaner Air and Cleaner Energy Technology Cooperation that focused on energy efficiency improvements in industrial coal-fired boilers; clean coal technology; high-efficiency electric motors; and grid-connected wind electric power.
1999–2000	Fusion Program of Cooperation	DOE and CAS	Plasma physics, fusion technology, advanced design studies and materials research.
2002–2003	U.S.-China Fusion Bilateral Program	DOE and CAS	Plasma physics, fusion technology and power plant studies.
2003	FutureGEN	DOE with many international partners	Initially planned as a demonstration project for an Integrated Gasification Combined Cycle (IGCC) Coal plant with carbon capture and storage (CCS), the project was significantly restructured in January 2008 and now may provide federal funding to support CCS on a privately funded IGCC or PC plant, though the timeframe is highly uncertain.
2004	U.S.-China Energy Policy Dialogue	DOE and NDRC	Resumed the former Energy Policy Consultations under the 1995 DOE-SPC MOU. Led to a MOU between DOE and NDRC on Industrial Energy Efficiency Cooperation and includes energy audits of up to 12 of China's most energy-intensive enterprises, as well as training and site visits in the U.S. to train auditors.
2004	U.S.-China Green Olympic Cooperation Working Group	DOE, Beijing Government	Included opportunities for DOE to assist China with physical protection of nuclear and radiological materials and facilities for the Beijing Olympics as done in Athens, Greece.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
2006	Asia-Pacific Partnership on Clean	U.S., China + India, Japan, Korea, Australia (later Canada)	Created public-private task forces around specific sectors: Aluminum, Buildings and Appliances, Cement, Cleaner Use of Fossil Energy, Coal Mining, Power Generation and Transmission, Renewable Energy and Distributed Generation, and Steel.
2006	U.S.-China Strategic Economic Dialogue (SED)	U.S. Treasury Secretary Henry Paulson and Vice Premier Wu Yi. Includes DOE, EPA, NDRC, MOST	Bi-annual, cabinet level dialogue that includes an energy and environment track.
2007	MOU on Cooperation on the Development of Biofuels	USDA and NDRC	Encourages cooperation in biomass and feedstock production and sustainability; conversion technology and engineering; bio-based product development and utilization standards; and rural and agricultural development strategies.
2007	U.S.-China Bilateral Civil Nuclear Energy Cooperative Action Plan	DOE and NDRC	To compliment discussions under the Global Nuclear Energy Partnership (GNPE) towards the expansion of peaceful, proliferation-resistant nuclear energy for greenhouse gas emissions-free, sustainable electricity production. Bilateral discussions include separations technology, fuels and materials development, fast reactor technology and safeguards planning.
2007	U.S.-China Westinghouse Nuclear Reactor Agreement	DOE, State Nuclear Power Technology Corporation (SNPTC)	DOE approved the sale of four 1,100-megawatt AP1000 nuclear power plants which use a recently improved version of existing Westinghouse pressurized water reactor technology. The contract was valued at \$8 billion and included technology transfer to China. The four reactors are to be built between 2009 and 2015.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
2008	Ten Year Energy & Environment Cooperation Framework (SED IV)	DOE, Treasury, State, Commerce, EPA, NDRC, State Forestry Administration, National Energy Administration (NEA), Ministry of Finance, Ministry of Environmental Protection (MEP), MOST, and MFA	Establishes five joint task forces on the five functional areas of the framework: (1) clean efficiency and secure electricity production and transmission; (2) clean water; (3) clean air; (4) clean and efficient transportation; and (5) conservation of forest and wetland ecosystems.
2009	U.S.-China Strategic & Economic Dialogue	U.S. Department of State and Department of Treasury, China Ministry of Foreign Affairs	In April 2009 the SED was re-branded as the Strategic and Economic Dialogue (S&ED), with the State and Treasury Departments now co-chairing the dialogue for the United States. Treasury Secretary Timothy F. Geithner and Secretary of State Hillary Rodham Clinton were joined for the first Dialogue in July 2009 by their respective Chinese Co-Chairs, State Councilor Dai Bingguo and Vice Premier Wang Qishan, to cover a range of strategic and economic issues. The S&ED was convened again in Beijing in May 2010.
2009	Memorandum of Understanding to Enhance Cooperation on Climate Change, Energy and the Environment This MOU is to be implemented via the existing Ten-Year Energy and Environment Cooperation Framework, and a newly established Climate Change Policy Dialogue, as well as new agreements forthcoming.	Signed between DOE, State and NDRC. To strengthen and coordinate respective efforts to combat global climate change, promote clean and efficient energy, protect the environment and natural resources, and support environmentally sustainable and low-carbon economic growth. Both countries resolve to pursue areas of cooperation where joint expertise, resources, research capacity and combined market size can accelerate progress towards mutual goals. These include, but are not limited to: <ul style="list-style-type: none"> • Energy conservation and energy efficiency • Renewable energy • Cleaner uses of coal, and carbon capture and storage • Sustainable transportation, including electric vehicles • Modernization of the electrical grid • Joint research and development of clean energy technologies • Clean air • Clean water • Natural resource conservation, e.g., protection of wetlands and nature reserves • Combating climate change and promoting low-carbon economic growth 	

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
2009	Climate Change Policy Dialogue	Representatives of the two countries' leaders	The United States and China will work together to further promote the full, effective and sustained implementation of the United Nations Framework Convention on Climate Change. The dialogue will promote: (1) discussion and exchange of views on domestic strategies and policies for addressing climate change; (2) practical solutions for promoting the transition to low-carbon economies; (3) successful international negotiations on climate change; (4) joint research, development, deployment, and transfer, as mutually agreed, of climate-friendly technologies; (5) cooperation on specific projects; (6) adaptation to climate change; (7) capacity building and the raising of public awareness; and (8) pragmatic cooperation on climate change between cities, universities, provinces and states of the two countries.
2009	Memorandum of Cooperation to Build Capacity to Address Climate Change	EPA and NDRC	In support of the MOU to Enhance Cooperation on Climate Change, Energy and the Environment, this five-year agreement includes: (1) capacity building for developing greenhouse gas inventories; (2) education and public awareness of climate change; (3) the impacts of climate change to economic development, human health and ecological system, as well as research on corresponding countermeasures; and (4) other areas as determined by the participants.
2009	U.S.-China Joint Commission on Commerce and Trade	Co-chaired by U.S. Dept. of Commerce Secretary Gary Locke, U.S. Trade Representative Ron Kirk, Chinese Vice Premier Wang Qishan, with participation from many ministries/agencies from both countries	The Commission met in October 2009 in Hangzhou, China, and reached multiple agreements in many sectors, including, in the clean energy sector for China to remove its local content requirements on wind turbines.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
2009	U.S.-China Clean Energy Research Center (CERC)	DOE, MOST, NEA	First announced in July 2009 during U.S. Department of Energy Secretary Steven Chu's visit to Beijing and finalized during the November 2009 Presidential Summit, the Center will facilitate joint research and development of clean energy technologies by teams of scientists and engineers from the United States and China, as well as serve as a clearinghouse to help researchers in each country. The Center will be supported by public and private funding of at least \$150 million over five years, split evenly between the two countries. Initial research priorities will be building energy efficiency, clean coal including carbon capture and storage, and clean vehicles.
2009	U.S.-China Electric Vehicles Initiative	DOE, MOST, NEA	Announced during the November 2009 Presidential Summit and building on the first-ever U.S.-China Electric Vehicle Forum in September 2009, the initiative will include joint standards development, demonstration projects in more than a dozen cities, technical roadmapping, and public education projects.
2009	U.S.-China Renewable Energy Partnership	DOE, MOST, NEA	Announced during the November 2009 Presidential Summit, the Partnership calls for the two countries to develop roadmaps for widespread renewable energy deployment in both countries. The Partnership will also provide technical and analytical resources to states and regions in both countries to support renewable energy deployment and will facilitate state-to-state and region-to-region partnerships to share experience and best practices. A new Advanced Grid Working Group will bring together U.S. and Chinese policymakers, regulators, industry leaders, and civil society to develop strategies for grid modernization in both countries. A new U.S.-China Renewable Energy Forum will be held annually, rotating between the two countries. The first was held in China late May 2010.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
2009	21st Century Coal	DOE, MOST, NEA	Announced during the November 2009 Presidential Summit, the two Presidents pledged to promote cooperation on cleaner uses of coal, including large-scale carbon capture and storage (CCS) demonstration projects. Through the new U.S.-China Clean Energy Research Center, the two countries are launching a program of technical cooperation to bring teams of U.S. and Chinese scientists and engineers together in developing clean coal and CCS technologies. The two governments are also actively engaging industry, academia, and civil society in advancing clean coal and CCS solutions.
2009	Shale Gas Resource Initiative	DOE, MOST, NEA	Announced during the November 2009 Presidential Summit, this shale gas initiative will use experience gained in the United States to assess China's shale gas potential, promote environmentally sustainable development of shale gas resources, conduct joint technical studies to accelerate development of shale gas resources in China, and promote shale gas investment in China through the U.S.-China Oil and Gas Industry Forum, study tours, and workshops.
2009	U.S.-China Energy Cooperation Program	A public-private partnership, including 22 companies as founding members, including Peabody Energy, Boeing, Intel and GE.	Announced during the November 2009 Presidential Summit, the U.S.-China Energy Cooperation Program (ECP) will leverage private sector resources for project development work in China across a broad array of clean energy projects on renewable energy, smart grid, clean transportation, green building, clean coal, combined heat and power, and energy efficiency.
2010	U.S.-China Strategic & Economic Dialogue	U.S. Department of State and NDRC/NEA	26 specific outcomes were produced by the second round of the S&ED under the Strategic track alone. Key outcomes addressing energy and climate issues specifically included MOUs on nuclear safety cooperation, EcoPartnerships, and Shale Gas; a joint statement on energy security; and three clean energy forums held each year.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
2010	U.S.-China Energy Efficiency Forum	NEA/NDRC, MIT, DOE/LBNL/ORNL/FERC, private sector participants	This first meeting of this Forum (established in the 2009 U.S.-China Energy Efficiency Action Plan) included the signing of an MOU on industrial energy efficiency between Lawrence Berkley National Laboratory, Oak Ridge National Laboratory and the University of Science and Technology, Beijing.
2010	U.S.-China Renewable Energy Forum	NEA/NDRC, DOE/NREL/FERC, private sector participants	The first meeting of this forum that was established in the 2009 U.S.-China Renewable Energy Partnership included a significant focus on potential cooperation opportunities between U.S. and Chinese renewable energy companies. The forum was followed by technical discussions that established three working groups on renewable energy, including: (1) planning, analysis and coordination; (2) wind technology; and (3) solar technology.
2010	U.S.-China Advanced Biofuels Forum	NEA/NDRC, DOE/NREL, private sector participants	The eight MOUs signed under this forum focus on private sector partnerships in advanced biofuels research and deployment. Private sector partnerships include: Boeing and PetroChina jointly developing a sustainable aviation biofuels industry in China; an expanded research collaboration between Boeing Research & Technology and the Qingdao Institute of Bioenergy and Bioprocess Technology on algae-based aviation biofuel development; and an inaugural flight using biofuel derived from biomass grown and processed in China conducted by Air China, PetroChina, Boeing and Honeywell.
2011	MOU for Protocol for Cooperation in Energy Sciences	U.S. Department of Energy and the Chinese Academy of Sciences	This Protocol will facilitate and promote cooperation in energy sciences such as nuclear energy sciences, biological science and environmental science.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
2011	U.S.-China Strategic & Economic Dialogue	U.S. Department of State and Department of Treasury, China Ministry of Foreign Affairs,	Decided to share information about regulatory experiences and practices of the Federal Energy Regulatory Commission and the National Energy Administration related to energy issues in both the United States and China. Also decided to enhance cooperation and analysis of the planning and deployment of large-scale wind projects research, and connecting wind projects to the electric transmission grid.
2011	MOU on Support of the Energy Cooperation Program	U.S. Trade & Development Agency (USTDA), NEA	Provides support for a wide range of clean energy activities in 2012. These include activities on clean fuels, energy efficiency, power generation, renewable energy, smart grid, and clean transportation.
2011	MOU for the advancement of Eco-Cities	DOE and the China Ministry of Housing and Urban Rural Development	Advance Eco-Cities Initiative in the United States and China, under which both sides will develop guidelines and policies to support the integration of energy efficiency and renewable energy into city design and operation.
2013	MOU for the creation of a Joint U.S.-China Green Data Center Industrial Initiative	U.S.-China Energy Cooperation Program (ECP) and Chinese Institute of Electronics (CIE)	Creation of a Joint U.S.-China Green Data Center Industrial Initiative aims to provide valuable reference and living best practices for green data center development in China through deep cooperation between both U.S. and China industries.
2013	MOU on U.S.-China Clean Energy Cooperation	China Industrial Overseas Development and Planning Association (CIODPA) and ECP's Energy Financing and Investment Working Group (EFI WG)	This MOU establishes the agreement for jointly cooperate initiatives that expand opportunities for U.S.-China collaboration in clean energy investment in the U.S. and other international markets. It also establishes a communication channel with ECP members and other key stakeholders to improve cooperation on Chinese investment in the energy sectors.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979-2014—Continued**

Year	Initiative	Participants	Purpose/Description
2013	MOU in Support of U.S.-China Energy Cooperation Program	U.S. Trade and Development Agency (USTDA) and China's National Energy Administration (NEA)	This MOU will establish a work plan between USTDA and NEA that will cover a broad range of energy activities over the next year in support of ECP. Subjects include, but are not limited to: clean transportation (clean fuels), decentralized energy and combined cooling, heat and power, industrial energy efficiency, shale gas, renewable energy, smart grid and microgrid, and other fields as mutually determined. USTDA intends to continue contributing funding for feasibility studies, consultancies, study tours, workshops and related project development work on clean and efficient energy best practices, as identified in continued consultation with ECP, the NEA, and other Chinese government agencies.
2013	U.S.-China Strategic & Economic Dialogue	U.S. Department of State and Department of Treasury, China Ministry of Foreign Affairs	Established the U.S.-China Climate Change Working Group to develop and implement significant proposals for bilateral cooperation on climate change between the two. Also decided to enhance cooperation on energy security and transparency. Also signed an MOU on Enhancing Energy Regulation Cooperation between the Federal Energy Regulatory Commission and the National Energy Administration to expand cooperation on electricity, oil, and gas issues.
2013	MOU to lower carbon dioxide emissions	Xie Zhenhua, vice-minister of the National Development and Reform Commission of China, and California Governor Jerry Brown	A two-year agreement to share expertise and resources to reduce CO ₂ . It includes sharing of information and experiences regarding policies and programs to strengthen low carbon development across economic sectors. The MOU also includes exchanges and temporary assignments of personnel from one of the parties to the other; cooperative research on clean and efficient energy technologies, including developing shared research, development and deployment projects.

**Addendum I: U.S.-China Cooperation on Clean Energy
and Climate Change, 1979–2014—Continued**

Year	Initiative	Participants	Purpose/Description
2013	U.S.-China Energy Efficiency Forum	DOE and NDRC	MOUs were signed between Chinese partners and the University of Colorado-Boulder to initiate the International Center for Urban and Building Engineering Sustainability, the Digital Energy and Sustainability Solutions Campaign on comprehensive exchanges to improve the efficiency of the IT sector, and LBNL to harmonize standards and foster pre-competitive R&D collaboration on high performance data center.
2014	U.S.-China Strategic & Economic Dialogue	U.S. Department of State and Department of Treasury, China Ministry of Foreign Affairs	Launched eight demonstration projects—four on carbon capture, utilization, and storage, and four on smart grids. Agreed to adopt stronger heavy and light duty vehicle fuel efficiency and greenhouse gas emissions standards, conduct a study on the efficiency and use of gas in industrial boilers, and launched a new initiative on climate change and forests.
2014	MOU for cooperation on strategic petroleum reserves	U.S. Secretary of Energy Ernest Moniz and Administrator Wu Xinxiong of China's National Energy Administration, DOE, NEA	The MOU enables the DOE's Office of Petroleum Reserves and NEA's National Oil Reserve Office to share information on technical, management, and policy issues related to oil stockpiles. DOE and NEA will conduct annual technical meetings to be held alternately in the United States and China.
2014	MOU for cooperation on electric vehicles and industrial energy efficiency	U.S. Secretary of Energy Ernest Moniz and Minister Miao Wei of the Chinese Ministry of Industry and Information Technology	The MOU facilitates cooperation in the fields of electric vehicles and related technologies, as well as energy efficiency improvement for end use products.

Source: Agreements for the 1979–2010 period adapted from Joanna Lewis, “The State of U.S.-China Relations on Climate Change: Examining the Bilateral and Multilateral Relationship,” *China Environment Series*, no. 11 (December 2010): 26–34. <http://www.wilsoncenter.org/sites/default/files/Feature%20Article%20The%20State%20of%20U.S.-China%20Relations%20on%20Climate%20Change.pdf>. Agreements for the 2011–2014 period compiled by Commission staff.

Addendum II: CERC Research Topics¹⁰³***Advanced Coal Technology Consortium (ACTC)***

ACTC focuses on the most critical research needs, categorized by the following eight research areas:

1. **Advanced Power Generation:** Develop breakthrough technologies in advanced coal power generation and the application of advanced technology.
2. **Clean Coal Conversion Technology:** Conduct research, development, and demonstration of new coal co-generation systems with CO₂ capture, including new coal-to-chemical co-generation; new CO₂ capture processes; and co-generation systems with combined pyrolysis, gasification, and combustion. Projects in this area will pursue high-efficiency conversion.
3. **Pre-Combustion CO₂ Capture:** Conduct major industrial-scale demonstrations of integrated gasification combined cycle (IGCC) power generation with carbon capture and sequestration.
4. **Post-Combustion CO₂ Capture:** Investigate various technologies for post-combustion capture and conduct demonstrations of CO₂ capture, utilization, and storage in cooperation with large power generation companies.
5. **Oxy-Combustion Research, Development, and Demonstration:** Study the fundamental and pilot-scale combustion and emission characteristics of indigenous Chinese and U.S. coals of different ranks under oxyfuel conditions, create a model for oxy-fired burner design, evaluate and optimize pilot-scale oxy-combustion, and conduct a commercial-scale engineering feasibility study for an oxyfuel-combustion reference plant, with the goal of achieving cost and performance breakthroughs in the laboratory and the field that help overcome the challenges to oxyfiring with both U.S. and Chinese coals.
6. **Sequestration Capacity and Near-Term CCUS Opportunities:** Develop research work focused on CO₂ geological sequestration (CGS) in China's Ordos Basin to better understand and verify key technologies for CO₂ storage in saline formations, to provide the scientific evidence to implement large-scale carbon capture and storage (CCS) in China and to provide support for CCS development in the United States.
7. **CO₂ Algae BioFixation and Use:** Support the industrial demonstration of carbon biofixation using microalgae to absorb CO₂ and turn the biomass produced into a rich source of renewable energy, including biodiesel.
8. **Integrated Industrial Process Modeling and Additional Topics:** Apply modeling techniques to a wide variety of issues associated with pre- and post-combustion CO₂ capture and oxy-combustion to assess the economic and operability potential of existing capture technologies in conjunction with removal of criteria pollutants, assess the technical feasibility and potential economic benefit and operability of new carbon capture technologies, and optimize the economics of different carbon capture technologies.

Clean Vehicles Consortium (CVC)

CVC research is organized into six areas:

1. **Advanced Batteries and Energy Conversion:** Increase application of novel battery designs that promise much higher energy densities, such as lithium-air and lithium-sulfur batteries; develop high efficiency thermoelectric materials to recover waste heat.
2. **Advanced Biofuels, Clean Combustion, and Auxiliary Power Unit (APU):** Accelerate development and deployment of advanced biofuels with molecular models that can be used to predict the behavior of novel fuels in various combustion environments; system controls for clean vehicles; and development, integration, and control of APU systems.
3. **Vehicle Electrification:** Develop electric motors and power electronics with higher conversion efficiencies and power/energy densities than are currently possible.
4. **Advanced Lightweight Materials and Structures:** Develop low-cost, energy-efficient, high-quality processes for producing, forming, and joining of lightweight materials to increase integration of aluminum alloys, magnesium alloys, and carbon-polymer composites into vehicle structures while maintaining structural rigidity and crash safety.
5. **Vehicle-Grid Integration:** Develop advanced control strategies and protocols to coordinate plug-in electric vehicle (PEV) charging and develop interfaces to accelerate the deployment of PEVs and minimize impact to grid quality and battery aging.

6. Energy Systems Analysis, Technology Roadmaps, and Policies: Integrate vehicle and energy infrastructure systems to address temporal and spatial variation of energy sources, petroleum demand, and CO₂ emissions impacts; diversity in consumer drive cycles and trip patterns; producer and consumer economic factors; global vehicle and fuel market factors; and future fuel efficiency and carbon policy regimes.

Building Energy Efficiency Consortium (BEE)

BEE has developed a collaborative research agenda organized into six research topics:

1. Integrated Building Design & Operation of Very Low Energy, Low Cost Buildings: Provide a rich foundation to support prioritization of energy savings opportunities from buildings. Research in this topic area is focusing on new scientific methods for collecting data and modeling energy consumption that will guide development of high-impact energy efficiency technologies.
2. Building Envelope: Develop new building materials and related control and integration systems. Research in this area improves understanding and strategies for ventilation, comfort systems, and cool roofs.
3. Building Equipment: Research and demonstrate the adaptability of advanced building equipment technologies. Research in this area includes new lighting system design and control and improvements to the performance and market penetration of climate control (heating, ventilation, and cooling) technologies. Research includes integrating building equipment with control systems and metering equipment and optimizing management software.
4. Renewable Energy Utilization: Research and demonstrate technological adaptability in applying new and renewable energy to buildings. This research area includes integration of geothermal, solar, and wind energy systems, among others, to convert buildings from energy consumers to net energy suppliers.
5. Whole Building: Research and demonstrate integrated building energy technologies. Research in this area includes analyzing building energy use in the United States and China to improve building integration and optimize the use of energy-efficient and low-carbon energy supply technologies.
6. Operation, Management, Market Promotion and Research: Evaluate standards, certification, codes and labels, and other policy mechanisms to establish a knowledge base from which to make effective decisions.

ENDNOTES FOR SECTION 4

1. Jonathan H. Elkind, *U.S.-China Cooperation on Clean Energy*, briefing to the U.S.-China Economic and Security Review Commission, Washington, DC, July 31, 2014.
2. United States Department of Energy, Carbon Dioxide Information Analysis Center (CDIAC). <http://mdgs.un.org/unsd/mdg/SeriesDetail.aspx?srid=749&crd=>.
3. Edward Wong, "Air Pollution Linked to 1.2 Millions Premature Deaths in China" *New York Times*, April 1, 2013.
4. Wang Yue, "China Unlikely to Reduce Coal Use in the Next Decade," China File, February 12, 2014. <https://www.chinadialogue.net/blog/6718-China-unlikely-to-reduce-coal-use-in-the-next-decade/en>.
5. U.S. Energy Information Administration, "Countries Analysis: China," February 4, 2014. <http://www.eia.gov/countries/cab.cfm?fips=CH>; included in Supplemental readings of this book.
6. "China Announces Targets on Carbon Emissions Cuts," http://english.gov.cn/2009-11/26/content_1474008.htm; "Air Pollution Prevention Action Plan," http://www.gov.cn/zwqk/2013-09/12/content_2486773.htm.
7. Jonathan Moch, "What Are China's National Climate and Energy Targets?" China FAQs, May 22, 2014. http://www.chinafaqs.org/files/chinainfo/ChinaFAQs_table_China_climate_energy_targets_0.pdf.
8. "Clean Energy Investment Falls for Second Year," *Bloomberg New Energy Finance*, January 15, 2014. <http://about.bnef.com/press-releases/clean-energy-investment-falls-for-second-year/>.
9. Benjamin Carlson, "Why China's Reputation as the Clean Energy King is Overblown," *Global Post*, February 18, 2014. <http://www.globalpost.com/dispatch/news/regions/asia-pacific/china/140217/china-clean-energy-world-leader-debunked>.
10. "Clean Energy Investment Falls for Second Year," *Bloomberg New Energy Finance*, January 15, 2014. <http://about.bnef.com/press-releases/clean-energy-investment-falls-for-second-year/>.
11. The White House, "Fact Sheet: The State of the Union: President Obama's Plan to Win the Future," January 25, 2011. <http://www.whitehouse.gov/the-press-office/2011/01/25/fact-sheet-state-union-president-obamas-plan-win-future>.
12. U.S. Energy Information Administration, *Annual Energy Outlook 2013*, April 2013, p. 71. [http://www.eia.gov/forecasts/aeo/pdf/0383\(2013\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2013).pdf).
13. Peter V. Marsters, Jennifer L. Turner et al., "Cooperative Competitors: Potential of U.S.-China Clean Energy Cooperation," *Woodrow Wilson Center China Environment Forum Brief*, 2012. http://www.wilsoncenter.org/sites/default/files/Cooperative%20Competitors-English_0.pdf.
14. Zhou Dadi, Vice Chairman, China Institute for Innovation and Development Strategy, Second Annual United States-China Strategic Forum on Clean Energy Cooperation, Brookings Institution, Washington, DC, January 18, 2011. http://www.brookings.edu/~media/events/2011/1/18%20china%20clean%20energy/20110118_china_clean_energy_part2.pdf.
15. Paul Joffe, "Clean Energy Forum Seeks Further Benefits from U.S.-China Cooperation," China FAQs, January 24, 2011. <http://www.chinafaqs.org/blog-posts/clean-energy-forum-seeks-further-benefits-us-china-cooperation>.
16. Secretary of State John Kerry, "Remarks at Energy Cooperation Event" (Diayutai Hotel, Beijing, China, April 13, 2013). <http://www.state.gov/secretary/remarks/2013/04/207474.htm>.
17. Melanie Hart, *Shining a Light on U.S.-China Clean Energy Cooperation* (Center for American Progress, February 2012). http://www.americanprogress.org/wp-content/uploads/issues/2012/02/pdf/china_trade.pdf.
18. Office of the United States Trade Representative, "United States Requests WTO Dispute Settlement Consultations on China's Subsidies for Wind Power Equipment Manufacturers," December 22, 2010. <http://www.ustr.gov/about-us/press-office/press-releases/2010/december/united-states-requests-wto-dispute-settlement-con>.
19. Office of the United States Trade Representative, "China Ends Wind Power Equipment Subsidies Challenged by the United States in WTO Dispute," June 7, 2011. <http://www.ustr.gov/about-us/press-office/press-releases/2011/june/china-ends-wind-power-equipment-subsidies-challenged>.
20. International Trade Administration, "Fact Sheet: Commerce Finds Dumping and Subsidization of Imports of Utility Scale Wind Towers from the People's Republic of China (China) and Dumping of Imports of Utility Scale Wind Towers from the Socialist Republic of Vietnam (Vietnam)," December 18, 2012. http://enforcement.trade.gov/download/factsheets/factsheet_china-vietnam-uswt-adcvd-final-20121218.pdf.

21. Melanie Hart, *Shining a Light on U.S.-China Clean Energy Cooperation* (Center for American Progress, February 2012). http://www.americanprogress.org/wp-content/uploads/issues/2012/02/pdf/china_trade.pdf.
22. International Trade Administration, "Fact Sheet: Commerce Preliminarily Finds Countervailable Subsidization of Imports of Certain Crystalline Silicon Photovoltaic Products from the People's Republic of China," June 3, 2014. <http://enforcement.trade.gov/download/factsheets/factsheet-prc-crystalline-silicon-photovoltaic-prod-cvd-prelim-060314.pdf>; International Trade Administration, "Fact Sheet: Commerce Preliminarily Finds Dumping of Imports of Certain Crystalline Silicon Photovoltaic Products from China and Taiwan," July 25, 2014. <http://enforcement.trade.gov/download/factsheets/factsheet-multiple-solar-products-ad-prelim-072514.pdf>.
23. SolarWorld "SolarWorld and Coalition of U.S. Solar Manufacturers Petition to Stop Unfair Trade by China's State-sponsored Industry," October 19, 2011. <http://www.solarworld-usa.com/newsroom/news-releases/news/2011/domestic-solar-manufacturers-petition-to-stop-unfair-trade-by-china.aspx>.
24. Diane Cardwell, "Solar Company Seeks Stiff U.S. Tariffs to Deter Chinese Spying," *New York Times*, September 1, 2014. http://www.nytimes.com/2014/09/02/business/trade-duties-urged-as-new-deterrent-against-cybertheft.html?ref=science&_r=1.
25. USTDA, "USTDA in China," March 2014.
26. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Leocadia I. Zak, April 25, 2014.
27. U.S.-China Energy Cooperation Program, *2013 Annual Report*. http://www.uschinaecp.org/Download/ECP_Report_216x280_EN_713.pdf.
28. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Leocadia I. Zak, April 25, 2014.
29. USTDA, "USTDA in China," March 2014.
30. U.S.-China Clean Energy Research Center, *Recent Achievements* (July 2014), p. 1. http://www.us-china-cerc.org/pdfs/June_2014_Steering_Committee_Meeting/CERC_booklet_FINAL.pdf.
31. U.S.-China Clean Energy Research Center, "About CERC." <http://www.us-china-cerc.org/about.html>.
32. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Hwei Peng, April 25, 2014.
33. U.S. Department of Energy, China Ministry of Science and Technology & China National Energy Administration, 2011. "U.S.-China Clean Energy Research Center Technology Management Plans (TMPs)." U.S.-China Clean Energy Research Center. http://www.us-china-cerc.org/Intellectual_Property.html#tmps.
34. U.S.-China Clean Energy Research Center, "Intellectual Property." http://www.us-china-cerc.org/Intellectual_Property.html.
35. U.S.-China Clean Energy Research Center, "Intellectual Property." http://www.us-china-cerc.org/Intellectual_Property.html.
36. Joanna Lewis, "Managing Intellectual Property Rights in Cross-Border Clean Energy Collaboration: The Case of the U.S.-China Clean Energy Research Center," pre-publication draft (accepted for publication in *Energy Policy*), December 2013.
37. Joanna Lewis, "Managing Intellectual Property Rights in Cross-Border Clean Energy Collaboration: The Case of the U.S.-China Clean Energy Research Center," pre-publication draft (accepted for publication in *Energy Policy*), December 2013, p. 15.
38. Robert Marlay, *U.S.-China Clean Energy Research Center Overview*, briefing to the U.S.-China Economic and Security Review Commission, Washington, DC, July 31, 2014.
39. Joanna Lewis, "Managing Intellectual Property Rights in Cross-Border Clean Energy Collaboration: The Case of the U.S.-China Clean Energy Research Center," pre-publication draft (accepted for publication in *Energy Policy*), December 2013, p. 11.
40. Brian Spegele, "China Fuels Energy Innovation," *Wall Street Journal*, December 6, 2011. <http://online.wsj.com/news/articles/SB1000142405297020451720457704240048678123v4?mg=reno64-wsj>.
41. U.S. Environmental Protection Agency, *Report of the Interagency Task Force on Carbon Capture and Storage*, August 2010. <http://www.epa.gov/climatechange/Downloads/ccs/CCS-Task-Force-Report-2010.pdf>.
42. Valerie Volcovici, "Shale Boom Derails U.S. Investments in Clean Coal Technology," Reuters, October 18, 2012. <http://www.reuters.com/article/2012/10/18/usa-coal-natgas-idUSL1E8LFFNL20121018>.

43. David Stanway, "China Approves Massive New Coal Capacity Despite Pollution Fears," Reuters, January 7, 2014. <http://www.reuters.com/article/2014/01/07/china-coal-idUSL3N0K90H720140107>.
44. David B. Piejak (LP Amina U.S. President), telephone interview with Commission staff, March 18, 2014.
45. U.S. Advanced Coal Technology Consortium. <http://www.nrcce.wvu.edu/USCEC/actc.cfm>.
46. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Jerald Fletcher, April 25, 2014.
47. Jerald J. Fletcher and Zheng Chuguang, "U.S.-China ACTC Research Overview," January 2013. http://www.us-china-cerc.org/pdfs/US/4A_ENG_1.pdf.
48. Robert Marlay, *U.S.-China Clean Energy Research Center Overview*, briefing to the U.S.-China Economic and Security Review Commission, Washington, DC, July 31, 2014.
49. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, p. E5. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
50. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, p. E14. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
51. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, p. E3. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
52. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, pp. E8–E9. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
53. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, pp. E12–E13. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
54. Brian Spegele, "China Fuels Energy Innovation," *Wall Street Journal*, December 6, 2011. <http://online.wsj.com/news/articles/SB10001424052970204517204577042400486781234?mg=reno64-wsj>.
55. David Piejak, "Road Testing American Carbon-Saving Technology in China," China FAQs, July 9, 2012. http://www.chinafaqs.org/files/chinainfo/China%20FAQs_Road_Testing_Tech_v1_6.pdf.
56. Robert Marlay, *U.S.-China Clean Energy Research Center Overview*, briefing to the U.S.-China Economic and Security Review Commission, Washington, DC, July 31, 2014.
57. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, pp. G4–G5. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
58. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, pp. G60–G61. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
59. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, pp. G44–G45. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
60. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, pp. G46–G47. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.
61. Huei Peng and Ouyang Minggao, "US-China CVC Research Overview and Technical Highlights," January 2013. http://www.us-china-cerc.org/pdfs/US/5_ENGL_1.pdf.
62. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Huei Peng, April 25, 2014.
63. Robert Marlay, *U.S.-China Clean Energy Research Center Overview*, briefing to the U.S.-China Economic and Security Review Commission, Washington, DC, July 31, 2014.
64. Huei Peng, "CERC–CVC: U.S.-China Clean Energy Research Center Clean Vehicles Consortium Progress Report October 1st–December 31st 2013." <http://www.us-china-cerc.org/pdfs/Quarterly/CERC-CVC-2013-Q4.pdf>.
65. U.S. Energy Information Administration, "Countries Analysis: China," February 4, 2014. <http://www.eia.gov/countries/cab.cfm?fips=CH>.
66. Luna Lin, "Closer U.S.-China Cooperation Could Fuel Shale Gas Boom, Say Experts," China Dialogue, May 13, 2013. <https://www.chinadialogue.net/blog/6000-Closer-US-China-cooperation-could-fuel-shale-gas-boom-say-experts/en>.

67. The White House, "FACT SHEET: U.S.-China Shale Gas Resource Initiative," November 17, 2009. http://www.chinafaqs.org/files/chinainfo/US-China_Fact_Sheet_Shale_Gas.pdf.
68. U.S.-China Oil & Gas Industry Forum, "Background." <http://www.uschinaoig.org/>.
69. U.S. Department of Energy, "Fossil Energy Protocol between the United States and China." http://www.fossil.energy.gov/international/International_Partners/China.html.
70. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Sarah Forbes, April 25, 2014.
71. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Sarah Forbes, April 25, 2014.
72. Rhodium Group, "China Investment Monitor." <http://rhg.com/interactive/china-investment-monitor>.
73. Thilo Hanemann and Cassie Gao, "Chinese FDI in the U.S.: 2013 Recap and 2014 Outlook," January 7, 2014. <http://rhg.com/notes/chinese-fdi-in-the-us-2013-recap-and-2014-outlook>.
74. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Sarah Forbes, April 25, 2014.
75. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Jane Nakano, April 25, 2014.
76. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Jane Nakano, April 25, 2014.
77. World Nuclear Association, "Nuclear Power in China," July 2014. <http://www.world-nuclear.org/info/Country-Profiles/Countries-A-F/China-Nuclear-Power/>.
78. World Nuclear Association, "Nuclear Power in China," July 2014. <http://www.world-nuclear.org/info/Country-Profiles/Countries-A-F/China-Nuclear-Power/>.
79. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Jane Nakano, April 25, 2014.
80. United States-China: Bilateral Civil Nuclear Energy Cooperative Action Plan, pp. 3, 5. http://www.nti.org/media/pdfs/1a_1_1.pdf?_=1317157933.
81. Leslie Hook, "U.S. Group Gives China Deals of Nuclear Technology," *Financial Times*, November 23, 2010.
82. David Stanway, "China Says First Westinghouse Reactor Delayed Until at Least End-2015," Reuters, July 18, 2014. <http://uk.reuters.com/article/2014/07/18/china-nuclear-ap-idUKL4N0PT0T820140718>.
83. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Jane Nakano, April 25, 2014.
84. World Nuclear Association, "Nuclear Power in China," July 2014. <http://www.world-nuclear.org/info/Country-Profiles/Countries-A-F/China-Nuclear-Power/>.
85. Government of the People's Republic of China, "China Issues S&T Development Guidelines," February 9, 2006. http://english.gov.cn/2006-02/09/content_183426.htm.
86. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Jane Nakano, April 25, 2014; World Nuclear Association, "Nuclear Power in China," July 2014. <http://www.world-nuclear.org/info/Country-Profiles/Countries-A-F/China-Nuclear-Power/>.
87. World Nuclear Association, "Nuclear Power in China," July 2014. <http://www.world-nuclear.org/info/Country-Profiles/Countries-A-F/China-Nuclear-Power/>.
88. Matthew Miller and Yan Huang, "China to Beat 2020 Nuclear Targets after Projects Restarted—CNNC," Reuters, March 12, 2014.
89. DOE Office of Nuclear Energy, "Bilateral Cooperation." <http://www.energy.gov/ne/nuclear-reactor-technologies/international-nuclear-energy-policy-and-cooperation/bilateral>.
90. World Nuclear Association, "Thorium," <http://www.world-nuclear.org/info/current-and-future-generation/thorium/>.
91. World Nuclear Association, "Thorium," <http://www.world-nuclear.org/info/current-and-future-generation/thorium/>.
92. David Lague and Charlie Zhu, "Special Report—The U.S. Government Lab Behind China's Nuclear Power Push," Reuters, December 20, 2013. <http://in.reuters.com/article/2013/12/20/breakout-thorium-idINL4N0FE21U20131220>; World Nuclear Association, "Thorium," <http://www.world-nuclear.org/info/current-and-future-generation/thorium/>.
93. Nuclear Science and Engineering at MIT, "MIT Wins \$7.5M DOE Grant to Develop a New Generation of Advanced Reactors," September 2011. <http://web.mit.edu/nse/news/2011/advanced-reactors.html>; Nuclear Energy University Program, *2013 Annual Report: High-Temperature Salt-Cooled Reactor for Power and Process*

Heat, October 20, 2013. <https://inlportal.inl.gov/portal/server.pt/document/139420/fhr-annual-report-2013-no-app-data-sheet.pdf>.

94. Joanna Lewis, “The State of U.S.-China Relations on Climate Change: Examining the Bilateral and Multilateral Relationship,” *China Environment Series*, no. 11 (December 2010): 17–18. <http://www.wilsoncenter.org/sites/default/files/Feature%20Article%20The%20State%20of%20U.S.-China%20Relations%20on%20Climate%20Change.pdf>.

95. Melanie Hart, *Shining a Light on U.S.-China Clean Energy Cooperation* (Center for American Progress, February 9, 2012). <http://www.americanprogress.org/issues/china/report/2012/02/09/11030/shining-a-light-on-u-s-china-clean-energy-cooperation/>.

96. Michael A. Riley and Ashlee Vance, “China Corporate Espionage Boom Knocks Wind Out of U.S. Companies,” Bloomberg, March 15, 2012. <http://www.bloomberg.com/news/2012-03-15/china-corporate-espionage-boom-knocks-wind-out-of-u-s-companies.html>.

97. U.S. Department of Justice, “Sinovel Corporation and Three Individuals Charged in Wisconsin with Theft of AMSC Trade Secrets,” June 27, 2013. <http://www.justice.gov/opa/pr/2013/June/13-crm-730.html>.

98. Joanna Lewis, “Managing Intellectual Property Rights in Cross-Border Clean Energy Collaboration: The Case of the U.S.-China Clean Energy Research Center,” pre-publication draft (accepted for publication in *Energy Policy*), December 2013.

99. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Valerie Karplus, April 25, 2014.

100. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Joanna Lewis, April 25, 2014.

101. U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Clean Energy Cooperation*, written testimony of Joanna Lewis, April 25, 2014.

102. Kelly Sims Gallagher, *The United States and China: Moving Forward on Coal and Climate Change* (Brookings Institution, July 2013). http://www.brookings.edu/~media/Events/2014/2/06%20china%20clean%20energy/USChina%20Moving%20Forward%20on%20Coal%20and%20Climate%20Change_KSGallagher.pdf.

103. U.S.-China Clean Energy Research Center, *Annual Report 2012–2013*, August 2013, pp. E2, F2, G2–G3. http://www.us-china-cerc.org/pdfs/US-China_CERC_Annual_Report_2012-2013.pdf.

RECOMMENDATIONS

U.S.-China Bilateral Trade and Economic Challenges

The Commission recommends:

- Congress direct the Government Accountability Office to update its report on the effectiveness of the U.S.-China Joint Commission on Commerce and Trade (JCCT) and the Strategic and Economic Dialogue (S&ED). The updated report should include an assessment of the objectives sought by the United States in these talks and whether China has honored its commitments to date.
- Congress require the Department of the Treasury to include in its semiannual report to Congress specific information on the beneficial economic impact of China moving to a freely floating currency in terms of U.S. exports, economic growth, and job creation. In addition, Congress should urge the Administration to begin immediate consultations at the G-7 to identify a multilateral approach to addressing China's currency manipulation.
- Congress direct the Interagency Trade Enforcement Center (ITEC) to provide briefings to the House Ways and Means and Senate Finance Committees and the House and Senate Appropriations Committees on its activities, since its creation, to coordinate and improve upon the enforcement of U.S. laws against unfair trade. Congress should examine whether providing statutory authority for ITEC would enhance enforcement activities and ensure that adequate resources are available and that other Departments and Agencies are responsive to its requests.
- Congress consider amending existing trade enforcement rules to ensure that foreign investment in the United States cannot be used to impede the ability of domestic producers to bring petitions for trade enforcement actions. Congress could direct the Department of Commerce to update its regulations and procedures for antidumping and countervailing duty cases to create a rebuttable presumption that firms that are state-owned, state-controlled, or state-invested with facilities in the United States are operating at the direction of the state. Those state-directed companies would then be excluded from calculations of industry support or opposition unless they can prove that there is no such involvement or direction.
- Congress consider whether state and local governments should be treated as interested parties under laws against unfair trade and thereby have standing to bring or participate in trade cases. Further, Congress should consider creating a private right of action allowing U.S. companies to take legal action against com-

petitors directly in antidumping and countervailing duty cases, rather than having to rely on U.S. government assistance.

- Congress seek clarification from the executive branch as to its interpretation of Article 15 of China's World Trade Organization Accession Protocol concerning China's achievement of "market economy" status.
- Congress consider legislation that would make available a remedy to domestic firms that have been injured from the anti-competitive actions (such as access to low-cost or no-cost capital) of foreign state-owned companies for the injury that has been inflicted and allow for the potential award of treble damages.
- Congress direct the Council of Economic Advisors (CEA) to brief the Joint Economic Committee on existing data collection efforts within the Administration regarding investments by Chinese entities in the United States. CEA shall describe the differing data sets available from public and private sources and the extent to which existing data provides adequate information to U.S. policy makers to assess changing trends and the potential economic implications from these investments.
- Congress require the Department of Commerce to prepare a comprehensive analysis of excess productive capacity in China across a range of sectors, including, but not limited to, steel, glass, paper, cement and solar products, and provide a report to the President and to Congress on what actions should be taken to address this problem. This report shall be prepared annually for a period of five years, at a minimum. In addition, the Administration should consult with major trade allies with similar concerns about Chinese overcapacity in these sectors to determine what multilateral engagement would effectively deal with this problem. As part of this approach, the Administration shall evaluate effectiveness of other efforts to address global and China's overcapacity in certain sectors, such as the Organization for Economic Cooperation and Development Steel Committee, the U.S.-China Steel Dialogue, JCCT and S&ED talks.
- Congress request that the Office of the United States Trade Representative, Department of Commerce, and International Trade Commission report to Congress on the extent to which existing authorities would allow for sanctions to be imposed against entities that benefit from trade secrets or other information obtained through cyber intrusions or other illegal means and were provided by a national government, foreign intelligence service, or other entity utilizing such means. If authorities do not exist, they should provide a proposal to address such problems.
- Congress require the Office of the United States Trade Representative to brief the House Ways and Means and Senate Finance Committees, within 60 days, on trade enforcement issues involving China which have been initiated or announced since 2009, but have not yet been resolved, and identify what steps will be taken to ensure a more rapid resolution of such issues. The briefing shall include an estimate of the economic value to

the U.S. in terms of production and job creation, if the identified market barrier or impediment were eliminated.

China’s Healthcare Industry, Drug Safety, and Market Access for U.S. Medical Goods and Services

The Commission recommends:

- Congress urge the Institutes of Medicine of the National Academies to convene a task force to assess purchasing decisions by U.S. wholesalers, retailers, and healthcare providers with regard to China-origin drugs and drug ingredients, and to recommend ways in which to improve information sharing and coordination with the Food and Drug Administration (FDA).
- Congress urge the FDA to insist on expedited approvals from the Chinese government for work visas for the FDA staff, and on expanded authority to conduct unannounced visits at drug manufacturing facilities in China.
- Congress monitor the efficacy of the FDA’s regulatory activities in China, consider ways to optimize the use of appropriated funding, and identify what other steps are necessary to protect the health and safety of the U.S. population.
- Congress pursue measures to improve the government’s information about drug ingredient and dietary supplement producers, especially for imports. To this end, Congress should urge the FDA to work with its Chinese counterparts to establish a more comprehensive regulatory regime for registering China-based active pharmaceutical ingredient (API) producers, and make this producer information available on demand for U.S. agencies.
- Congress adopt measures that make greater use of “track and trace” technology. To this end, Congress should: (1) urge the U.S. government negotiators to demand that China harmonize with internationally recognized standards its unique device identifiers for medical devices and its serialized verification of APIs, so as to allow for equivalency with U.S. systems and standards; (2) make the use of serial numbers for product verification at U.S. pharmacies mandatory at all times, not only in cases where a product is suspect (as currently spelled out in the Drug Quality and Security Act).
- Congress direct the Trade Policy Review Group of the Office of the U.S. Trade Representative to review the interests of U.S. healthcare goods and services providers in the Chinese market, Chinese market barriers, and opportunities to promote human health in China in ways that promote U.S. consumer and business interests.

U.S.-China Clean Energy Cooperation

The Commission recommends:

- Congress direct the Government Accountability Office to conduct an assessment of U.S.-China collaborative initiatives on clean energy. This assessment should describe the nature of collabora-

tion, including funding, participation, and reporting on the outcomes; consider whether the intellectual property rights of U.S. researchers and companies are being protected; examine whether Chinese state-owned enterprises are benefitting from U.S. taxpayer-funded research; investigate if any U.S. companies, universities and labs participating in government-led collaboration with China have been subject to cyber penetrations originating in China; and evaluate the benefits of this collaboration for the United States. Further, this assessment should examine redundancies, if any, among various U.S.-China government-led collaborative programs, and make suggestions for improving collaboration.

- Congress require that the Department of Energy, in consultation with the Department of Commerce, identify barriers to market access in China for clean and renewable energy products and services and their impact on U.S. production and job creation, and report to the committees of jurisdiction, within 120 days, on specific action plans to address these barriers. As part of this report, the Departments shall identify sourcing patterns that have changed over the last 10 years in these sectors and also the extent to which U.S. companies are producing in the Chinese market to serve that market and whether they were previously able to manufacture these products in the United States for export to China.