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# THE IMPACT OF INTERNATIONAL TECHNOLOGY TRANSFER ON AMERICAN RESEARCH AND DEVELOPMENT

## HEARING

BEFORE THE

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

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WEDNESDAY, DECEMBER 5, 2012

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# THE IMPACT OF INTERNATIONAL TECHNOLOGY TRANSFER ON AMERICAN RESEARCH AND DEVELOPMENT

**WEDNESDAY, DECEMBER 5, 2012**

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
*Washington, D.C.*

The Subcommittee met, pursuant to call, at 10:09 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Paul C. Broun [Chairman of the Subcommittee] presiding.

Subcommittees on Investigations & Oversight Hearing

***The Impact of International Technology Transfer on American Research and Development***

Wednesday, December 5, 2012
10:00 a.m. to 12:00 p.m.
2318 Rayburn House Office Building

Witnesses

**Dr. Robert D. Atkinson**, President, Information Technology & Innovation Foundation

**The Honorable Dennis C. Shea**, Chairman, U.S. China Economic and Security Review Commission

**U.S. House of Representatives**
**Committee on Science, Space, and Technology**
**Subcommittee on Investigations & Oversight**

**HEARING CHARTER**

*The Impact of International Technology Transfer on American Research and Development*

Wednesday, December 5, 2012
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

**Purpose**

On Wednesday December 5, 2012, the Subcommittee on Investigations and Oversight will hold an oversight hearing titled "The Impact of International Technology Transfer on American Research and Development." U.S. taxpayers provide both direct and indirect support for private sector research and development. Recipients of this federal support are often required to transfer that technology overseas in order to gain access to foreign markets. The hearing will examine issues related to international technology transfers, particularly as it pertains to how and where the benefits of American research, development, and innovation are realized. The Committee is interested in understanding the methods by which domestic technology and intellectual property are transferred to foreign countries, as well as the overall scope of such efforts. The hearing will also seek to identify measures that might limit such activity.

**Background**

American Research and Development Efforts
American taxpayers fund significant amounts of basic and applied research and development (R&D). In 2012, an estimated $139 billion of federal funds were directed towards federal R&D programs across a number of agencies in several categories.[1]

**Federal R&D Funding (in billions)**

| | FY2011 | FY2012 (est.) |
|---|---|---|
| Basic research | $29.70 | $30.18 |
| Applied research | $30.83 | $31.78 |
| Development and facilities | $82.19 | $76.91 |
| TOTAL | $142.71 | $138.87 |

The results of this federal investment are often commercialized by the private sector which invests additional private sector resources into R&D. According to the annual R&D study conducted by Batelle, American industry and entities such as universities and non-profit grant

[1] Congressional Research Service, "Federal Research and Development Funding: FY2013," CRS Report R42410, October 1, 2012.

organizations invest more than double the federal investment in R&D, resulting in a total American investment in R&D of $436 billion in 2012.[2] The rest of the world invests approximately $966 billion overall.[3] In the U.S. private sector entities can also deduct a portion of their own R&D investments from their annual federal tax obligation, resulting in an indirect subsidy of private sector R&D efforts.[4] In addition, in 2008, for which the most recent data is available, American companies deducted $8.3 billion in R&D tax credits which creates additional investments in R&D.[5]

Using the American intellectual property system, commercial entities can obtain exclusive rights for a limited amount of time to sell or transfer their newly discovered inventions.[6] Enacted in 1980, the Bayh Dole Act extends these rights to small businesses, non-profit organizations, and universities for inventions created by federally funded R&D.[7] Although there are generally very limited downstream restrictions on where most non-defense taxpayer funded R&D can be commercialized, most of the benefits have historically accrued to American taxpayers, either directly through more American jobs or indirectly through higher tax receipts from companies that commercialize the R&D in the U.S. or overseas. Recent stimulus funding also included domestic sourcing requirements where possible.[8]

Foreign Policies Impacting Market Access

Although the U.S. has entered into a number of trade agreements to better enable free trade, a range of actions undertaken by foreign governments have prohibited the ability of American companies to enter overseas markets without transferring corporate R&D including:

1. Procurement Barriers Imposed by Governments and State Owned Entities
2. Technology Standards Manipulation
3. Joint Venture / Domestic Location Requirements
4. Intellectual Property Theft
5. Technology Transfer as a Government Policy
6. Technology Transfers Via Corporate Asset Sales and Bankruptcy

These actions are often sharply reduced for American companies that agree to open local factories or transfer their R&D to an entity in the foreign nation. This technology transfer can have a significant effect upon America's balance of trade. For example, the American software industry remains one of the few sectors of the U.S. economy that maintains a highly positive balance of trade with the rest of the world.[9] In software, the balance of trade is approximately $20 worth of exports for every $1 of imports. Trade groups such as the Business Software Alliance (BSA) have studied the impacts of foreign government policies that limit access of their

[2] 2012 Global R&D Funding Forecast, Batelle.
[3] *Ibid.*
[4] Chapter 41 of the Internal Revenue Service Code sets the requirements for claiming this deduction.
[5] U.S. Department of Treasury, Office of Tax Policy, "Investing in U.S. Competitiveness," March 2011, p. 2.
[6] This authority is vested in Article 1, Section 8 of the U.S. Constitution.
[7] P.L. 96-517.
[8] Section 1605 of the American Recovery and Reinvestment Act of 2009.
[9] Import / export data for all industries can be found at http://www.census.gov/foreign-trade/statistics/country. Other industries that maintain a positive balance of trade include the aviation and entertainment industries.

member companies to specific markets.[10] These policies, amongst others, reduce the positive balance of trade for the affected industries.

1. Procurement Barriers Imposed by Governments and State Owned Entities

Government procurement can be a major driver of local economies. State owned entities can dominate particular industries and there may be few alternatives to selling to them. This allows governments to easily discriminate against foreign manufacturers that choose not to make available relevant R&D in return for market access. For example, India issued regulations in 2009 that only required imported telecommunication products to be tested and certified by local laboratories before being made available for sale. Domestic firms were exempt from this testing and certification requirement.[11] In addition, India imposed a mandatory facility inspection requirement that allows the Indian government or its designee(s) to inspect the technology and components used in all telecommunications products.[12] During these inspections, there are no guarantees that such inspections will not lead to the surreptitious transfer of intellectual property to domestic competitors.

Government procurement barriers may also occur at multiple levels of government. In November 2009, China issued a list of products that would receive preferential treatment for government purchases.[13] Eligibility for products to be listed was limited to those products that contained Chinese owned intellectual property and Chinese registered trademarks. This policy would require corporations to enter into joint ventures or transfer their R&D to China in return for market access. After numerous objections from its international trading partners including repeated negotiations with the U.S. Trade Representative, the lists of approved products were rescinded. However, these lists then reappeared at the local level in a variety of forms, making it even harder for USTR and international companies to identify these barriers. Efforts are still ongoing to eliminate these lists.

2. Technology Standards Manipulation

Technology standards and certification manipulation can be another impediment to accessing foreign markets. In most free market economies technology standards and certifications are established and conducted by industry coalitions and nongovernment standards bodies. However, in some countries government agencies are responsible for establishing at least some standards based upon an open process of soliciting private sector feedback, such as with NIST in the U.S. Not all countries use an open process to determine standards. Products can be required to be funneled through government certification agencies before they are allowed market access, resulting in delays and opportunities for industrial espionage. As products make their way through the certification process, their design and specifications are meticulously studied and recorded. A major concern is that this information may wind up in the possession of domestic, government-supported manufacturers. Even if the intellectual property is protected, the

[10] "Lockout, How a Wave of Protectionism is Spreading Through the World's Fastest Growing IT Markets – and What to Do about It," report by the Business Software Alliance, June 2012, http://www.bsa.org/~/media/Files/Policy/Trade/BSA_Market%20Access_Report_FINAL_WEB_062012.ashx

[11] *Ibid*, p. 10.

[12] *Ibid.*

[13] Robert Atkinson, "Enough is Enough: Confronting Chinese Innovation Mercantilism," Information Technology & Innovation Foundation, February 2012, http://www2.itif.org/2012-enough-enough-chinese-mercantilism.pdf, p. 30.

certification process can be extended to delay market access to foreign products while allowing local competitors to produce their own slightly modified product and capture the market.[14]

Over the last decade, the Chinese government began looking at ways to expand and redevelop its telecommunications infrastructure. To avoid paying more fees and royalties to Western patent holders, including those available under the fair, reasonable, and non-discriminatory (FRAND) licensing model, China formed a partnership with Siemens AG to develop its own 3G standard known as TD-SCDMA that was required to be used in China.[15] Based upon foreign R&D, TD-SCDMA is only used in China, forcing manufacturers to build to this standard or not be able to sell in the Chinese marketplace.

In an effort to boost the utilization of its GLONASS satellite positioning system, similar to the American GPS system, Russia has sought to impose a 25% duty on devices containing position locating systems that do not also include the ability to use GLONASS signals.[16] Cell phone manufacturers are now including GLONASS capabilities in their phones. For example, the iPhone5 now includes the ability to receive GLONASS signals.[17]

India similarly announced a policy in 2010 to require open standards on e-governance technology.[18] The Indian policy would require intellectual property owners wanting to access the e-governance market in India to essentially license their technology for free, transferring R&D paid for by other nations, including American taxpayers.

3. Joint Venture / Domestic Location Requirements

The creation of a local high-tech manufacturing base is of major interest to many foreign nations looking to "move up" in the technology economy. Although technology assembly operations provide jobs, access to core R&D is viewed as an important goal for economic policy.

Advanced alternative energy technology is sought by foreign governments in order to supplant traditional energy sources. The U.S. government provided significant financial incentives towards the development of alternative energy technologies, through such programs as ARPA-E and the American Recovery and Reinvestment Act.[19] This American R&D is now in high demand in other nations. For example, in 2011, General Motors and Ford sought to sell hybrid technology cars in China that benefited from long-term American R&D investments. The Chinese government refused to allow American manufacturers to qualify for Chinese tax subsidies unless they entered into a joint venture with a local partner, agreed to share the underlying technology, and manufacture the vehicle domestically.[20] Ford agreed to transfer its

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[14] See *supra*, note 11.
[15] *Ibid.*
[16] GPS Import Duties to Promote Russia's GLONASS", Russian-American Business, February 21, 2012, http://russianamericanbusiness.org/web_CURRENT/articles/878/1/GPS-import-duties-to-promote-Russia%92s-GLONASS.
[17] See the technical specifications for the iPhone5 at http://www.apple.com/iphone/specs.html.
[18] See *supra*, note 11.
[19] P.L. 111-5.
[20] Keith Bradsher, "Hybrid in a Trade Squeeze", *New York Times*, September 6, 2011, http://www.nytimes.com/2011/09/06/business/global/gm-aims-the-volt-at-china-but-chinese-want-its-secrets.html

own technology to a local partner in order to qualify for the subsidies that were worth up to $19,000 per vehicle, while GM chose not to transfer its technology.[21]

Other countries have sought to set minimum domestic content requirements in return for tax and subsidy incentives. Ukraine requires up to 30 percent of clean energy technologies to be built locally in order to qualify for government subsidies and some provinces in Canada require up to 60 percent for similar subsidies.[22] The U.S. also enacts similar restrictions, imposing "Buy America" provisions in ARRA, although waiver provisions were included to allow the use of foreign manufactured goods if commercially necessary.[23]

In addition to physical goods, R&D for services industries is of interest to foreign governments as well. Countries such as Indonesia have enacted regulations requiring local construction of data centers to host electronic domestic transactions.[24]

4. Intellectual Property Theft

After making successful R&D investments, U.S. companies use American intellectual property laws to create a limited monopoly for use of that intellectual property. In the U.S., interested parties can apply for a patent that awards them exclusive rights to their invention for twenty years in return for payment of fees ranging from several hundred to several thousand dollars.[25] In addition to foreign government policies that encourage or force technology transfers, American companies routinely face intellectual property theft and corporate espionage. Local governments that fail to investigate or prosecute local entities responsible for theft and espionage may be indirectly or directly complicit in the theft, often enabling the thief to continue using American intellectual property.

The example of American Superconductor (AMSC) of Devens, Massachusetts is instructive. AMSC entered into a joint venture with Sinovel Wind Group, the world's third largest wind turbine manufacturer, headquartered in Beijing, China.[26] In June 2011, AMSC employees discovered that their technology had been incorporated into Sinovel products without authorization.[27] From that point forward, AMSC's attempts to continue its sales in the Chinese market were met with regulatory burdens and delays while the Sinoval Wind Group sales expanded. AMSC later discovered extensive evidence that one of its employees in Serbia was bribed by Sinoval in return for the transfer of AMSC's intellectual property. Repeated efforts by the U.S. Trade Representative have led to progress for AMSC's legal complaint before China's

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[21] *Ibid.*

[22] Matthew Stepp and Robert Atkinson, "Green Mercantilism: Threat to the Clean Energy Economy," Information Technology & Innovation Foundation, June 2012, http://www.itif.org/publications/green-mercantilism-threat-clean-energy-economy, p. 7.

[23] Section 1605 of the American Recovery and Reinvestment Act of 2009.

[24] See *supra,* note 21.

[25] A full fee schedule can be found at http://www.uspto.gov/web/offices/ac/qs/ope/fee092611.htm.

[26] Jonathan Weisman, "U.S. to Share Cautionary Tale of Trade Secret Theft With Chinese Official," *New York Times*, February 14, 2012, http://www.nytimes.com/2012/02/15/world/asia/chinese-official-to-hear-trade-theft-tale.html.

[27] Michael A. Riley and Ashlee Vance, "China Corporate Espionage Boom Knocks Wind Out of U.S. Companies," Bloomberg, March 15, 2012, http://www.businessweek.com/news/2012-03-15/china-corporate-espionage-boom-knocks-wind-out-of-u-dot-s-dot-companies.

Supreme People's Court.[28] A final resolution to this intellectual property theft case has not yet been reached.

5. Technology Transfer as a Government Policy

Experts generally agree that efforts to encourage or force the international transfer of technology appear to be the most strident in China where international technology transfers are a matter of fundamental state policy. China is better able than other countries to force these technology transfers due to the strong desire of foreign companies to access their large and growing domestic market, as well as the significant role that the government plays in the private market through state-owned corporations.

In January 2006, China unveiled a new policy to become a world leader in science and technology. The new proposal termed, "The National Medium- and Long-Term Plan for the Development of Science and Technology (2006-2020)" (MLP), called for China to become innovation oriented by 2020 and a world leader in science and technology by 2050.[29] The plan listed the most significant Chinese structural deficits along with the goals and corrective measures to address them using science and technology development. In order to achieve these goals, the MLP called for increasing R&D expenditures from 1.3 percent of Gross Domestic Product (GDP) in 2006 to 2.5 percent by 2020 and use China's huge market as leverage against foreign businesses hoping to gain access.[30] By comparison, the U.S. currently spends 2.8 percent of its GDP on R&D.[31]

The MLP places particular emphasis on "indigenous innovation," defined as "enhancing original innovation through co-innovation and re-innovation based on the assimilation of imported technologies."[32] The policy builds upon a series of bureaucratic policies first created in the 1980s and 1990s to limit foreign competition and protect domestic industries. Lax enforcement of intellectual property rights (IPR) has been especially challenging for foreign businesses operating in China. In many cases of IPR theft, local law enforcement appears to prefer protecting the domestic business, often refusing to address theft complaints or ruling against foreign companies despite substantial evidence in their favor.[33] Additionally, in August 2008 the central government enacted the "Anti-Monopoly Law" (AML), seemingly directed at foreign entities while exempting state-sanctioned monopolies and state-owned enterprises (SOE).

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[28] Ehren Goossens, "AMSC Taking Sinovel Infringement Suit to China's Supreme Court," *Bloomberg*, April 9, 2012, http://www.bloomberg.com/news/2012-04-09/amsc-taking-sinovel-infringement-suit-to-china-s-supreme-court.html

[29] U.S. China Economic and Security Review Commission, "China's Program for Science and Technology Modernization: Implications for American Competitiveness," January 2011, http://www.uscc.gov/researchpapers/2011/USCC_REPORT_China%27s_Program_forScience_and_Technology_Modernization.pdf.

[30] James McGregor, "China's Drive for 'Indigenous Innovation: A Web of Industrial Policies," US Chamber of Commerce, 2010, http://www.uschamber.com/reports/chinas-drive-indigenous-innovation-web-industrial-policies

[31] Batelle, *supra*.

[32] "China's Program for Science and Technology Modernization: Implications for American Competitiveness", *supra*.

[33] UK China IPR Forum, "Intellectual Property Rights in China: Risk Assessment, Avoidance Strategy and Problem Solving,", 2004, http://www.chinabusinesssolutions.com/dbimg/china_ipr_guidelines1.01.pdf

Commentators have stated that the Law's lack of clarity and detail also provides "enforcement agencies and courts wide discretion to use the AML to protect domestic companies." [34]

6. Technology Transfers Via Corporate Asset Sales and Bankruptcy

American companies that are unable to succeed commercially typically seek additional financial resources from another entity either through a partial or complete sale of the company or simply declare bankruptcy. In both situations, American technology can be transferred internationally as part of the corporate restructuring process. The goal in federal bankruptcy policy is to generate the largest financial return to corporate bondholders and others owed money by the failing company. Recent efforts by China to acquire failing green energy companies are instructive of how countries can acquire cutting edge American technology.

In August 2009, A123 Corporation of Waltham, Massachusetts was awarded a $249 million grant under the Advanced Vehicle Technologies Manufacturing Loan Program to produce advanced batteries for hybrid electric vehicles.[35] In 2012, A123 Corporation repeatedly stated in its official corporate filings that it was facing significant financial difficulties.[36] In August 2012, Wanxiang Group of China agreed to invest $465 million dollars in A123 that would allow A123 to continue operating. This proposed investment raised fears that advanced battery technology funded by American taxpayers would be transferred to China.[37] The investment did not occur and, in October, A123 filed for bankruptcy. At the time of the bankruptcy filing, A123 agreed to a packaged bankruptcy in which Johnson Controls of Milwaukee would acquire its assets for only $165 million.[38] Given the large difference in the two amounts, the federal court decided that an asset auction will occur on Thursday December 6, 2012. Johnson Controls and Wanxiang Group have both expressed interested in using the auction to acquire the assets of A123 Corporation.

**Issues**

Monitoring the Scope and Impacts of International Technology Transfer

The Committee is not aware of any U.S. government agency that coordinates efforts to monitor the scope of the issues; nor are there any that coordinate a response to efforts to force international technology transfers. As part of its trade negotiating authority, the Office of the U.S. Trade Representative does assist individual companies facing efforts to force international technology transfer and negotiates with foreign government to remove discriminatory regulations

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[34] See *supra*, note 28.

[35] White House Press Release dated August 5, 2009, http://www.whitehouse.gov/the_press_office/24-Billion-in-Grants-to-Accelerate-the-Manufacturing-and-Deployment-of-the-Next-Generation-of-US-Batteries-and-Electric-Vehicles.

[36] Multiple SEC filings by A123 are available at http://ir.a123systems.com/sec.cfm.

[37] Norihiko Shirouzu, "Chinese say green battery technology leak fears overblown," *Chicago Tribune*, August 17, 2012, http://articles.chicagotribune.com/2012-08-17/news/sns-rt-usa-batterieschinal4e8jf1xr-20120816_1_a123-battery-maker-lithium-ion-battery.

[38] Julie Wernau, "A123 scraps deal with Chinese firm, files for Chapter 11 protection," *Chicago Tribune*, October 17, 2012, http://articles.chicagotribune.com/2012-10-17/business/ct-biz-1017-a123-bankrupt--20121017_1_a123-wanxiang-group-battery-maker.

or laws that violate U.S. trade agreements with that nation. However, no federal agency pro-actively reviews this issue in an attempt to quantify the impact upon America's competitiveness or determine who ultimately benefits from taxpayer funded R&D investments. With over $400 billion in combined annual public and private sector R&D, significant amounts of R&D funding may be transferred without any way to identify it. Key unanswered questions include:

- Are American taxpayers paying for R&D investments whose benefits are being realized by foreign countries? Can accurate statistics be obtained?
- Are American companies paying for R&D investments whose benefits are being realized by foreign countries? Can accurate statistics be obtained?
- Will this issue continue to grow in scope, both in the numbers of countries attempting to force international technology transfer and the aggressiveness of the effort by particular countries?
- Are there any affirmative steps that can be taken to reduce or limit either the amount of forced technology transfers or their impact?
- How should technology transfers that result from corporate bankruptcies be addressed, if at all?
- How are competing interests weighed in determining the impact of technology transfers?
- What are federal agencies doing to monitor this issue?

**Witnesses**

Dr. Robert D. Atkinson
President
Information Technology & Innovation Foundation

The Honorable Dennis C. Shea
Chairman
U.S. China Economic and Security Review Commission

Chairman BROUN. Good morning. The Subcommittee on Investigations and Oversight will come to order.

Welcome to today's hearing titled "The Impact of International Technology Transfer on American Research and Development." You will find in front of you packets containing our witness panel's written testimony, their biographies, and their truth-in-testimony disclosures. I now recognize myself for five minutes for an opening statement.

Good morning, everyone. I welcome to you to today's hearing that again is entitled "The Impact of International Technology Transfer on American Research and Development." I want to thank our witnesses for being here and for being so flexible. This hearing was originally scheduled back in September, but because of a last-minute Member briefing regarding the Benghazi incident, we were forced to postpone this hearing. Ironically, as we speak, there is enough—there is another briefing on Benghazi going on right now as well, but we will move ahead. I apologize for any inconvenience this may have caused any of you, particularly to our witnesses and Members, and I thank all of you for your understanding.

This hearing was difficult to organize for other reasons as well. Many potential witnesses expressed apprehension about appearing before this Committee to testify on this topic out of fear of retribution against their business interests by foreign countries. While they expressed serious concerns to us in private about the tactics of many foreign countries when it comes to technology transfer, they worried that speaking out publically about those tactics would adversely affect them in those foreign markets.

This is unfortunate, because today's hearing addresses a topic of great concern to this committee—innovation and U.S. competitiveness, particularly in international markets. While the U.S. invests significant taxpayer resources in public as well as in private sector research and development, other nations remain dedicated to acquiring the fruits of our labor. Their efforts to acquire U.S. technology have clearly had a significant impact on U.S. trade, our GDP, and the U.S.'s standing as a world leader in research, development, and innovation. Unfortunately, measuring that impact has proven very difficult.

Last year, the U.S. taxpayers spent roughly $130 billion on research and development, and U.S. companies and universities spent another $310 billion. This doesn't even take into effect or account the impacts of tax incentives that total over $8 billion. Determining who ultimately benefits from these investments should be something that government as well as private sector entities are able to track.

Our concerns are not limited to economic espionage and theft, even though this is clearly a significant threat. This Subcommittee has been active in ensuring that federal agencies under our jurisdiction are prepared for cyber attacks and insider threats that seek to steal sensitive and proprietary information. We are here today to discuss something different, but just as troubling—the policies and practices of foreign countries that facilitate the transfer of U.S. technology and intellectual property overseas. This happens in many ways, sometimes through domestic manufacturing requirements, sometimes through standards certification, and sometimes

through conditions of foreign investment. These policies, among others, allow countries to exploit our R&D investments without making the commensurate investments themselves.

Oftentimes, U.S. companies allow this transfer to take place because they are faced with a very difficult choice. In today's global marketplace, companies need access to the largest markets in order to compete. Sometimes, companies are faced with the difficult decision to either file for bankruptcy or agree to detrimental financing terms, such as transferring their intellectual property, in order to receive additional investment.

It was reported just last week that a company, A123, a U.S. company that has received $124 million of its $249 million grant from the Obama Administration, this to develop battery technology for electric cars, would file for bankruptcy. As part of that bankruptcy, A123 planned to sell its business to a U.S.-based company, Johnson Controls, for $125 million, but other bidders are able to make better offers at an upcoming auction that I understand is going to happen tomorrow. China's Wanxiang Group Corporation has already expressed interest in procuring A123 and making it entirely possible that the U.S. taxpayer's investment in A123 will be shipped off to China. This is just the most recent case. Several other companies that received significant support from U.S. taxpayers, like Evergreen Solar, were faced with making difficult decisions, very similar to this, in order to remain viable.

Time and time again, we have seen U.S. R&D investments, particularly in sectors that received favorable treatment from the current Administration like wind, solar, and batteries, simply be sent overseas. It is a dirty secret that nobody wants to talk about—not the government agencies that fund the R&D, not the companies that receive the R&D, not the associations that represent the companies, and certainly not the foreign countries that benefit from our R&D investments—investments, I should add, that ultimately came from money that we borrowed from China in the first place.

I want to be clear; this is not just about China. This is not just about green technology. It is happening across the board. This also isn't about the value of public or private sector R&D, which everyone realizes is important for economic competitiveness. Our goal is to better understand the magnitude of the international technology transfer, ensure that someone is monitoring these issues, and identify measures to ensure that U.S. investments are realized by U.S. interests.

Now, I recognize my Ranking Member, my good friend from New York, Mr. Tonko, for his opening statement.

[The prepared statement of Mr. Broun follows:]

PREPARED STATEMENT OF SUBCOMMITTEE CHAIRMAN PAUL BROUN

Good morning, and welcome to today's hearing titled "The Impact of International Technology Transfer on American Research and Development." I want to thank our witnesses for being here and for being flexible. This hearing was originally scheduled in September, but because of a last minute member briefing by the Secretary of State on the Benghazi incident, we were forced to postpone. Ironically, there is another briefing on Benghazi right now as well, but we will move ahead. I apologize for any inconvenience this may have caused you, and thank you all for your understanding.

This hearing was difficult to organize for other reasons as well. Many potential witnesses expressed apprehension with appearing before the Committee to testify on

this topic out of fear of retribution against their business interests by foreign countries. While they expressed serious concerns to us in private about the tactics of many foreign countries when it comes to technology transfer, they worried that speaking out publically about those tactics would adversely affect them in foreign markets.

This is unfortunate, because today's hearing addresses a topic of great concern to this Committee —innovation and U.S. competitiveness. While the U.S. invests significant taxpayer resources in public and private sector research and development, other nations remain dedicated to acquiring the fruits of our labor. These efforts to acquire U.S. technology have clearly had a significant impact on U.S. trade, GDP, and our standing as a world leader in research, development, and innovation. Unfortunately, measuring that impact has proven difficult.

Last year, the U.S. taxpayers spent roughly $130 billion on research and development, and U.S. companies and universities spent about another $310 billion. This doesn't even take into account the impacts of tax incentives that total over $8 billion. Determining who ultimately benefits from these investments should be something that government or private sector entities are able to track.

Our concerns are not limited to economic espionage and theft, even though that is clearly a significant threat. This Subcommittee has been active in ensuring that federal agencies under our jurisdiction are prepared for cyber attacks and insider threats that seek to steal sensitive or proprietary information. We are here today to discuss something different but just as troubling—the policies and practices of foreign countries that facilitate the transfer of U.S. technology and intellectual property overseas. This happens in many ways, sometimes through domestic manufacturing requirements, sometimes through standards certification, and sometimes through conditions of foreign investment. These policies, among others, allow foreign countries to exploit our R&D investments without making the commensurate investments.

Often times, U.S. companies allow this transfer to take place because they are faced with a difficult choice. In today's global marketplace, companies need access to the largest markets in order to compete. Sometimes, companies are faced with the difficult decision to either file for bankruptcy, or agree to detrimental financing terms, such as transferring intellectual property, in order to receive additional investment. It was reported just last week that A123, a U.S. company that has received $124 million of its $249 million grant from the Obama Administration to develop battery technology for electric cars, would file for bankruptcy. As part of that bankruptcy, A123 planned to sell its business to U.S.-based Johnson Controls for $125 million, but other bidders are able to make better offers at an upcoming auction. China's Wanxiang Group Corporation has already expressed interest, making it entirely possible that the U.S. taxpayer's investment in A123 will simply go to China. This is just the most recent case. Several other companies that received significant support from U.S. taxpayers, like Evergreen Solar, were faced with making difficult decisions such as this in order to remain viable.

Time-and-time-again, we have seen U.S. R&D investments, particularly in sectors that received favorable treatment from the current Administration like wind, solar, and batteries, simply be sent overseas. It's a dirty secret that nobody wants to talk about—not the government agencies that fund the R&D, not the companies that receive the R&D, not the associations that represent the companies, and certainly not the foreign countries that benefit from our R&D investments. Investments, I should add, that ultimately came from money we borrowed from China in the first place.

I want to be clear, that this is not just about China. And this is not just about green technology. It's happening across the board. This also isn't about the value of public or private sector R&D—which everyone realizes is important for economic competitiveness. Our goal is to better understand the magnitude of the international technology transfer, ensure that someone is monitoring the issues, and identify measures to ensure that U.S. investments are realized by U.S. interests.

Mr. TONKO. Thank you, Mr. Chair.

American citizens have a huge stake in what American firms do with their innovations. The Federal Government is a key driver of innovation through federal research laboratories and its substantial support of research through grants and contracts. In fiscal year 2012, the Federal Government appropriated over $140 billion for research and development. American firms also received support for innovation through the widely used Research and Experimentation Tax Credits. For 20 years, this tax credit has effectively sub-

sidized research by private firms, and by 2011, it represented approximately $10 billion a year in savings to companies. This credit obviously needs to be extended.

Finally, a whole web of public supports ranging from state budget appropriations to Bayh-Dole Act protections for intellectual property to student loans and education tax credits have created an engine of innovation that drives our economic success in this ideas economy.

The central engine of innovation remains the American university. Our universities lead the world in producing high-quality science and engineering students, and they provide a home for researchers who work at the cutting edge of their fields to supply the basic ingredients for continued innovation.

These interconnected public investments have helped make the United States one of the most innovative economies in the history of the world with American firms leading in almost every area. The American people provide this support out of a belief that innovation will ensure that our economy remains strong in the long run. They also believe that American firms that reap the lion's share of these supports will indeed share the fruits of these innovations with our society in the form of jobs for hardworking Americans.

When firms instead license that technology abroad, whether as part of a strategy to build access to foreign markets or because they wish to move production to lower-wage markets, the American taxpayer finds that the bargain they made to support those firms is not as rosy as had been promised. It is no secret that it is faster and cheaper to adopt technologies than it is to develop them. It comes as no surprise that with the development of a global marketplace, the intense competition for market share and the movement to a more open and integrated world economy, governments have turned to policies that will enable their firms to exploit the innovations of others.

I am indeed uncomfortable with the idea that American firms license away innovations subsidized by our citizens. It is bad enough that we have lost jobs when firms offshore production and move out of our communities. The idea that they would exchange taxpayer-supported innovations for market access, however reluctantly, is very disturbing to me.

Stating opposition to the practice of foreign governments adopting policies that bar American firms from doing business in those countries, absent a local partner and absent a technology-sharing agreement, is, quite honestly, easy. Finding a solution is much more complicated. We cannot abandon our investments in education and research, but our citizens have the right to expect and require I would note a return on those investments.

I do not have a policy answer ready to address these concerns, but I am very interested in hearing the thoughts of the witnesses today as you are invited to appear before us. And I thank you again, Mr. Chair, for convening this hearing.

[The prepared statement of Mr. Tonko follows:]

PREPARED STATEMENT OF SUBCOMMITTEE RANKING MEMBER PAUAL D. TONKO

Thank you, Mr. Chairman.

American citizens have a huge stake in what American firms do with their innovations. The Federal government is a key driver of innovation through federal research laboratories and its substantial support of research through grants and contracts. In Fiscal Year 2012, the Federal government appropriated over $140 billion for research and development. American firms also receive support for innovation through the widely used Research & Experimentation tax credit. For 20 years, this tax credit has effectively subsidized research by private firms, and by 2011 it represented approximately $10 billion a year in savings to companies. This credit needs to be extended.

Finally, a whole web of public supports ranging from State budget appropriations to Bayh-Dole Act protections for intellectual property and through to student loans and education tax credits have created an engine of innovation that drives our economic success.

And of course, American universities which lead the world in producing high quality science and engineering students, and which provide a home for researchers who work at the cutting edge of their fields supply the basic ingredients for continued innovation.

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It comes as no surprise that with the idea that American firms license away innovations subsidized by our citizens. It is bad enough that we have lost jobs when firms offshore production and move out of our communities; the idea that they would exchange taxpayer supported innovations for market access, however reluctantly, is very disturbing to me.

Stating opposition to the practice of foreign governments adopting policies that bar American firms from doing business in those countries absent a local partner and absent a technology sharing agreement is easy. Finding a solution is more complicated. We cannot abandon our investments in education and research, but our citizens have the right to expect a return on those investments.

I do not have a policy answer ready to address these concerns. I am very interested in hearing the thoughts of the witnesses you have invited to appear before us today, Mr. Chairman.

Chairman BROUN. Thank you, Mr. Tonko. It is really nice that we are both on the same page in making sure our taxpayers get a proper return from their investment in these companies.

If there are Members who wish to submit additional opening statements, your statements will be added to the record at this point.

At this time, I would like to introduce our panel of witnesses: Dr. Robert D. Atkinson, President of Information Technology & Innovation Foundation; and the Hon. Dennis Shea, Chairman, U.S. China Economic and Security Review Commission. I thank you all for you all's patience and willingness to have the flexibility to be here today.

And as our witnesses should know, spoken testimony is limited to five minutes each after which Members of the Committee will each have five minutes to ask questions. Your written testimony will be included in the record of the hearing. And it is the practice of the Subcommittee on Investigations and Oversight to receive tes-

timony under oath. Do either of you have any objection of taking an oath?

Dr. ATKINSON. No, sir.

Mr. SHEA. No.

Chairman BROUN. Let the record reflect that both stated no, so that is great, instead of shaking their head from side to side.

You also may be represented by counsel. Do either of you have any counsel with you here today?

Mr. SHEA. I have a couple of very able staffers with me, but I don't know if they rise to the level of counsel.

Chairman BROUN. Okay. Legal counsel is what we are discussing here.

So let the record reflect that the witnesses have—that none of the witnesses have counsel.

Now, if you all would please stand and raise your right hand.

Do you solemnly swear and affirm to tell the whole truth and nothing but the truth, so help you God?

Dr. ATKINSON. I do.

Mr. SHEA. I do.

Chairman BROUN. You may be seated.

Let the record reflect that the witnesses participating have taken the oath of truthfulness.

Now, I recognize our first witness, Dr. Atkinson. If you would, sir, turn on your microphone. You have five minutes. We are not going to gavel you down at 5 if you take a few seconds over, but if you would, we have votes a little after 11:00, so we want to get to questions as quickly as we can. Thank you, sir.

## TESTIMONY OF DR. ROBERT D. ATKINSON, PRESIDENT, INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

Dr. ATKINSON. Thank you, Mr. Chairman. Thank you, Congressman Tonko. I appreciate the invitation to appear before you today.

This is a critical issue that you are facing and discussing today. Many nations are looking to get as much technology, knowledge, and innovation from other countries who are leaders like the United States and like Europe, and they are looking to get it in inappropriate ways as a way to advance their own economy.

We mentioned China. China is not the only one but they are the most egregious. For example, in 2011, the Chinese Government committed to "place the strengthening of indigenous innovation capability at the core of economic restructuring." Indigenous innovation refers to "enhancing original innovation, integrated innovation, and re-innovation based on assimilation and absorption of imported technology." What that really means in English is they are going to do everything they can to take as much technology from people who develop it and get it into their economy and into their firms.

Some of these policies that countries use are quite legitimate. Countries and firms in other countries buy technology, they license it, they have policies like R&D tax credits to spur their own innovation. In fact, we now have the 27th least generous R&D tax credit in the world. But many of these policies are illegitimate and they violate the spirit if not the letter of the WTO. And let me just go through a few of them. We have already talked about some.

IP theft—industrial espionage is up according to the FBI and according to national security experts. You see high-profile cases recently like the Chinese stealing chemical secrets from DuPont, stealing wireless telecom secrets from Motorola, and stealing and bribing employees and stealing from an American company called American Superconductor, which is one of the largest providers of wind turbine software in the world.

We also see—again, you alluded to this, Mr. Chairman—state-owned or state-backed companies who will buy U.S. companies. I think this is going to be an increasing trend. Again, it is one thing for a private company in another country to come in and buy a company—our companies do the same—but it is very different when a company comes in to bid on a U.S. company where they are backed by the state. They have deep pockets and many of these, particular in China, are either state-owned or state-backed, and they have an unfair advantage when it comes to buying and bidding for U.S. companies. So we have really got to do a better job, particularly in CFIUS and other areas like that.

Another area is weak IP protection. Many of these countries intentionally have weak IP regimes. Even if they look strong on paper, they are weak in enforcement. We see this, for example, in data exclusivity in biopharmaceutical firms. We have a 12-year data exclusivity period in the United States because of Congress and this is about the minimum seeing as the time that companies need to be able to recoup their investments in this highly risky technology. Many countries are trying to weaken that and have very limited data exclusivity policies for biotechnology.

I think the most troubling area and the widest area is basically limiting market access to tech transfer. It is hard for a small country to do that with just a few million people because multinationals will say we don't really care about your market; we will just bypass you. But big countries like Brazil, India, China, they have essentially a monopsony. They have so much market power they basically can force foreign companies to take these unfair extortionist practices and they do that. China is a good example. In China, it is virtually impossible for a foreign company to go in there and just open up a factory or an office so they can—we can do that here. Foreign companies come here all the time; they can open up here. In China, they require joint ventures.

Another area is compulsory licensing. Countries that just simply say we think we want your technology. If you want to sell it, here, you have to do a compulsory license. We see that particularly in drugs.

And finally, in procurement where the government itself says we are not going to buy products unless the company transfers the technology to our country.

So what should we do about this? The most important thing we can do about it is exactly what you are doing, which is we need to raise the issue. I simply don't think enough policymakers are aware of this, enough people in the media are aware of the significance of the problem.

But the second thing we need to do is be much more active in enforcement. And I know there is a budget crisis, but I think a few million dollars more at USTR would be money very, very well

spent. We spend at least 100 times, if not more, defending our national security through the Defense Department than we do defending our economic security through USTR. USTR is just simply under-resourced to be able to bring the kinds of cases and the pressures that they need to do.

The second area I think is critical is we have—we can't solve this problem on our own. We have to do it with our allies, particularly with Europe. And I would suggest two things. One is we have got to develop a strategy where European and American governments actively joint arm and say to countries like China and Brazil and India that we are just not going to accept this anymore.

Another area I think to consider there—I know I am slightly over and I will just stop—is I think we need to think about joint antitrust exemption. We did this in 1984 with an antitrust exemption for collaborative R&D for U.S. companies. I think we need to give companies the tools to say together, if they are all in the chemical industry, for example, or the aerospace industry, we are all going to agree that we are not going to transfer technology to these countries under duress. If we want to do it on our own, that is one thing, but we are not going to do it under duress. That way, they can't get played off against one another.

And finally, we need to make sure that any trade agreements we sign, including the Bilateral Investment Treaty that is being negotiated with China right now, are really gold-standard agreements. I think we put way too much pressure on either this Administration or the last or any Administration just to sign agreements. Get an agreement, get an agreement. A bad agreement is worse than no agreement. We need good agreements. We need gold-standard agreements. We need to do that with the Trans-Pacific Partnership Agreement, we need to do it with the China BIT Agreement, and we need to basically say to the—to any Administration again, regardless of party, you need to negotiate trade agreements, but they need to be gold-standard agreements that protect U.S. interests.

Thank you.

[The prepared statement of Dr. Atkinson follows:]

Robert D. Atkinson
President and Founder
Information Technology and Innovation Foundation (ITIF)

Hearing on

"The Impact of International Technology Transfer on American Research and Development"

Before the House Science Committee

Subcommittee on Investigations and Oversight

U.S. House of Representatives

December 5, 2012

Mr. Chairman, Mr. Tonko, and members of the Committee, I appreciate the opportunity to appear before you today to discuss the issue of the impact of international technology transfer on American R&D.

I am president of the Information Technology and Innovation Foundation (ITIF). ITIF is a nonpartisan research and educational institute whose mission is to formulate and promote public policies to advance technological innovation and productivity. Recognizing the vital role of technology in ensuring American prosperity, ITIF focuses on innovation, productivity, and digital economy issues.

**Why is the Issue of Tech Transfer and U.S. R&D is Becoming More Important?**

A nation's investments in research and development (R&D) are vital to its ability to develop the next-generation technologies, products, and services that keep a country and its firms competitive in global markets. Until recently, corporate R&D was generally not very mobile, certainly not in comparison to manufacturing. But in a "flat world" companies can increasingly locate R&D activities anywhere skilled researchers are located. Moreover, as I argue in *Innovation Economics: The Race for Global Advantage*[1], in the last decade many other nations have put in place a range of policies, including expanding government R&D funding, training scientists and engineers, and expanding R&D tax incentives, to make them more attractive for global R&D investment. But many nations have also put in place a range of "bad" policies, including intellectual property theft and forced joint ventures and technology transfer that unfairly seek advantage.[2]

The result of these "good" and "bad" policies has been that the United States has seen its relative competitive advantage in R&D and advanced technology industries decline. While the United States still leads the world in aggregate R&D dollars invested, on a per-capita basis it is falling behind. The United States now ranks just eighth among Organization for Economic Cooperation and Development (OECD) countries in the percentage of GDP devoted to R&D expenditures (2.8 percent), behind Israel (4.3 percent), Finland (4.0 percent), Sweden (3.6 percent), Korea (3.4 percent), Japan (3.3 percent), Denmark (3.0 percent), and Switzerland (3.0 percent), with Germany and Austria both less than .04 percent behind the United States. In 2008, for the first time, Asian nations as a group surpassed the United States in R&D investment, investing $387 billion to the United States' $384 billion.[3]

As another example, business R&D expenditures by U.S. IT manufacturing and IT services industries as a share of GDP fell substantially compared to 21 other OECD peer countries between 1997 and 2005. While at first glance the United States appears to score fairly well on these measures—fifth in business R&D expenditures in IT manufacturing and sixth in IT services—the data reveal a striking decrease of almost 50 percent in the amount of U.S. IT manufacturing industry R&D as a percentage of GDP from 1997 to 2005.[4] Moreover, during this time, businesses in IT manufacturing and services industries in countries such as Finland, Korea, Denmark, Ireland, and the Czech Republic substantially increased their IT R&D investment.[5] In the ITIF report *Atlantic Century II: Benchmarking EU & U.S. Innovation and Competitiveness*, which assesses the innovation-based competitiveness of 44 nations or regions on 16 factors, including corporate R&D, the United States ranks second to last, ahead of only Italy, in the rate of progress on these factors.[6]

The decline in America's innovative edge is due to a number of factors, not the least of which are failures of federal policy, such as an unwillingness to make permanent and expand the R&D tax credit, limitations on high-skill immigration, and stagnant federal funding for R&D.

But the decline is also related to unfair practices by other nations that collectively ITIF has termed as "innovation mercantilism." Many other nations engage in a variety of practices related to unfairly obtaining knowledge for competitive advantage. One way is through intellectual property theft. This can take the form of cyber espionage where foreign actors, sometimes governments themselves, hack into the computer systems of U.S. companies or government to steal intellectual property. (In fact, one German study found a 40 percent increase in industrial espionage cases between 2009 and 2010.)[7] In other cases, nations maintain a weak and discriminatory patent or broader IP system that allows their firms to reverse engineer U.S. technology products, even though they are under patent protection. For example, some nations have weak protections for data related to biopharmaceutical firms (e.g., data exclusivity) in order to more easily transfer critical data to their domestic firms.

Increasingly, state-owned or state-supported enterprises buy U.S. technology companies and then transfer the intellectual property, including trade secrets, back to the home country and its companies. Nations also rely on forced joint ventures, where U.S. multinationals are forced to "partner" with a domestic firm to gain the right to produce in that country, with the domestic firm then using this relationship to steal the firm's IP.

In addition, many nations have turned to "compulsory licensing" as a way to transfer knowhow and technology to their economies. This normally involves countries granting permission to domestic companies to produce patented products from foreign companies without the permission of the patent owner. This is done often in the case of medical drugs, where countries not only want to get drugs at a lower price without paying for the costs of drug development, but also to support their own domestic pharmaceutical and biotech industry. For example, earlier this year the Indian government issued a compulsory license to Natco, an Indian pharmaceutical company, enabling it to produce a cancer drug made by Bayer. A decade ago, Brazil passed its Generics Law, which allows companies to legally produce generic drugs that are perfect copies of patented drugs.

Finally, a growing number of nations rely on forced technology transfer where U.S. firms are pressured to transfer technology to the host country (by opening R&D labs, sharing proprietary secrets with domestic firms, or opening advanced production facilities) in exchange for being able to sell their products or services in the market. While many nations practice this, China is by far the most egregious actor when it comes to forced technology transfer. As David Joy, Chief Market Strategist for Ameriprise Financial, stated with respect to China, "To me, that's [forced technology transfer] actually the biggest issue, more even than currency valuation. Being forced to give up technology for access to the market is essentially blackmail."[8]

**Examples of Forced Technology Transfer: the Case of China**

Many nations seek to engage in forced technology transfer, but no nation does it "better" or more than China. This is in part because China is not a market-oriented democracy constrained by the rule of law, but also because the Chinese economy is so large and fast growing that the country is able to get away

with practices that if implemented by a smaller nation would be rejected out of hand by multinational corporations. While the forced technology transfer practices of a nation a like Argentina are onerous, it is small enough that many companies would rather give up on the Argentinean market than succumb to the strong arm tactics. U.S. multinationals have much less room to maneuver with China since it is the world's second largest economy. This is why in a survey of U.S. executives doing business in China by the U.S. Bureau of Industry and Security, "the majority of industry representatives interviewed for this study clearly stated that technology transfers are required to do business in China."[9] Foreign companies capitulate because they have little choice; they either give up their technology or lose out to other competitors that are willing to make the essentially Hobson's choice.[28] Industrial organization economists refer to this type of market as monopsonistic: having one buyer that can set largely whatever terms it wants against competitive sellers.

A case in point related to a Chinese state-owned enterprise engaged in dumping the chemicals for a particular herbicide that a U.S. company sold (that is, selling it below what it costs to make in order to gain market share). The company told the Chinese agricultural minister that it was planning to bring a complaint before the WTO. The minister responded that if the case were brought, the company would lose access to the Chinese market. Needless to say, the U.S. firm did not bring the case, even as it continued to lose global market share and jobs in the United States.

Forced technology transfer is a cornerstone of China's economic plan. For example, in 2011, the Chinese government committed to "place the strengthening of indigenous innovative capability at the core of economic restructuring, growth model change, and national competitiveness enhancement ....Indigenous innovation refers to enhancing original innovation, integrated innovation, and re-innovation based on assimilation and absorption of imported technology, in order improve our national innovation capability."[10] As Thomas Hout and Pankaj Ghemawat describe in the *Harvard Business Review*, China's goal with these "indigenous innovation" policies is no less than "creating a tipping point in which multinational corporations will have to locate their most-sophisticated R&D projects and facilities in China, enabling it to eventually catch up with the U.S. as the world's most advanced economy."[55] Figure 1 provides a framework to identify the types of innovation mercantilist practices the Chinese government engages in to directly benefit Chinese companies at the expense of foreign companies. As it shows, forced technology transfer is just one of many tools in the intellectual property category that the nation employs to gain unfair competitive advantage.

A principal arrow in China's innovation mercantilist quiver is to force requirements on foreign companies with respect to intellectual property, technology transfer, or domestic sourcing of production as a condition of market access. While China's accession agreement to the WTO contains rules forbidding it from tying foreign direct investment to requirements to transfer technology to the country, the rules are largely ignored.[11] Because China is still largely a technologically developing nation, forcing companies from developed nations to transfer their technology (or, in many cases, just downright stealing it) is a faster way to innovation success than engaging in the hard work to move up the technology learning curve, as European and American companies have had to do. And then China uses this newfound technological prowess to turn the tables on the "developed" companies, by combining their newly acquired advanced technology with low wages (and government subsidies) to take global market share away from them.

4

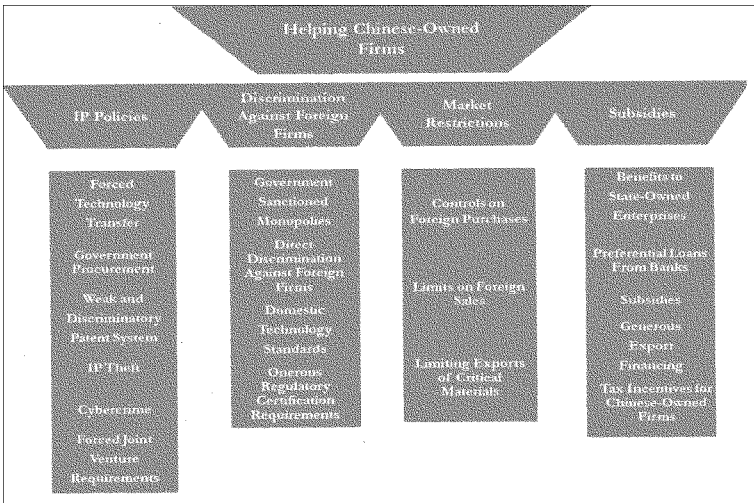


**Figure 1: A Taxonomy of Unfair Chinese "Innovation Mercantilist" Policies Designed to Help Chinese-Owned Company Gain Advantage Over Foreign Firms[12]**

In the 1990s, when the country began aggressively promoting domestic technological innovation, it developed investment and industrial policies that included explicit provisions for technology transfer, particularly for collaboration in production, research, and training.[13] Rather than doing the hard work to build its domestic technology industries, or better yet focus on raising productivity in low-producing Chinese industries, China decided it would be much easier and faster simply to take the technology from foreign companies.

China is the undisputed master of the joint venture and R&D technology transfer deal. China's government unabashedly forces multinational companies in technology-based industries—including IT, air transportation, power generation, high-speed rail, agricultural sciences, and electric automobiles—to share their technologies with Chinese state-owned or influenced enterprises as a condition of operating in the country. For example, Chinese officials normally force multinational companies to form joint ventures with its national champions and transfer the latest technology in exchange for business opportunities. Companies that resist are simply excluded from projects and refused permission to invest. The Chinese government uses the restrictions to drive wedges between foreign rivals vying to land big projects in the country in order to induce them to transfer their technologies, which state-owned enterprises often need to catch up. Although the WTO prohibits mandatory technology transfers, the Chinese government maintains that incentivized transfers, whereby companies trade technology for market access, are purely business decisions.[27] Thus, China continues to violate the WTO, only more covertly, getting the technology of developed countries and paying nothing in return.

5

In China, it is commonplace to require that firms transfer technology in exchange for being granted the ability to invest in China. For example, in the *Catalogue for the Guidance of Foreign Investment Industries (2007)* joint ventures with foreign firms have to be approved, and technology transfer agreements reached within joint venture contracts must also be submitted for approval. The guidelines encourage transfer of technology.[14]

Sometimes this process takes the form of mandatory licensing of technology. As BASF Chairman and Chief Executive Jürgen Hambrech stated, foreign companies doing business in China face "forced disclosure of know-how."[15] Sometimes this is in the form of requirements to open up R&D facilities where the technology often "goes out the back door" in the form of Chinese researchers who leave to take the technology to Chinese firms. As one publication stated, the Chinese central government requires foreign firms:

> To form joint ventures with its national champions and transfer the latest technology in exchange for current and future business opportunities. Companies that resist are simply excluded from projects. The Chinese government uses the restrictions to drive wedges between foreign rivals vying to land big projects in the country and induce them to transfer the technologies that state-owned enterprises need to catch up. Executives working for multinational companies in China privately acknowledge that making official complaints or filing lawsuits usually does little good.[16]

One example is the evolution of China's high-speed rail market. In early 2009, the Chinese government began requiring foreign companies that wanted to bid on high-speed railway projects to form joint ventures with the state-owned equipment producers, CSR and CNR. Not willing to just import the trains and equipment, even though China was running (and still runs) massive trade surpluses it could have used to purchase the trains and expertise, the Chinese government stipulated that multinational companies could hold only a 49 percent equity stake in the new companies, that they had to offer their latest designs, and that 70 percent of each system had to be made locally. Competing foreign rail manufacturers—like France's TGV, Japan's Kawasaki, and Germany's Siemens—had no choice but to go along with these stipulations, even though they realized that their joint-venture partners would soon become their rivals outside China.[29] But this was not sales; this was sales and tech transfer. The winning bidder, Kawasaki, had to develop the local supply chain for train components and teach the Chinese engineers—by sharing their entire know-how and catalog of technologies, and even bringing Chinese engineers to its Japanese manufacturing facilities for training.

While the foreign multinationals are still importing the most sophisticated components, such as traction motors and traffic-signaling systems, today they account for less than 20 percent of China's high-speed rail market. Meanwhile, CSR and CNR have acquired many of the core technologies, applied them with stunning quickness, and now dominate China's local market. Moreover, they have become major players in the $110 billion international rolling-stock market, having built high-speed railways in several developing countries, including Saudi Arabia, Turkey, and Venezuela (several for which the Chinese government has generously cofunded the railway modernization projects).[30] They've also made inroads in developed markets, with CNR recently winning rail contracts in Australia and New Zealand, all the while outbidding their forced mentor Kawasaki because they got much of their technology for free and then enjoyed massively government subsidies for production and exports.

And now the Chinese companies are in negotiations to supply high-speed rail to the state of California. As the *New York Times* surreally explains, "Nearly 150 years after American railroads brought in thousands of Chinese laborers to build rail lines across the West, China is poised once again to play a role in American rail construction. But this time, it would be an entirely different role: supplying the technology, equipment, and engineers to build high-speed rail lines."[31] Without a trace of irony about how China came to be so competitive in high-speed rail, Zheng Jian, director of high-speed rail at China's Railway Ministry said: "We are the most advanced in many fields, and we are willing to share with the United States." And not only is China offering to build California's 215 mph bullet train, but it even generously offered to finance some of the construction (no doubt out of its trade surplus with the United States). Of course, California would still have to invest billions, including for Chinese rail components and engineering services. Imagine that—America's own stimulus dollars potentially going to help deepen its trade deficit with China.

Rail is far from the only industry where China uses pressured technology transfer against foreign multinationals. This occurs in industry after industry. For example, Ford Motor Company has opened several automobile plants in China, but as a condition of access, it had to do so as part of a joint venture with Chinese automobile producer Chang'an Motors so that Chang'an could learn from Ford, with the intention of ultimately replacing Ford in the Chinese marketplace. Moreover, as a condition of market access, the Chinese government required Ford to establish an R&D laboratory. When Ford sought to build a second factory nearby, again the requirement was to build a second R&D facility. Collectively, Ford employs at least 300 Chinese engineers at these two adjacent buildings.

China is also using this practice to try to win in the electric vehicle market. In accordance with its "New Energy Vehicles" plan, China requires foreign electric vehicle makers to transfer IP to a Chinese automaker as a requirement for gaining access to the market.[17] One of the most recent cases of this involved General Motors, which looked to start selling its electric hybrid vehicle, the Volt, in China. The Chinese government began placing "heavy pressure on the company to share some of the car's core technology."[18] Specifically, the Chinese government precluded the Volt from qualifying for purchase subsidies totaling up to $19,300 a car—which are available for alternative fuel vehicles (but only if manufactured in China)—unless General Motors agreed to transfer the engineering secrets for one of the Volt's three main technologies (electric motors, complex electronic controls, and power storage devices) to a joint venture in China with a Chinese automaker.[19] In contrast, U.S. tax credits for the purchase of energy-efficient alternative fuel vehicles are not restricted to domestic cars nor are foreign auto manufacturers denied them unless they transfer technology to the United States. For its part, Ford Motor Company, which is currently conducting demonstration projects of electric cars in China (and plans to launch commercial sales there), has already acceded to China's technology transfer demand.[20] Ford will transfer at least one of the three core electrical vehicle technologies to a Chinese joint venture partner: the civilian automotive affiliate of China Weaponry Equipment, a large contractor for the People's Liberation Army.[21]

This is often par for the course, especially since 2006. China has done this with other car makers. It has always had a requirement that foreign auto makers open factories only as joint ventures. But recently China has begun to pressure foreign carmakers like GM and Nissan to build domestic brands with

Chinese partners. Only after Volkswagen promised to build an electric car with a Chinese company was the company allowed to build a new factory in Foshan.[22]

China is using the same process to gain advanced aeronautics and aviation technology where the Chinese government hopes to become self-sufficient through Chinese firms. Commercial Aircraft Corporation of China (COMAC), the state-owned Chinese commercial aircraft company, benefits from a wide array of mercantilist policies in order to foster the development of a narrow-body aircraft to compete with Boeing and Airbus despite the fact that the global aviation market is best served thought market-based policies and not artificially produced overcapacity.[23] COMAC's stated goal is clear: get as much foreign aviation technology as possible while seeking to develop its own "independent intellectual property rights."[24] COMAC "will commit to national and international cooperation based on the 'airframe suppliers' model to share risks and benefits, and build a system of both national and international suppliers for trunk lines, and eventually establish relatively complete service and industrial chains in the commercial airplane business."[25] In other words, the goal is to produce all kinds of airplanes, from commuter jets to wide-body, long-haul jets and to produce all the supply chain inputs, including engines and advanced avionics. A core strategy is to pressure Boeing and Airbus to transfer technology to China in exchange for market access so that COMAC can learn how to produce its own passenger jets for the Chinese and global markets. And because the Chinese government controls more than 95 percent of the passenger air travel market, it can use procurement to reward the company (Airbus or Boeing) that transfers the most technology.

This occurs with regard to R&D labs as well. The CEO of a large multinational telecommunications equipment company shared with us that his company opened a large R&D facility in Beijing employing more than 500 scientists and engineers. When asked if he did this to access Chinese engineering talent, he responded bluntly: "Unless I promised the Chinese government that I would open up an advanced technology lab there, I was told that I would not be able to sell to the Chinese telecommunications providers." Representatives of other U.S. technology companies have also acknowledged that they opened or expanded R&D laboratories in China in order to gain favor with the Chinese government so that they would be discriminated against less than otherwise might be the case.

**Forced Technology Transfer Outside of China**

But China is not alone; other nations also try to force the transfer of technology and R&D from foreign multinationals. Portugal requires any wind company wishing to gain access to its market to partner with a local Portuguese university to conduct clean tech research as a way to more quickly gain technical know-how.[26] Malaysia's official policy is to use government procurement to try to force the transfer of technology from foreign to domestic industries.[27] Another country with technology transfer requirements is Indonesia. Indonesia's Ministry of Health Decree No. 1010/MENKES/PER/XI/2008 requires foreign pharmaceutical companies to manufacture locally or entrust a company already registered as a manufacturer in Indonesia, a potential competitor, to obtain drug approvals for them. Under this policy, foreign companies can be barred from the Indonesian market even if they are market leaders in globally recognized good manufacturing and distribution practices and provide high quality pharmaceutical products to Indonesian patients. Among its requirements, Decree 1010 requires also contains a technology transfer requirement and requires local manufacturing in Indonesia of all pharmaceutical products that are

five years past patent expiration.[28] Government procurement practices in Venezuela have included measures such as price preferences for domestic goods and suppliers, reservation of procurements for nationals, requirements for domestic content, technology transfer, or the use of local labor and other incentives to purchase from companies domiciled in Venezuela.[29]

Finally, India, in an effort to what they see as China's successful forced technology transfer policies, is increasingly using forced technology transfer requirements. For example, according to the *2012 National Trade Estimate Report on Foreign Trade Barriers*:

> India issued a series of new requirements for telecommunications service providers and equipment vendors in December 2009, March 2010, and July 2010, explaining that these were adopted to maintain the security of its commercial telecommunications networks. The requirements apply to the purchase of imported products and do not apply to products manufactured or developed in India by Indian-owned or –controlled manufacturers. Issued in the form of amendments to telecommunications service licenses, the new regulations imposed an inflexible and unworkable security approval process, mandating the forced transfer of technology to Indian companies, the escrowing of source code, and assurances against malware and spyware during the entire use of relevant equipment. These measures effectively halted billions of dollars worth of trade in telecommunications equipment and seemed unlikely to advance India's stated security objectives.[30]

**Why do Nations Like China Engage in Forced Technology Transfer?**

As ITIF documented in *The Good, the Bad, the Ugly (and Self-Destructive) of Innovation Policy*, a growing number of nations are turning to innovation mercantilism, with China being the most egregious practitioner. Why do so many nations engine in innovation mercantilism? There are two principle reasons. First, these nations have embraced a particular and fundamentally limited model of economic growth that holds that the best way to grow an economy is through exports and shifting production to higher-value (e.g., innovation-based) production. Moreover, they don't want to wait the 20 to 50 years it will take to naturally move up the value chain through actions like improving education, research capabilities, and infrastructure, as nations like the United States did. They want to get there now and the only way to do this is to short-circuit the process through innovation mercantilism. This explains much of China's economic policies. The Chinese know that to achieve the level of technological sophistication and innovation that America enjoys will take them at least half a century if they rely on only their own internal actions. So they are intent on stealing and pressuring as much of American (and other advanced nations') technology as they can to their own companies. If you can't build it, steal it, is their modus operendi.

This gets to the second reason why these nations do this. Western nations like the United States, the Commonwealth nations, and much of Europe believe in the rule of law and the principles of free trade. Innovation mercantilists do not. For them the ends justify the means, even if they violate the values of market-based free trade and respect for the rule of law and private property rights (including respect for intellectual property). And on top of this, many developing nations advance a pernicious and subtle argument to work on the "guilt" of Western, developed nations. The narrative goes like this: the West has used its imperialist powers to gain its wealth, including at the expense of poor, developing nations and now it wants to "pull the ladder" up after it. This means turning a blind eye to intellectual property and

giving our technology, including pharmaceutical drugs, to nations almost for free. After all, we are rich and they are poor because we are rich. In fact, it is the very fact that America (and other innovative nations) are leaders in R&D and technology that amazing new technologies get developed that provide vast benefits to developing nations. As Dan Breznitz states, Chinese officials and corporate leaders "agree that Chinese companies should not have to pay for the right to use a technology that every economic actor is required to use."[31] But this misses two points. First, China has almost $3 trillion in foreign exchange earnings from chronic trade surpluses that it could use to purchase foreign IP. Former Ambassador to China and longtime China hand James Lilly once wrote, "The American guilt complex over wrongs done to China is often played upon by the Chinese. 'We are weak,' they say. You have caused this, so you owe us. Give us something.' I never bought this."[32] Nor should we.

**What Should the Federal Government Do?**

Before identifying what the federal government should do, the first question is should it do anything at all. In other words, is forced technology transfer a threat to the United States? Some argue that because rampant IP theft shows little sign of abating, we should just give up fighting it. In a *Washington Post* editorial, Zachary Karabell argued that since China steals so much IP, including through forced tech transfer, that it's a waste of time to try to fight it and that the United States would be better off just trying to stay ahead and keep developing new IP faster than the Chinese can steal it.[33] This somehow implies that companies like Boeing, Cisco, Ford and other leading U.S. companies are not innovating as fast and as best as they can now. Moreover, this is akin to saying during the cold war that it made no sense to try to stop the Soviets from stealing our weapons technology; we should just develop better weapons faster.

The reality is that forced technology transfer is enabling China and other nations to gain global market share. But even if this does not succeed in transforming the Chinese economy into an innovation-based one, forced technology transfer polices do considerable harm to U.S. technology companies and to the U.S. economy, if for no other reason than reducing their profits and ability to reinvest in the next wave of innovation.

So what should the U.S. government do? This is a difficult question because if there were easy solutions, they would have been done by now. Any effective solution will need to be multifaceted:

A first step is to try to do more through conventional trade dispute channels. While there are limitations to what can be accomplished here, in part because some of the tech and R&D transfer practices are hidden and informal, the U.S. Trade Representative's Office (USTR) can do more. But USTR is generally underfunded and needs more resources to make stopping coerced tech transfer a higher priority. To enable that, **Congress should expand funding for USTR.**

Second, **we need to ensure that future bilateral trade and investment treaties contain strong and enforceable provisions against forced technology and R&D transfer.** In 2010, Premier Wen Jiabao announced, "We will … enable foreign businesses to get national treatment like their Chinese counterparts." Yet, China's system of investment screening is discriminatory, and would constitute a denial of national treatment under U.S. investment treaties and free trade agreements. China bound certain rights of establishment when joining the WTO, namely those for which it scheduled commitments under the General Agreement on Trade in Services (GATS). In the WTO Doha Development Round, a key

sticking point has been Chinese unwillingness to expand its GATS commitments. Thus, Chinese statements that it gives non-discriminatory treatment to foreign businesses are not accurate.[34] The Office of the United States Trade Representative is negotiating a Bilateral Investment Treaty with China. It is not clear that this treaty will contain the provisions needed to actually end pressured technology transfer. Congress should make it clear to USTR and the administration that no treaty is preferential to a treaty that does not firmly stop this practice. **Congress should also make it clear that it will not judge any administration by whether a BIT with China is concluded, but rather by if the United States made a strong effort to conclude a treaty that provided full protection against mercantilist practices like forced transfer of R&D.** Without this assurance, administrations will feel pressure to sign agreements just for the sake of signing agreements and being able to "check the box." Likewise, federal trade negotiators and Congress should insist that any Trans-Pacific Partnership (TPP) agreement signed be a "gold standard" agreement that holds TPP signatories to the highest standards, including on IP protection and forced technology transfer.[35]

Third, the United States needs to better empower multinational companies with tools to better resist forced technology transfer. **Congress should pass legislation that allows firms to ask the Department of Justice for an exemption to coordinate actions regarding technology transfer and investment to other nations.** For example, if companies in a similar industry can agree that none of them will transfer technology to China in order to gain market access then the Chinese government will have much less leverage over them. The same would be true if companies agreed that they would not invest in China until China improved its intellectual property protections. This could be modeled in part on the 1984 National Cooperative Research Act, which led to an explosion of consortium-based research activity by removing a defect of antitrust law which suggested that collaborative joint research efforts among corporations were potentially collusive. For those who worry that extending this kind of cooperative tool to foreign tech transfer would somehow be anti-consumer, it's important to note that this would not apply to pricing issues, but only to tech transfer issues where companies could point to coercive action in foreign markets.

Fourth, **Congress should exclude mercantilists from the Generalized System of Preferences (GSP).** In 1976, the United States launched a new development assistance program called the Generalized System of Preferences. It eliminated duties on thousands of products from developing countries, intending to promote economic growth through a "trade, not aid" approach. In 2010, $22.5 billion of imports from the 129 GSP-beneficiary countries entered the United States duty-free, saving the exporting countries $682 million in import duties.[36] While the goal of promoting economic growth in these countries is admirable, some of the top GSP beneficiaries are counties like Argentina, Brazil, Russia, and Venezuela which restrict many U.S. exports to their markets and have long failed to maintain adequate intellectual property rights protections. In fact, of the top 20 GSP-beneficiary countries, 12—Argentina, Brazil, Bolivia, Colombia, India, Indonesia, Pakistan, the Philippines, Russia, Thailand, Turkey, and Venezuela—are on the U.S. Trade Representative's Special 301 Watch List (which documents countries that fail to adequately protect U.S. companies' or individuals' intellectual property rights). Congress should amend the GSP authorizing legislation such that any country on USTR's Special 301 Watch List, or any country with documented forced technology transfer practices in USTR's *2012 National Trade Estimate Report on Foreign Trade Barriers*, becomes ineligible to receive GSP status.

Finally, the United States also needs to be actively exploring alternatives to the WTO. Whether because the WTO (and its member countries) continue to look the other way in the face of systemic mercantilist practices such as forced transfer of technology as a condition of market access, or because these practices are not fully covered by its terms, the WTO is limited in its ability to enforce action against rampant mercantilism. We need a new path. Therefore, **the United States needs to pursue a two-pronged trade strategy, continuing as best it can to improve conventional trade organizations like the WTO, but also creating alternative "play-by-the-rules" clubs of like-minded countries.** This in fact was the originating spirit behind the Obama Administration's efforts to pass a Trans-Pacific Partnership agreement, but also behind Governor Romney's proposal for what he has termed "Reagan Economic Zones"—a multilateral trade agreement(s) comprised of "like-minded nations" genuinely committed to the principles of open markets and strong intellectual property protections.[37]

Pressured or mandatory technology transfer by other nations has, is, and will continue to negatively impact American R&D and innovation capabilities. It's time for the federal government to step up its actions to fight this corrosive mercantilist practice.

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Chairman BROUN. Thank you, Dr. Atkinson.

Mr. Shea, you are recognized for five minutes.

**TESTIMONY OF THE HONORABLE DENNIS C. SHEA, CHAIRMAN, U.S. CHINA ECONOMIC AND SECURITY REVIEW COMMISSION**

Mr. SHEA. Thank you, Chairman Broun, Ranking Member Tonko, Members of the Subcommittee. I appreciate the opportunity to speak before you today.

I will share some of the Commission's findings, but the views I present today are my own.

Technology transfer is just one part of a multi-faceted strategy by the Chinese Government to move China's economy to a higher position on the value-added, high-technology industrial chain and to develop a culture of innovation.

The Commission addresses many of the broader issues in China's innovation strategy in our 2012 report to Congress, which was released in mid-November. Today, I will focus my testimony on Chinese Government efforts intended to transfer technology from the United States and other developed nations to China and Chinese companies.

Let me say at the outset that China has made no secret of its ambition to shift its economy from one dependent on manufacturing products invented elsewhere to one that produces products whose intellectual property originates in China. One of China's key Central Government planning documents, the "2006 Medium- to Long-Term Plan for the Development of Science and Technology," describes 402 technologies in which China seeks to gain expertise, and it calls for China to limit its dependence on foreign technology to just 30 percent by the year 2020. The 12th five-year plan, another Chinese Central Government plan for economic development, which was adopted last year, identified seven strategic emerging industries in which Chinese corporations are expected to become global champions. These industries include clean energy technology, biotechnology, and next-generation information technology.

To help achieve its technology goals, China frequently adopts policies of tech transfer as a condition for foreign firms 1) to gain access to Chinese markets in certain industries, 2) to be considered for procurement by the Chinese Government, and 3) to benefit from Chinese subsidies and tax benefits.

Depending on the industrial sector, the Chinese Government requires many foreign companies, as Dr. Atkinson mentioned, to enter into joint ventures with Chinese firms in order to enter the Chinese market, the Chinese companies often requiring their foreign partners to transfer technology as a precondition for the establishment of the joint venture. Additionally, Chinese law requires government approval of foreign joint venture agreements.

Paragraph 7.3 of China's Protocol of Accession to the World Trade Organization prohibits China from conditioning the approval of investment by foreign companies on the transfer of technology, but China claims that it is not violating WTO prohibitions because the actions taken by foreign companies are purely business decisions. This argument has been seriously questioned by the U.S. Government and business groups. Here is what the USTR said ear-

lier this year, and I quote, "Although China has revised many of its laws and regulation to conform to its WTO commitments, some of these measures continue to raise WTO concerns, including those that encourage technology transfers to China without formally requiring them." U.S. companies remain concerned that this encouragement in practice can amount to a requirement, particularly in light of the high degree of discretion provided to Chinese Government officials when reviewing investment applications.

My written testimony goes into greater detail about the dilemma that U.S. companies face when considering whether to transfer technology in China. However, I do want to note that of some 300 U.S. businesses surveyed by the American Chamber of Commerce in China last year, one in three acknowledged that either they or their clients had been negatively impacted by forced technology transfer.

As Dr. Atkinson mentioned, forced technology transfer also occurs through the Chinese Government procurement policies. Although China agreed in 2001 to accede as soon as possible to the voluntary WTO Agreement on Government Procurement, that has not yet occurred. Without the constraints of the GPA, the Chinese Government has introduced restrictive procurement laws. In 2009, Beijing required companies to file applications to be considered for accreditation as indigenous innovation products eligible for procurement.

President Hu Jintao came to the United States and said we are repealing this policy. The policy looks like it has been repealed at the Central Government level, but—the message hasn't gotten to all the provinces, which have huge procurement markets as well. So this is an issue that needs continuing monitoring by the Federal Government.

Another issue is the issue of patents. The impetus to register local patents is also being reinforced by the rising number of utility model patents issued in China. While such patents are used throughout the world, they are subject to less rigorous and expensive review processes in China. Utility model patent holders in China cannot just patent troll, using patents as a ploy to either exclude foreign competitors or to justify intellectual property theft.

As companies continue to transfer technology to China, many will face increased competition and pressure from Chinese firms. They may even find that they are excluded from a large part of China's market that they had hoped to gain access to, and that they would have access to if China had adhered to international trade norms. Instead of the reciprocal trade relationship that we should have with a WTO partner, China's conditioning access to their markets on the transfer of technology results in the loss of American jobs and harms the American economy.

Two points, as I mentioned in my written testimony, I don't believe reciprocity is a bad word. Maybe we ought to be demanding some reciprocity in this relationship. And secondly, I agree with the point, the importance of putting pressure on China on a multilateral basis. Let's work with the Europeans, the Japanese, and other partners to deal forcefully with these issues.

Thank you very much.

[The prepared statement of Mr. Shea follows:]

**"The Impact of International Technology Transfer on American Research and Development."**

**Testimony of the Honorable Dennis C. Shea**

**before the**

**Committee on Science, Space, and Technology Subcommittee on Investigations and Oversight**
**United States House of Representatives**

**December 5th, 2012**

Chairman Broun, Ranking Member Tonko, and Members of the Subcommittee, thank you for the opportunity to appear today to discuss transfers of domestic technology and intellectual property to the People's Republic of China (PRC). As Chairman of the U.S.-China Economic and Security Review Commission (USCC), I will share some of the Commission's findings with you; however, the views I present today are my own.

**OVERVIEW**

Technology transfer is just one part of a multi-faceted strategy by the Chinese government to move China's economy to a higher position on the value-added, high-technology industrial chain and to develop a culture of innovation. Along with "forced" transfers, this strategy includes acquisition of foreign companies and technology through mergers and acquisitions; trade policies designed to benefit Chinese industries; incentives to encourage foreign companies to undertake research and development operations in China; huge investments in research and infrastructure; and industrial and cyber espionage. While there has been some market reform in China, the government still engages in centralized planning in an attempt to control the economy and guide growth. Two such plans that are relevant to technology transfer are the "Medium- to Long-term Plan for the Development of Science and Technology" (MLP) and the 12th Five-Year Plan. These plans propose to leapfrog international competitors by harvesting and building upon foreign-developed technology, a process that my co-witness, Dr. Robert Atkinson, has called "innovation adaptation."

China's MLP is a "grand blueprint of science and technology development" to bring about "innovation with Chinese characteristics." It was released in January 2006 and seeks to make China a "world leader" in science and technology by 2050. The plan commits long-term funding to a series of mega-projects in high-tech industries; sets targets for research and development spending; introduces a comprehensive set of subsidies and tax incentives to encourage development of specific technologies; and incentivizes collaboration between government research institutes and the corporate sector.

China's 12th Five-Year Plan, released in March 2011, places an emphasis on moving away from labor-intensive and low-skilled manufacturing toward more sophisticated production. It specifically focuses on the development and expansion of seven strategic emerging industries: new-generation information technology, high-end equipment manufacturing, advanced materials, alternative-fuel cars, energy conservation and environmental protection, alternative energy, and biotechnology.

The Commission addresses many of these broader issues in its 2012 Report to Congress, which was released to the public on November 14th and which contains a section on Chinese efforts to become a more innovative society. Today I will focus my testimony on Chinese government efforts intended to transfer technology from the United States and other developed nations to China and Chinese companies.

Technological improvements are a critical way for countries to enhance global competitiveness and to improve the quality of life for their people. The United States welcomes international competition and we believe it is in our best interest to see China develop and rebalance its economy. That said, transfers of technology must occur on a level playing field. Unfortunately, China maintains policies of forced technology transfer in violation of international trade agreements and international norms as a condition of obtaining access to the Chinese market.

Paragraph 7.3 of China's Protocol of Accession to the WTO prohibits China from conditioning the approval of investment by foreign companies on the transfer of technology,[1] but these provisions are easy to circumvent. In the past, China imposed explicit requirements on foreign companies to transfer technology in exchange for access to the Chinese market. However, in order to comply with WTO prohibitions, China has changed these mandates into implicit, de facto requirements. Foreign companies in certain sectors must form joint ventures with Chinese firms to gain access to the Chinese market. Such joint ventures frequently entail the transfer of technologies to the Chinese partner. Chinese government requirements for technology transfer are implied in documents such as the Five Year Plan and MLP, and through laws requiring government approval of joint ventures with foreign firms.

Because Chinese technology transfer requirements are implicit, and because U.S. businesses are often reluctant to share information for fear of retribution, we do not have a full understanding of how U.S. companies are being pressured to transfer technology to China. Even so, we can gain insight from the methods by which the Chinese government encourages technology transfer, which can include requiring the transfer of technology in order to (1) gain access to Chinese markets, (2) be considered for procurement by the Chinese government, or (3) benefit from Chinese subsidies and incentives.

**MARKET ACCESS**

Depending on the industrial sector, the Chinese government requires many foreign companies to enter into joint ventures with Chinese firms in order to do business in China. The relevant rules are laid out in the Catalogue of Industries for Guiding Foreign Investment ("Catalogue"), which was first introduced in 1995 and last revised in 2011. The Catalogue comprises over 450 industries, forty of which are designated as completely off-limits to foreign investors. The remaining industries in the Catalogue are classified as either "encouraged" or "restricted" for foreign investment. In nearly 100 of those industries, foreign investment is subject to ownership restrictions. About half of those restrictions require foreign investors to form joint ventures - equity, cooperative, or contractual - with Chinese partners. The other

[1] PROTOCOL ON THE ACCESSION OF THE PEOPLE'S REPUBLIC OF CHINA, General Provisions, 7.3, Non-tariff Measures: *"China shall, upon accession, comply with the TRIMs Agreement, without recourse to the provisions of Article 5 of the TRIMs Agreement. China shall eliminate and cease to enforce trade and foreign exchange balancing requirements, local content and export or performance requirements made effective through laws, regulations or other measures. Moreover, China will not enforce provisions of contracts imposing such requirements. Without prejudice to the relevant provisions of this Protocol, China shall ensure that the distribution of import licences, quotas, tariff-rate quotas, or any other means of approval for importation, the right of importation or investment by national and sub-national authorities, is not conditioned on: whether competing domestic suppliers of such products exist; or performance requirements of any kind, such as local content, offsets, the transfer of technology, export performance or the conduct of research and development in China."*

restrictions go a step further, requiring the Chinese partner to hold a controlling or dominant stake. The majority of restrictions apply to manufacturing industries, in particular the automotive sector. In strategic sectors like financial services and mining, ownership restrictions are the norm.

The Chinese companies that form these joint ventures often require their foreign partners to transfer technology to the joint venture entity established by the foreign and Chinese partners as a pre-condition for the establishment of the joint venture. Additionally, Chinese law requires government approval of foreign joint venture agreements.[2] Since the size and rapid growth of China's market makes it vital to many foreign businesses, especially as current consumer demand in the United States and Europe is weak, foreign affiliates of U.S. and Europe based companies often transfer technology or technological knowhow to their Chinese partners in expectation of contracts and market access.

China claims that it is not violating WTO prohibitions because the actions taken by foreign companies are purely business decisions. This is a specious argument. In its 2012 National Trade Estimate Report on Foreign Trade Barriers, the United States Trade Representative said:

> *Although China has revised many of its laws and regulations to conform to its WTO investment commitments, some of these measures continue to raise WTO concerns, including those that 'encourage' technology transfers to China, without formally requiring them. U.S. companies remain concerned that this 'encouragement' in practice can amount to a 'requirement,' particularly in light of the high degree of discretion provided to Chinese government officials when reviewing investment applications.*

In his book, *No Ancient Wisdom, No Followers: The Challenges of Chinese Authoritarian Capitalism*, James McGregor says this about the "voluntary" nature of Chinese technology transfer standards:

> *The global financial crisis of 2008 was a game changer for the relationship between China and the world's multinationals that populate this district. The Chinese bureaucracy appeared to conclude that foreigners now need China more than China needs the foreigners. This was evident in the aggressive arm-twisting of foreign companies to hand over their latest technology to Chinese national champion SOEs as the price of market access. The complaints from foreign governments and multinationals led to softened Indigenous Innovation rhetoric and a few policy adjustments. With the more subtle Strategic Emerging Industries initiative, voluntary became the new mandatory. Technology transfer requirements are not put in writing. Instead, verbal requests to "voluntarily" share technology became the market access requirement. "That is the lesson of Indigenous Innovation," said a China-based senior executive of a technology multinational. "Don't write things down clearly. Spread the regulations verbally."*

In addition, in January of this year, a coalition of U.S. manufacturers, represented by the law firm Stewart & Stewart, alleged that a broad range of Chinese support policies, including technology transfer

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[2] LAW OF THE PEOPLE'S REPUBLIC OF CHINA ON CHINESE-FOREIGN JOINT VENTURES, Article 3: *"The joint venture agreement, contract and articles of association signed by the parties to the venture should be submitted to the competent foreign economic and trade department of the state (hereafter referred to as the ``examining and approving organ'') for examination and approval; and the examining and approving organ shall, within three months, decide whether to approve or disapprove them. After approval, the joint venture should register with the competent administration department for industry and commerce, obtain a license to do business and start operation."*

requirements, violate China's WTO obligations. Whether or not to engage in technology transfer in exchange for access to the Chinese market through a joint venture agreement is not a decision that U.S. companies, or any foreign company, should be forced to make. Unfortunately, this is the reality that many of our businesses face.

Foreign companies operating in China face a common challenge of trying to protect their long-term interests while transferring some technology to Chinese partners in exchange for market access. Some companies, such as General Motors (GM) and Boeing, appear to have benefitted from their joint ventures in China. On the other hand, companies such as Siemens have complained publicly about China's technology transfer requirements.

In June 2011, the Commission held a hearing on "China's Five Year Plan, Indigenous Innovation, and Outsourcing." At the hearing my colleague, the Vice Chairman of the Commission, Bill Reinsch, asked Dr. Eswar Prasad, an economics professor at Cornell University and the former Chief of the Financial Studies Division in the International Monetary Fund's Research Department, what he thought about the dilemma faced by companies that are asked to transfer technology to gain access to the Chinese market. Dr. Prasad responded: "My sense is that trying to turn over technology to China in order to willingly be co-opted in terms of getting market access is a very high price to pay.... Now, for a corporate leader who is worried about quarter-to-quarter earnings... that can be a pretty serious concern. But if I had the ability to stop worrying about the quarter-to-quarter returns, I would... be very concerned about this Faustian bargain because it's very difficult, given the present [Chinese] intellectual property regime, to really guarantee that there will not be technology that is dissipated within China." My colleague noted that U.S. companies are "trying their best not to give away the store. That doesn't mean that they succeed."

The success of these companies often rests on keeping their Chinese partners happy with the partnership. For example, last year Shanghai GM – a US-Chinese joint venture – sold 2.5 million cars and trucks in China, posted $30 billion in revenue, and $3.2 billion in profit. General Motors received about $1.5 billion profit from the venture. While GM believes this partnership to be in its best interest, its managers have expressed the desire to maintain control over critical technology, such as new battery technology, that their Chinese partners are interested in.

There are multiple examples of how forced technology transfers have caused problems for foreign companies in China.

In the high-speed rail sector, Siemens and other firms transferred sensitive technology to joint venture partners in expectation of future contracts that never transpired. Siemens formed a joint venture with China National Railway (CNR) to build the Beijing-Tianjin high-speed railway in a deal worth $1 billion. Of 60 trains, 57 were built in China at the CNR facility. For the follow-on deal to build the Beijing-Shanghai rail line, CNR obtained the contract, while Siemens only delivered the components. In July 2010, China's Railway Ministry denied any allegations of forced technology transfer despite complaints by Siemens and other foreign companies.

In the automotive sector, the 1994 Automotive Industry Policy instituted a law requiring all foreign car companies to form minority-owned joint ventures with Chinese firms in order to enter the Chinese market. This law is still in place today. In addition, the National Development and Reform Commission's (NDRC) 2004 Policy on Development of Auto Industry increased import tariffs and mandated an extremely high domestic content clause, in order to force more foreign automakers to produce in China.

At the same time, the government has done little to enforce penalties against intellectual property theft. Chery – a former subsidiary of Volkswagen (VW) joint-venture partner SAIC – allegedly used VW produced parts in its cars illegally. Volkswagen planned a lawsuit, but instead agreed to an out of court monetary settlement to be assumed solely by SAIC. There have been other alleged counterfeit incidents as well, such as a dispute between Chery and General Motors (GM claimed the Chery QQ was a copy of the Chevrolet Spark – to the extent that the doors of the two cars were interchangeable). Today Chery is one of China's largest automakers and the largest Chinese automobile exporter. Since then, other cases of counterfeiting have emerged, such as a car that directly copied a Chevrolet compact.

As the Commission noted in its March 2011 research report "Ready for Takeoff," the Chinese government has attempted to leverage airliner purchases in exchange for agreements that it hopes will lead to technology transfers into China's aviation industry. Foreign firms have played an important role in the development of China's capabilities in these areas. Partnerships in technological areas of particular importance to the Chinese, such as aircraft engines and composite materials manufacturing techniques, have received priority. For example, last year the Commission received testimony that, soon after making a $10 billion order to import 150 Airbus A320s, China approached Airbus seeking that an assembly line be built in China. Shortly thereafter, Airbus set up a joint venture company to assemble the A320 in Tianjin. An Airbus spokesman acknowledged the developments as a quid pro quo.[3] In another example of technology transfer in the aviation industry, the state owned Commercial Aircraft Corporation of China (COMAC) made it clear that foreign bidders on the C919 program, a narrow-bodied jetliner intended to compete against Airbus A320 and the Boeing 737, are expected to form joint ventures with Chinese partners, especially in high-technology areas such as advanced materials and flight control systems, where Chinese technology is lagging. Every C919 contract awarded to a foreign bidder has been awarded to a joint-venture entity. Companies that do not provide access to coveted technologies or that are perceived to compete against domestic producers are not likely to receive preferential treatment and may indeed face severe obstacles. Given the close integration of China's commercial and military aviation sectors, technology in the aviation sector has strategic implications.

In addition to joint ventures, there are other subtle impediments to market access that may force technology transfer. First, the Chinese government continues to interfere directly or indirectly in technology licensing negotiations between foreign patent holders and Chinese users. This is of particular concern in the communications sector. Such interference reportedly can lead to dissemination of sensitive information during the negotiation process. Second, the government is developing a series of indigenous, mandated standards for 4G and other information technologies, with very little input from foreign companies. In the future, it is possible that foreign companies may be forced to reveal sensitive information to comply with these standards. Finally, technology transfer is already being "forced" in some cases through conformity assessment; according to the United States Information Technology Office (USITO), "some of China's [product] certification programs require disclosure of unnecessary information, much of which is confidential", such as source code and design information.[4]

Some U.S. companies are able to benefit by transferring select technology; however, Chinese government policies have a net negative effect on the U.S. economy. The U.S. Chamber of Commerce, for example, said the following about China's innovation policy: "[It r]estricts the ability of American

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[3] U.S.-China Economic and Security Review Commission, *Hearing on Chinese State-owned Enterprises and U.S.-China Bilateral Investment*, prepared Statement of Dr. Theodore H. Moran, March 30, 2011.

[4] United States Information Technology Office, *Written Comments to the U.S. Government Interagency Trade Policy Staff Committee in Response to Federal Register Notice Regarding China's Compliance with its Accession Commitments to the World Trade Organization (WTO)* (Washington, DC: September 2012), p.18.

companies to access the market and compete in China and around the world by creating advantages for China's state-owned enterprises and state-influenced champions, [and has] the potential to undermine significantly the innovative capacity of the American economy in key sectors [and] harm the competiveness and livelihood of American business and the workers that they employ." Of some 300 U.S. businesses surveyed by the American Chamber of Commerce in China last year, one in three acknowledged that either they or their clients have been negatively impacted by forced technology transfer requirements. Over half stated that the problem of forced technology transfer is either increasing (27 percent) or staying the same (24 percent).

The U.S. government has also raised this issue with China a number of times in recent months, including:

- at the US-China Joint Commission on Commerce and Trade (JCCT) meeting last November;
- in February during Vice-President Xi Jinping's visit to the United States;
- at the US-China Strategic and Economic Dialogues in February and May; and
- in June when the U.S. WTO ambassador Angelos Pangratis told the World Trade Organization (WTO) that forced technology transfer in China is a continual problem.

**GOVERNMENT PROCUREMENT**

Forced technology transfer also occurs through the Chinese government's procurement of goods and services. In 2009, the official value of China's public procurement market surpassed $100 billion, according to Chinese statistics from the Ministry of Finance, ranking it among the largest in the world. This measure probably understates its true size, because it excludes most government infrastructure projects and procurement by state-owned enterprises. For example, the EU Chamber of Commerce in China estimated that the procurement market was actually worth as much as $1 trillion in 2009, about ten times the official figure. This would be equivalent to nearly 20 percent of China's economy; in the United States in 2008, the ratio of general government and state-owned utilities procurement to GDP was just over 10 percent.

China has not acceded to the voluntary WTO Agreement on Government Procurement (GPA), which pledges signatories to refrain from discriminating against foreign goods and services in government procurement. Although China agreed in 2001 to accede "as soon as possible", its first bid was only submitted in February 2008. Because the terms of accession that China offered did not satisfy other WTO members, China subsequently submitted two more bids, the latest in November of last year. Three bids are generally the maximum required for GPA applicants; yet several obstacles make China's imminent accession unlikely. First, China employs a very narrow definition of government procurement, as per its 2002 Government Procurement Law (GPL). This definition excludes large swaths of the state sector; uses a positive list approach (i.e. a product catalogue) to limit the types of products covered; and sets very high thresholds to limit the types of transactions that fall under procurement law. Of special concern is the limited coverage of state entities – including many state-owned enterprises and sub-central government units – because the state sector is the primary source of fixed asset investment in China. Second, the Chinese government is likely not particularly eager to join the GPA. It is neither attracted by reciprocal access to much smaller procurement markets, nor deterred by the limited repercussions it faces if it does not join. As a result, Beijing has not invested much political capital in the GPA negotiations: rather than an intra-ministerial negotiating team, it has designated the Ministry of Finance (MOF) as chief negotiator. MOF has neither the requisite experience to conduct WTO negotiations, nor the capacity to align the interests of powerful state-owned enterprises and government bodies. Finally, the GPA was designed for market economies where government

procurement is clearly delineated. Even if China were to accede to the GPA, the size and opacity of its government procurement market would seriously challenge the adjudication capacities of the WTO.

Without the constraints of the GPA, the Chinese government has introduced restrictive procurement laws. In 2009, Beijing issued the Circular on Launching the National Indigenous Innovation Product Accreditation Work, which required companies to file applications to be considered for accreditation as "indigenous innovation products" eligible for procurement. Under this policy, foreign-invested enterprises are expected to file for patents and copyrights within China in order to qualify for preferential treatment in government contracting or public work projects. The impetus to register local patents is also being reinforced by the rising number of utility model patents issued in China. While such patents are used throughout the world to establish intellectual property for product and process modifications, they are subject to less rigorous and expensive review processes in China. As a result, China ranked first in utility model applications in 2010, accounting for over four-fifths of the global total. Utility model patent holders in China can act as "patent trolls", using patents as a ploy to either exclude foreign competitors or to justify intellectual property theft. Finally, due to poor intellectual property rights enforcement in China, any attempt to qualify a foreign affiliate for the official procurement catalogue would likely require foreign companies to transfer or reveal sensitive and proprietary technology to Chinese companies.

Concerns about these policies have been raised multiple times, including:

- In December 2009, the heads of 34 U.S., European, and Japanese companies and business associations wrote to Chinese leaders to protest national indigenous innovation catalogues.
- In a January 2010 letter to senior Obama Administration officials, the heads of 19 U.S. business and industry associations cautioned against "[s]ystematic efforts by China to develop policies that build their domestic enterprises at the expense of U.S. firms and U.S. intellectual property."
- The U.S. Trade Representative's (USTR) 2009 Report to Congress on China's WTO Compliance noted a "growing concern" among U.S. businesses and industries that "the pace of economic reform in China appears to have slowed in key sectors, and there are growing indications that China's movement toward a market economy has stalled."
- A 2009 report by the U.S. Chamber of Commerce said that "the [indigenous innovation] plan is considered by many international technology companies to be a blueprint for technology theft on a scale the world has never seen before."

In January 2011, President Hu Jintao attempted to allay the worries of foreign businesses and governments by pledging to revise the indigenous innovation policy. Five months later, the Chinese government issued a notice on behalf of all agencies, effective July 1, to revoke key measures linking government purchases to procurement catalogues. The notice was promptly reissued by provincial-level branches of the Ministry of Finance. However, the notice did not automatically nullify indigenous innovation measures instituted independently by provincial governments. For example, China's government records indicate that Beijing terminated its local indigenous innovation measures in September 2011; Jiangsu province in December 2011; and Tianjin in June 2012. In comments filed with the Office of the U.S. Trade Representative in September 2012, the USITO found that "some provincial and local governments [in China] continue to implement various government procurement policies that favor products developed with local IP, or even products with IP from a particular province or municipality, over foreign ones." The central government appears to be aware of the problem: in November 2011, it issued an internal circular to "deepen" the delinking of innovation policies from procurement. But when the Ministry of Finance published measures in June 2012 to standardize

procurement practice among local governments, it made no mention of problems with indigenous innovation measures.

In parallel to inconsistent enforcement at the sub-national level, the commitment to delinking procurement from indigenous innovation is also questionable at the central level. Product catalogues have not been completely eliminated – the Ministry of Industry and Information Technology (MIIT) recently came out with a catalogue for sub-ministerial vehicle procurement. Moreover, in February of this year, the Ministry of Finance issued the *Key Points for Government Procurement Work Plan*, which includes a 50 percent domestic content requirement. To comply with this requirement, foreign companies will almost certainly relocate more production to China, which enhances the risk of technology transfer.

**SUBSIDIES AND TAX BREAKS**

In addition to market access and eligibility for government procurement, subsidies and tax breaks serve as a third form of inducing technology transfer. Several fiscal policies illustrate this. First, Beijing maintains a 150 percent tax deduction for foreigners who make qualified research and development expenditures in China. Second, although foreign-invested enterprises now pay the same statutory income tax as domestic firms (25 percent), they can pay a lower effective tax if they transfer technology. Specifically, the first 5 million RMB of income earned in a taxable year from transferring ownership of technology is exempted from the Enterprise Income Tax, and any excess amount is allowed to be taxed at one-half the normal 25 percent rate. The preferential tax rate of 15 percent applicable to eligible "high and new technology" enterprises is retained, but only if they receive priority support from the state and possess substantial or key ownership of core proprietary intellectual property rights.[5]

**CONCLUSION**

Technology plays an important role in our economy. It is vital to our national security, but it also makes an excellent target for opportunistic competitors. As companies continue to transfer technology to China, many will face increased competition and pressure from Chinese firms. They may even find that they are excluded from a large part of China's market that they had hoped to gain access to, and that they would have access to if trade with China adhered to international norms. Instead of the reciprocal trade relationship that we should have with a WTO partner, China's conditioning access to their markets on the transfer of technology results in the loss of American jobs and harms the American economy. China's commitment to remove indigenous innovation from government procurement catalogues requires continued monitoring by the U.S. government.

As the Commission explained in its 2011 Report to Congress, the Commission believes that the administration should press for a more reciprocal trading relationship in critical areas, such as intellectual property protection and market access. The United States should demand the same level of treatment from its major trading partners that it provides to them. The administration should identify those sectors that China has failed to open up to trade in goods and services, and the practices that act to nullify and impair anticipated economic benefits for U.S. producers and service providers. The

[5] U.S.-China Economic and Security Review Commission, *Annual Report 2011* (Washington, D.C.: November 2011), p.52.

administration should then seek the elimination of such practices in a timely manner and, if unable to gain sufficient market access, evaluate what reciprocal actions may be appropriate.

The United States government should also work to employ multilateral pressure on China. In the past, Beijing has been willing to change course when facing pressure from multiple governments or when foreign governments and the private sector speak forcefully with one voice. We would likely find willing international partners in such an effort as China's technology transfer requirements are not a problem just for the United States. In July 2010, two of Germany's most prominent industrialists criticized the business and investment climate in China during a meeting with Chinese Premier Wen Jiabao. Jurgen Hambrecht, chairman of BASF, complained of foreign companies facing the "forced disclosure of know-how" in order to do business in China. "That does not exactly correspond to our views of a partnership," he said. In addition, Peter Loscher, chief executive officer of Siemens, said foreign companies operating in China "expect to find equal conditions in the fields of public tenders," referring to China's controversial procurement practices. He called on Beijing to rapidly remove trade and investment restrictions in sectors such as automobiles and financial services.

Chairman Broun, Ranking Member Tonko, thank you for allowing me to appear before you today. I appreciate the Subcommittee's focus on this important issue and I look forward to your questions.

**China's Investment Catalogue Revisions Compared: 2007 vs. 2011**

| | 2007 | | 2011 | |
|---|---|---|---|---|
| Sub-Sectors | Number | Share of 2007 | Number | Share of 2011 |
| Encouraged | 350 | 74.6% | 354 | 74.8% |
| Restricted | 86 | 18.3% | 79 | 16.7% |
| Prohibited | 33 | 7.0% | 40 | 8.5% |
| **TOTAL** | **469** | | **473** | |

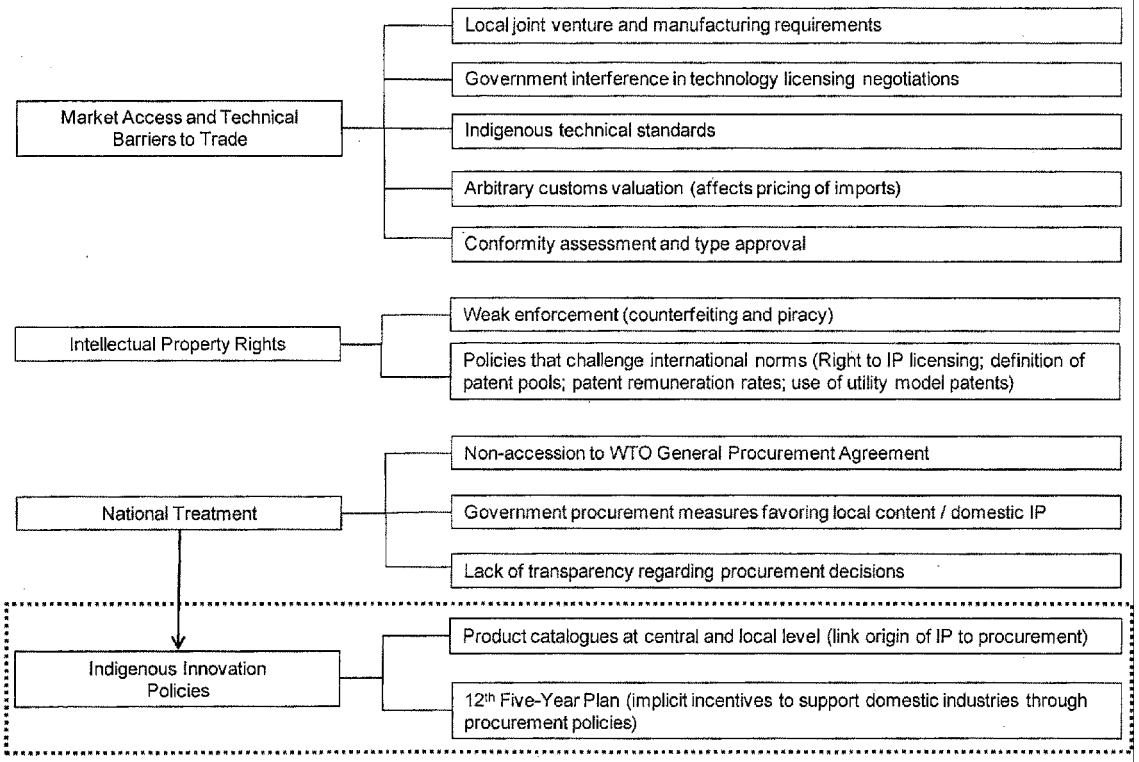
Source: Adapted from China's Ministry of Commerce

**A Breakdown of China's 2007 Investment Catalogue: Classification and Ownership Requirements**

| | Sector | Encouraged Industries | | Restricted Industries | | Prohibited Industries | Total |
|---|---|---|---|---|---|---|---|
| | | Without ownership requirement | With ownership requirement | Without ownership requirement | With ownership requirement | | |
| | **TOTAL** | **293** | **57** | **49** | **37** | **33** | ***469*** |
| 1 | Agriculture, Forestry, Animal Husbandry and Fishery Industries | 11 | 1 | 1 | 2 | 3 | *18* |
| 2 | Culture, Sports and Entertainment | 1 | 1 | 1 | 4 | 11 | *18* |
| 3 | Education | 0 | 1 | 0 | 1 | 1 | *3* |
| 4 | Finance Industry | 0 | 0 | 1 | 4 | 0 | *5* |
| 5 | Health, Social Security and Community Welfare | 1 | 0 | 0 | 1 | 0 | *2* |
| 6 | Leasing and Commercial Services | 2 | 1 | 2 | 1 | 1 | *7* |
| 7 | Manufacturing Industry | 244 | 37 | 30 | 8 | 8 | *327* |
| 8 | Mining and Quarrying Industries | 3 | 6 | 5 | 3 | 3 | *20* |
| 9 | Production & Supply of Electricity, Gas and Water | 6 | 1 | 1 | 1 | 0 | *9* |
| 10 | Real Estate Industry | 0 | 0 | 2 | 1 | 0 | *3* |
| 11 | Scientific Research, Technical Services and Geological Exploration | 14 | 0 | 1 | 2 | 2 | *19* |
| 12 | Transportation, Warehouse Management and Postal Services | 7 | 7 | 3 | 4 | 2 | *23* |
| 13 | Water Conservancy, Environment and Public Utility Management | 2 | 2 | 0 | 1 | 2 | *7* |
| 14 | Wholesale and Retail Business | 2 | 0 | 2 | 4 | 0 | *8* |

Source: Adapted from China's Ministry of Commerce

**An Overview of "Forced" Technology Transfer Issues in China**




Source: Adapted from USITO

**Utility Model Applications for the Top-15 Offices, 2010**

| Office | Application Year | | | | |
|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | Share of total (%): 2010 | Growth (%): 2009-10 |
| Total | 313,000 | 399,000 | 496,000 | 100.0 | 24.3 |
| **China** | **225,586** | **310,771** | **409,836** | **82.6** | **31.9** |
| Germany | 17,067 | 17,306 | 17,005 | 3.4 | -1.7 |
| Republic of Korea | 17,405 | 17,144 | 13,661 | 2.8 | -20.3 |
| Russian Federation | 10,995 | 11,153 | 12,262 | 2.5 | 9.9 |
| Ukraine | 9,600 | 9,205 | 10,685 | 2.2 | 16.1 |
| Japan | 9,452 | 9,507 | 8,679 | 1.7 | -8.7 |
| Turkey | 2,992 | 2,882 | 3,033 | 0.6 | 5.2 |
| Spain | 2,682 | 2,560 | 2,640 | 0.5 | 3.1 |
| Italy | 2,200 | 2,307 | 2,456 | 0.6 | 6.5 |
| Brazil | 3,218 | 3,122 | 1,988 | 0.4 | -36.3 |
| Czech Republic | 1,183 | 1,382 | 1,608 | 0.3 | 16.4 |
| Australia | 1,255 | 1,320 | 1,465 | 0.3 | 11.0 |
| Thailand | 1,515 | 1,467 | 1,328 | 0.3 | -9.5 |
| Belarus | 967 | 1,119 | 1,089 | 0.2 | -2.7 |
| Poland | 719 | 780 | 945 | 0.2 | 21.2 |
| Others | 6,164 | 6,975 | 7,320 | 1.5 | 4.9 |

Source: Adapted from World Intellectual Property Organization

This is in reference to utility model patents. See page 7 paragraph 2 of testimony.

Chairman BROUN. Thank you, Mr. Shea.

I thank you all for your testimony.

Reminding Members that Committee rules limit questions to five minutes each. The Chair at this point will open the first round of questions. I now—the Chair recognizes himself for five minutes.

Dr. Atkinson mentioned that China often requires that U.S. companies create R&D facilities in China as a condition of market access. How does creation of an R&D facility lead to the transfer of R&D investments in intellectual property? And I ask both of you all that question. Maybe we will start with Mr. Shea and then we will come to Dr. Atkinson since you started off the——

Mr. SHEA. Well, I would say 20 years ago, western companies would happily transfer technology because the technology wasn't that advanced. But as production cycles have gotten much, much shorter, the Chinese know that they—they are not willing to accept just the old stuff. They know what is out there and what is new. So it is hard to say with respect to a specific facility.

Western companies go to China. From what they have told us, they put in significant protocols to protect that IP in that facility from theft. Whether it works or not is subject to question.

Chairman BROUN. Dr. Atkinson?

Dr. ATKINSON. So when I was in Nanjing about, I guess, a year-and-a-half ago on a delegation and we visited a Ford Motor Company facility there where, first of all, Ford had opened a factory—which, again, by Chinese rules they had to do a joint venture—and as a condition of the joint venture they had to open up an R&D laboratory. And as we were in the facility, we looked across the little road they were building another building and I asked what is that? And they said that is the second R&D facility to go with the second factory.

Now, what is the problem with that? There are two problems with that. One is that is R&D that Ford would otherwise would probably be doing here. And so we are missing out on those jobs and the technologies that would happen. And secondly, as Mr. Shea alluded to, that technology just doesn't stay within the Ford facility. Those are mostly Chinese scientists and engineers working in that facility who, some of them will take that technology to their joint venture partners; they will take it to other companies in China and just turn it over if you will.

Chairman BROUN. And exclude U.S. interest?

Dr. ATKINSON. Absolutely. The entire goal there is to fundamentally exclude U.S. company interest and foreign company interest over the next decade.

Chairman BROUN. Are either of you aware of any federal effort to proactively monitor the technology transfer issue as an economic policy matter rather than a national security matter? Dr. Atkinson?

Dr. ATKINSON. I am not. We have basically haphazard and not-very-well-coordinated efforts. I think this is an issue that the National Intelligence Committee—Service group is looking at as well as DOD because they see it as critical to our defense and intel interests. But they don't have any systematic—a way right now of looking at how bad this problem is. And we certainly don't do it out of the Department of Commerce or USTR, so it is very haphazard. We don't really know what is going on as much as we should.

Chairman BROUN. Mr. Shea.

Mr. SHEA. Mr. Chairman, in our 2011 report—I know Ranking Member Tonko asked for some policy solutions—in our 2011 report we have two recommendations—if I may read them—that may attempt to address this issue. First, we recommend that Congress hold hearings to assess the success of the strategic and economic dialogue in a Joint Committee on Commerce and Trade in addressing Chinese actions to implement its WTO commitments, including with regard to the issue of tech transfer. And in preparation for such hearings, Congress should request that the Government Accountability Office prepare an inventory of specific measures agreed to as part of these bilateral discussions. So let us see if these discussions, which are supposed to produce results, are actually producing results, specifically with respect to the issue of tech transfer.

The other issue—the other recommendation from our 2011 report is that Congress ask the Government Accountability Office again to undertake an evaluation of investments and operations of U.S. firms in the Chinese market and identify what federally supported R&D is being utilized in such facilities and the extent to which and on what terms such R&D has been shared with Chinese actors in the last 10 years.

Chairman BROUN. Very good. My time is just about expired, but if you all have any more specific solutions, I don't have time to ask my next question, but we will go forward. If you all have any other suggestions or solutions to try to monitor this, I would appreciate it.

Now, I will recognize Mr. Tonko for five minutes.

Mr. TONKO. Thank you, Mr. Chair.

Dr. Atkinson, you state in your testimony that, and I quote, "China is still largely a technologically developing nation forcing companies from developed nations to transfer their technology, and that is as a faster way to innovation success than engaging in the hard work to move up the technology learning curve as European and American companies have had to do." In your opinion, why is it that American firms are so quick to give away their technology inherited through generations of innovators and a federal investment when there are so many examples that the Chinese would just use this technology to compete not only in China, but also in other global markets and in America as in your example of high-speed rail?

Dr. ATKINSON. Thank you. I think there are two reasons. One is it is not just American firms, though in the high-speed rail case I think is a classic where Kawasaki transferred high-speed rail technology to the Japanese as a condition of them being able to sell them equipment for the largest high-speed rail system in the world, and then a few years later, the Chinese state-owned enterprise, started to outcompete them in third-party markets. So even countries where the firms have a longer-term horizon, they get forced to do this because they are faced with a Hobson's Choice. They can either do this or they are left out of the market completely. So that is why I think joint action is so important.

But I do think the second reason is that American companies are under much shorter time horizon pressures to show returns be-

cause of the way our equity markets are structured, and so they oftentimes don't have the ability to—or the patience to say, well, you know, we are not going to do this because we know in ten years it is going to be a problem. It is going to help us right now but in ten years it is going to be a problem. I think the way equity markets are structured in other countries sometimes gives other companies more leeway.

Mr. TONKO. Thank you. And the United States Government has invested heavily in promoting electric vehicles, and as you note in your testimony, Dr. Atkinson, the Chinese Government precluded the Chevy Volt from qualifying for alternative fuel vehicle subsidies unless GM agreed to transfer their engineering secrets to a joint venture in China. However, GM did not let this deter them from entering this market. They conducted a separate agreement to transfer battery and other electric car technology to a Chinese joint venture.

So while I agree that China should be opposed in the policies they are currently pursuing to gain advantage, how can we encourage a new firm culture that would more aggressively protect American ingenuity and innovation? And do firms bear no social responsibility for the consequences of their conduct?

Dr. ATKINSON. Well, what I would worry about is if we somehow said to U.S. companies you can't transfer any technology under duress to China and somehow we could pass a rule or a law to that effect—my worry would be that it would just simply give foreign competitors the competitive advantage. We see this, for example, in the competition between Airbus and Boeing. China is the largest-growing aviation passenger market in the world—jet market in the world—and if you are not in that market as either Boeing or Airbus, you are in tough shape. Now, if we were to, for example, say to Boeing you just can't—you can't help COMAC; they are a state-owned enterprise. You can't help them; you can't do anything. They are just going to basically say, okay, we are going to get everything and we will pressure Airbus.

So I think—again, I go back to this. I think that is where we have to basically go—with the Japanese who are facing this exact same problem and the Europeans—and we have to all act collectively because you are right, Mr. Tonko. It is not in the interest of U.S. companies to do this, but it is very, very hard for them to resist this.

Mr. TONKO. And finally, if either of you could make recommendations from the Federal Government perspective, and I know that Mr. Shea offered some comments, but are there any within the programs of agencies that we oversee such as NIST or DOE or NSF or NASA? Is there anything you would recommend with—in association with those given agencies?

Dr. ATKINSON. I haven't thought extensively about that, but just a couple of quick thoughts. One, you could require that those agencies who are funding technology projects monitor the use of those technologies and where they end up being commercialized as a first step, which we don't do. So again, it is not to say that—I would not put a hard ban on anything. There are real reasons why you might want to go and commercialize something in Canada, for example, but we at least ought to know exactly what is going on with

these when we are transferring or helping firms with federally supported R&D at home.

Mr. TONKO. Mr. Shea, any thoughts?

Mr. SHEA. Well, NASA's Jet Propulsion Laboratory was the subject of a major hacking attempt. I would make sure that NASA reported to you whether there was any dissipation of technology as a result of that hacking. This is not related to those specific agencies, sir, but this antitrust exemption is something that we recommended in 2010 that Congress explore with respect to the airplane industry. We looked at the offset requirements being imposed on airplane manufacturers. If you want to sell airplanes to China, you have got to build facilities in China. And we thought maybe the major companies should get together and collectively resist these efforts, and that may require an antitrust exemption. So that should be looked at.

Mr. TONKO. Thank you very much.

Chairman BROUN. The gentleman's time is expired.

I now recognize Dr. Benishek for five minutes.

Dr. BENISHEK. Thank you, Mr. Chairman.

This is really interesting to me and to see how this works because obviously these American companies, you know, are doing this voluntarily because they want the business that is available in China. And the thing that Mr. Tonko just talked about to me seems to be the crux of the issue is that if companies want to do this freely, I don't see, you know, why they shouldn't, but if the American people are paying for the technology, you know, shouldn't there be some sort of a limit as to, you know, what these private companies can do with the technology if it is somehow associated with a taxpayer investment?

I mean that to me is the crux of the issue. I mean they wouldn't do business in China unless they thought it was in their best interest to do that, but since some of the funding comes from the government, is there—we touched a lot over—a little bit with Mr. Tonko. Was there some way of doing that that is not completely—you know, I mean you mentioned doing something in Canada and I can understand that, but is there some way we can do that better without completely closing off that, you know, the good part of the market? Do you understand my question? I am just trying to figure that out.

Dr. ATKINSON. I do. I—just a couple of points and then I will try to provide an answer. I do think that a lot of this is not voluntary, that—the intellectual property theft, the—so there are certain parts where they just take it.

Dr. BENISHEK. Yeah, okay.

Dr. ATKINSON. And then there is another component where companies give it, but they essentially have a gun to their head. So it is——

Dr. BENISHEK. But then they could not do business. I mean they could just not go there. I mean they have that option, right? I mean that is the truth.

Dr. ATKINSON. It is true, but as I think as I said in my opening, they have that option with regard to Zimbabwe, but they don't have it—they really don't have it with—you know, they could just say we are going to avoid China and Brazil and India, but it essen-

tially—Mr. Tonko's point, that also consigns them to a long-term competitive disadvantage and perhaps decline because they are just not in those markets——

Dr. BENISHEK. Right.

Dr. ATKINSON. —and their competitors would be in those markets and gain the market share. So I do think that it is worth exploring, perhaps some rules about where—what companies can do if it is clearly federal technology that has been supported where there is a grant involved for an R&D project. I think it is definitely worth exploring where those can be commercialized and made.

One thing I would really strongly encourage you to do is as we move forward, which I hope we do as a country with a trade agreement with Europe, I think that is a very important next step that we get the Europeans to adopt the same policies with regard to all of their science and technology and framework programs. Again, if we both have the same policies about what our technology can be used for, it is going to be harder for those countries to play us off against each other.

Dr. BENISHEK. So as I understand, the Chinese don't really prosecute this theft part of it, you know, the actual people stealing the technology, which you must have, you know, safeguards in that in other countries where employees are not allowed to do that, but apparently that is not enforced in China or that is a problem.

Mr. SHEA. Yeah, I think that is fair to say, Congressman. They have great laws. The laws are on the books. They have courts but they don't enforce the laws effectively. Going back to your question about R&D and taxpayer-funded R&D being used in China and then taken in China, the recommendation that we made in 2011 I think has been acted upon by Congressman Rohrabacher if I am not mistaken, so thank you for doing that. So that might be—getting a handle on the problem, getting a handle on the extent of what is going—what is being siphoned out would be a good first step.

I just want to share this issue of competitive pressure and, you know, forced technology transfer; you are right; it is voluntary. I mean no one is forcing you to do business in China but companies, because there is such a large market, feel compelled. And I had a conversation that still sticks in my memory about 20 years ago. I guess it was 1990. I was part of a group that met with Akio Morita, who is the founder of Sony, a great innovative company at the time. And one thing that he said that the U.S. did wrong was it had too short a—companies had too short a time horizon. And he specifically said this—quarterly reporting is a bad thing because it forces companies to look for short-term profits rather than a longer investment timeline. That thought has stuck with me for these many years.

Dr. BENISHEK. I thank you.

I will yield back the remainder of my time.

Chairman BROUN. Thank you, Dr. Benishek.

Next person I will recognize is my friend from North Carolina, Mr. Miller, for five minutes.

Mr. MILLER. Thank you, Dr. Broun.

Mr. Shea, my questions are along the lines of what you just spoke to, corporate governance issues. I do agree with your testi-

mony. I agree with the premise of this hearing that we should resist the policies of the Chinese Government. They are harming our economy. They are harming American workers, our ability to take advantage of our own investments and innovation. But I wonder if we are naive to think that the corporations that are subject to this are truly American corporations. They really do want to resist—that they really are being bullied into doing something contrary to the interests of the American economy and that that—and they really want to do that.

In the last presidential campaign for all the talk of small business, which I think we should encourage, you would think that we were a nation of yeoman farmers and shopkeepers and artisans when in fact our economy is being dominated by enormous corporations, increasingly enormous corporations. The Economist ran a piece on that just two or three weeks ago. And they are not really American corporations. They may be incorporated in Delaware but they are international, international in the scope of their operations, international in their ownership.

There was a piece this morning or yesterday in a publication—internet publication called Business Insider by Henry Blodget that said a theme that I have heard before that a generation ago American corporations saw themselves as having a variety of stakeholders, including their own workers, including the communities in which they have operations, including their own country. They were American corporations. And that has now been replaced completely by a philosophy or at least a stated philosophy that everything that corporate management did should be in the interest of making more profit. Is it the case that corporations are going to take into account at all the interest of the American economy? Should they? And how do we make that so?

Mr. SHEA. Well, that is a very big statement. I will say, you know, Clyde Prestowitz has written a book on this issue——

Mr. MILLER. You have got two minutes and 25 seconds to answer this.

Mr. SHEA. Okay. The pressures—corporations are with—American corporations are undoubtedly expanding. Their operations are moving on a global basis. I don't think we can expect U.S. companies to ignore 2.5 billion consumers in China and India. So I completely appreciate the desire of U.S. companies to reach out to these markets and to tap into that consumer base. The question is what about our own productive capacity? What about our own manufacturing capacity? How does that diminish it?

Our Commission looks at the U.S.-China relationship. We don't look at U.S. domestic policies or U.S. corporate governance policies. That is not something that we feel is within our Commission's mandate. But I think you raised some very good points. Do the interests of large corporations converge with the interests of the United States Government? It used to be said that what is good for GM is good for America. Is that necessarily true today? Again, this is not something that we—these are not the types of issues that—I am copping out here, sir. These are not the issues that the Commission itself looks at, but I think you have raised some valid points that deserve exploration. And there has been some good work on corporate governance issues by people like Prestowitz, by

people like Ralph Gomory and others who have some very strong opinions on these matters.

Dr. ATKINSON. Now, I——

Mr. MILLER. Mr. Atkinson, yeah.

Dr. ATKINSON. So when I got my Ph.D. at North Carolina back in the '80s, I was involved a lot with the state government——

Mr. MILLER. You are playing to your audience now.

Dr. ATKINSON. And—but I will note one of the things that North Carolina built its economy on after World War II and even through the '80s was the movement of firms from the north who frankly had no loyalty to the north. They were Michigan companies or Delaware companies or Massachusetts—I mean they came down to North Carolina because the business climate was good. We are seeing that same dynamic today all around the world, and I think we can like it or we cannot like it. I really don't think there is anything we can do about it.

I think fundamentally it is incumbent upon us to do two things. One is to make the U.S. business environment the best in the world, which means in part protecting our multinational companies from these pressures and this extortion that they are facing overseas. The second thing, we have the highest corporate tax rate in the world now, we have the 27th-worst R&D tax credit, we haven't funded science and research the way other competitors have, so I think we have got to do much more of that.

Just on this point about what the companies' interests are, there is a very good book by a finance professor at Northwestern that came out last year called "Saving Capitalism from Short-Termism," and his argument is that the role of companies is to maximize shareholder value. And the problem is if U.S. companies increasing the maximized short-term shareholder value, not long-term net present value shareholder value. And that is exactly the dynamic we see in China.

So I think dealing with corporate governance is important but I don't think we have to sacrifice or get rid of the notion that companies are there to make a profit. They are just under pressures to make the wrong kind of profit I would argue today.

Chairman BROUN. The gentleman's time is expired.

I ask unanimous consent that Mr. Rohrabacher, who is not a Member of this Committee, be allowed to ask questions.

Hearing no objections, Mr. Rohrabacher, you are recognized for five minutes.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman.

This issue has a lot of layers to the onion, and we have heard the term extortion of our companies who go there and extortion of our business leaders. I think it is very hard to extort someone who is a willing accomplice.

We have had a couple generations now of CEOs who are Ivy League trained and part of their training isn't being loyal to the United States of America or to the people of the United States. Their Ivy League training, which quite often includes hostile analysis of current history and past history, making the United States look not like the—what most of believe it should be, which is the bastion of liberty and justice and the shining city on the hill like Mr. Reagan used to talk about, but instead that we are the—at the

root cause of much of the world's problems. So we have CEOs who were trained in terms of their history not to be necessarily fans of their own country. And then we have CEOs who seem to also—so they don't feel obligated to do something that is in the best interest of our country—they just don't. There are many CEOs who don't believe that.

But what is even more disturbing, Mr. Chairman, is we have CEOs who don't feel they have to do something in the best interest of their own corporation, much less their own employees. And we have just heard testimony talking about the short-term business decision by our corporations. Well, those are short-term business decisions made by specific individuals who head those corporations who may take short-term profit, give themselves bonuses, and get the hell out before the long-term consequences to their own company is being felt, much less the employees of the company.

I think we are all in this together as Americans whether you are talking about employees or employers, and we should be. I mean the world depends on us having a certain dedication to the principles that our Founding Fathers thought was going to unite Americans. But we don't seem to have it. And I don't believe it is a product of extortion. I think it is a product of people joining on to what I see as an enemy camp, but at least it is an immoral force in this world.

Are many of the—let me just note I think we need to restructure our system so that the corporate leaders do have long-term interests rather than the short-term quarterly profits that we heard about today. I personally believe, for example, that we should add into our system incentives to promote employee ownership, which would let the employees help pick the CEOs, give them a voting share, make sure they are involved with this whole process so that in the long run employees think of themselves as 20- or 30-year employees. CEOs see themselves as three- to five-year CEOs. Thus their notion is not as long-term as their own employees.

But back to the basic issue here. How many of these companies that are benefitting from ripping off American technology development and the taxpayers who have paid for much of the development of the technology of these corporations who the CEOs are going over there and making these sweetheart deals—how much of that—how many of these companies that are benefitting over there are owned by the People's Liberation Army? I mean you keep hearing the Chinese corporations buying this and buying that. Are these really fronts for the Chinese military?

Mr. SHEA. I don't know. That is the short answer. But people in America need to realize that the Chinese economy is significantly owned by the state. We have estimated that the Chinese economy, 40 to 50 percent of it is state-dominated. So that the issue of dual-use capability is something that is very important.

We, last year, examined this issue with respect to U.S. support for the development of the Chinese aviation industry. There are a couple of very large Chinese aviation companies that want to make competitors to the Airbus and to the 737 and commissioned a research report that talks about the potential application of the technology that gets transferred for military purposes. The Chinese are already undergoing a significant military modernization program.

They have something called the J20, a fifth-generation stealth fighter.

Mr. ROHRABACHER. Let me interrupt at this point because my time is running out. Let me just note——

Mr. SHEA. Sure.

Mr. ROHRABACHER. —everything he is saying, Mr. Chairman, is sinful against the United States of America. If we have a potential enemy—I think China is our adversary today, but it certainly has to be put in the potential enemy category—for us to have paid for the research and development that helped our airlines and our aviation and our aerospace industry, for them then to work in joint projects with the Chinese that then give Chinese companies these capabilities. And then we find out—which we will find out—that these Chinese aviation companies are all fronts for the People's Liberation Army, that is the people who actually own those companies, we will have transferred the equivalent—and by the way, I understand the Boeing was negotiating with the Japanese. Just six months before Pearl Harbor, they were negotiating with selling the Japanese the blueprints for the B–17, which turned out to be most important bomber of World War II. We need to make sure that our technology is not going to someone who will be killing Americans five years down the line or ten years down the line.

Chairman BROUN. The gentleman's time is expired.

Mr. ROHRABACHER. Thank you.

Chairman BROUN. And I agree with the gentleman from California. Economic as well as military espionage is a tremendous issue that we face, but that is not the real issue here in this hearing. But I would be very eager to hear maybe until this date even further what you are saying, Mr. Shea and Dr. Atkinson, any further comments on that question.

I thank you all for your valuable testimony today. Again, thank you for your flexibility and willing to come back and short-term notice for cancellation last time and willing to come back for this valuable testimony that you have given to us here today.

I know I have many other questions that I will present to you all for written response, and I will appreciate an expedited response because it will be included in the official record. I know other Members of the Committee may have other questions also besides the ones that I have. We need to make sure that we have a way of monitoring this information transferred to these foreign entities, particularly in cases such as Mr. Rohrabacher was talking about that maybe even going to our enemies, both economic enemies as well as military enemies. So I am eager to hear you all's suggestions about how we can monitor these things and even develop policies that will help prevent the transfer, particularly of those—the research and development that is funded by our taxpayers to these foreign entities and where they take advantage of our largess.

Members of the Subcommittee, you all have two more weeks for additional comments from Members to present questions to these very good witnesses. And I want to thank the Members of the Subcommittee since this will be the last hearing of this Congress. I am not sure who is going to be on this Committee in the next Congress.

Mr. Tonko, I have had a tremendous pleasure working with you during this Congress as my Ranking Member, and I appreciate your help. It has been great. When we see throughout Congress so much bipartisan—very little bipartisanship and very little mutual interests by Members on opposite sides of the aisle, it has been great working with you and working with your staff. And I thank the Democrat staff as well as all the Republican staff for working with me and with us on our side. And it has been just a tremendous blessing to me to work with you, Mr. Tonko. And I appreciate your being here in this situation.

We will see what the next Congress offers as far as this Committee is concerned and look forward to where this Committee goes because we have a lot of things, as you know and the Committee knows on both sides, that we have looked at a lot of issues in this Congress that I am still interested in and want to continue to pursue investigation and oversight of many issues. And this is another one that we just absolutely I think is critical for our taxpayers, American citizens, and American businesses that we prevent the transfer of the research and development, particularly that that is paid for by U.S. taxpayers and that other foreign companies benefit from that investment by our taxpayers and then turn around and compete unfairly in a global market. So it is something that I am going to continue to be interested in.

So thank you. I thank you, Mr. Tonko, and——

Mr. TONKO. Mr. Chair?

Chairman BROUN. Mr. Tonko, you are recognized.

Mr. TONKO. Yes, Mr. Chair, if I might. Thank you for the partnership and sincere desire to build cooperation. Your staff, too, is to be commended for working so well with our team. And I enjoy this Committee assignment and we thank you for the cooperation.

Chairman BROUN. Well, thank you, Mr. Tonko. And a closing remark, Mr. Miller was the Chairman in the last Congress and I was the Ranking Member, and I just want to tell you, as you leave Congress, I am going to miss you being on this Committee and I have enjoyed working with you, Mr. Miller, and I wish you well in whatever endeavors that you undertake as you go back to North Carolina or whatever you do. And I wish you well and tremendous amount of blessings. And I wish everybody in the Committee staff as well as Committee Members a very Merry Christmas and happy holidays.

With that, the witnesses are excused. The hearing is now adjourned. And thank you all very much.

[Whereupon, at 11:11 a.m., the Subcommittee was adjourned.]

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