The Good, the Bad, and the Ugly of Innovation Policy:

Executive Summary

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EXECUTIVE SUMMARY

Innovation has become the central driver of economic growth and thus a key focal point of countries' economic development strategies as they seek to gain global competitive advantage. Accordingly, countries are increasingly designing national innovation strategies that seek to coordinate their policies toward skills, scientific research, information and communications technologies (ICTs), tax, trade, intellectual property, government procurement, standards, and regulations in an integrated approach designed to drive economic growth through innovation.

In general, this focus on innovation is a net positive for the world, as discoveries, inventions, and innovations made in one place ultimately spillover to the benefit of citizens worldwide. However, countries' focus on innovation carries risks as well as benefits, because countries can implement their innovation policies in ways that are either: 1) "Good," benefiting the country and the world simultaneously; 2) "Bad," failing to benefit either the country or the world; 3) "Ugly," benefiting the country at the expense of other nations; or 4) "Self-destructive," actually hurting the country while benefiting others. This report places countries' actual implementation of specific innovation policies across the nine categories listed above within the "Good, Bad, Ugly, Self-destructive" framework, giving policymakers a concrete guide to promoting constructive innovation policies while avoiding the ruinous ones.

Notwithstanding the fact that countries can readily implement a range of "Good" innovation policies benefiting themselves and the world, over the last several decades the global economic system has become increasingly distorted as many countries have embraced mercantilist strategies seeking to realize innovation-based growth through a negative-sum, beggar-thy-neighbor, export-led approach. Such "Ugly" and "Bad" (and occasionally "Self-destructive") mercantilist strategies are designed around the view that achieving economic growth through exports is preferable to achieving economic growth by raising domestic productivity levels through innovation, particularly by leveraging ICTs. These nations, such as China, are not so much focused on innovation as on technology mercantilism, specifically the manipulation of currency, markets, standards, IP rights, etc., to gain an unfair advantage favoring their exports in international trade. As Adam Smith observed in *The Wealth of Nations,* by favoring exports, such nations "have been taught that their interest consisted in beggaring all their neighbors. Each neighbor has been made to look with an invidious eye upon the prosperity of all the nations with which it trades, and to consider their gain as its own loss."

Countries' innovation activity should be found at all points across the innovation value chain, including in products, services, business and production processes, organizational models, and business models and at different points in the innovation process, including

conception, research and development, transfer (the movement of the “technology” to the production organization), production and deployment, and marketplace usage. But far too many countries place the vast majority of their innovation focus on supporting the manufacturing and export of internationally tradable products, while giving very short shrift to their domestic services industries. Indeed, building their economies around high-productivity, high-value-added, export-based sectors, such as high-tech or capital-intensive manufacturing sectors, appears to be the path that nations such as China, Germany, Indonesia, Malaysia, Russia, and others are following, in the footsteps of Japan and the Asian tigers Hong Kong, South Korea, Singapore, and Taiwan before them. These countries place a dominant focus on tradable goods exports—often abetted by mercantilist practices—as their path to economic growth, while neglecting the opportunity to spur growth by raising the productivity of the non-traded sectors of their economy, particularly services industries, and especially through the more extensive and sophisticated application of information and communications technology.

Countries pursue mercantilist policies for a number of reasons, but principally because they harbor one or more of these four beliefs: 1) that goods, and particularly tradable goods, constitute the only real part of their economy; 2) that moving up the value chain is the primary path to economic growth; 3) that they should become autarchic, self-producing economies; or 4) that mercantilist policies actually do work.

As explained above, many nations believe that goods constitute the only real part of their economy through which they can drive a Keynesian expansion (growth) multiplier and therefore see exports and large trade surpluses as good (and imports bad), in and of themselves, as a target of economy policy. Furthermore, these nations believe that the primary path to economic growth lies in moving up the value chain from low-wage, low-value-added industries to high-wage, high-value-added production. These countries are willing to engage in forms of predatory pricing on international markets, sacrificing short-term losses in order to grow long-term, high-value-added production. By doing so, they hope to erode the production base of advanced industrial nations, with the goal of ultimately knocking industry after industry out of competition, if possible, in order to reap long-term job gains.

Some countries even pursue mercantilist, export-led growth strategies out of a desire to realize national economic self-sufficiency. Indeed, China’s current economic strategy could basically be described as autarky—a desire to become fully economically self-sufficient and free from the need to import goods or services. Chinese policy appears to be to identify every single flow of money exiting the country and shut off the spigot, an ambition evident in China’s efforts to establish a domestic base of commercial wide-body jet aircraft production and in its desire to establish indigenous standards across a range of technologies so it need not make royalty payments on intellectual property embedded in foreign technology standards.

But the primary reason countries purse mercantilist strategies is because they believe those strategies will prove effective. And the reality is that, while some mercantilist policies do not work, some mercantilist practices actually do work and help these countries—at least temporarily—especially if other countries fail to stand-up to and contest such practices. China's Ugly practices, such as currency manipulation and forced IP transfer, have in fact boosted the country's exports, moved productive activity to its shores, and hurt foreign producers (and in many cases knocked them out entirely). The "success" of China's mercantilist practices is reflected in the country's share of world exports jumping from 7 percent to 10 percent between 2006 and 2010 and in the country's $400 billion and $426 billion current account (trade) surpluses in 2007 and 2008, respectively. For example, one set of Ugly mercantilist strategy nations may benefit from pertains to using import restrictions or export subsidies for high-value added, non-GPT and non-capital goods industries, such as automobiles or steel. When a country such as China intervenes to support auto or steel production through export subsidies or import restrictions, what the country loses in terms of allocation inefficiency (the fact that its automobile prices are higher) it may gain in value-added from higher-wage jobs in the auto sector. Moreover, seeing the perceived success of China's mercantilist strategies (or the Asian Tigers before it) motivates others to follow suit. For example, Japanese companies including Sony and Toyota have demanded their government take action to devalue the yen out of a fear of being undercut by exporters in China, South Korea, Singapore, and Taiwan—all countries that aggressively manipulate their exchange rates.

Thus, while some would argue that countries that field mercantilist practices are only hurting themselves, and therefore that countries' mercantilist strategies are Bad *prima facie*, the reality is more complex. In evaluating what is "Good" innovation policy and what is "Bad" or "Ugly," it is important to consider both the impacts of innovation policies on the nation adopting them and the impacts on other nations with which they trade. Moreover, some policies may be good for workers, while bad for consumers and taxpayers, or vice versa. In addition, some policies may be beneficial for the economy in the short-run, but harmful in the long-run. For example, countries' mercantilist practices tend to damage foreign workers' interests much more than foreign consumers' interests. At the same time, the report shows that, for a country that employs mercantilist practices, the effect on its domestic workers and consumers/taxpayers is decidedly less appealing over the long-run than the short-run. Therefore, a more nuanced understanding of the trade, innovation, and globalization debate is required.

But while mercantilist practices can indeed prove effective, they are only effective over the short-term. Ultimately, mercantilism is a fundamentally flawed strategy, healthy neither for the countries that practice it nor for the rest of the world, which fails to build countries' long-term innovation capacity. The flaws in mercantilist strategy include the following:

- They are fundamentally unnecessary and counterproductive; countries have much more effective means to drive economic and employment growth at their disposal;

- They place the wrong emphasis on economic growth; neglecting the far greater and more sustainable opportunity to drive economic growth by raising productivity across-the-board, particularly in non-traded sectors, and particularly through the application of ICTs. In fact, mercantilist policies imperil the health of these sectors;

- They are unsustainable, for both the country and the world;
- Many, especially those distorting ICT and capital goods sectors generally, are Bad and fail outright;
- They contravene commitments countries have elected to accept in participating in global trade agreements and undermine the international trading system.

Mercantilist countries—and the apologists who would defend them—argue that the only way they can grow is through ever-more high-value-added exports that run up massive trade surpluses as if they were collecting gold bullion. But the notion that the only way countries can achieve a full employment economy is by manipulating the trading system with mercantilist practices and running ever-growing trade surpluses is flat wrong. It contradicts basic macroeconomics, which observes that a change in GDP equals the sum of the changes in consumer spending, government spending, corporate investment, and net exports (exports minus imports). In other words, mercantilist countries could grow just as rapidly, and probably even more so, by pursuing a robust domestic expansionary economy that drives growth through increased domestic consumption, and greater business or government investment. Thus, the mercantilist perspective that exports are indispensible to growth misses both that: 1) the surer path to lasting economic growth lies through raising the productivity of all sectors of an economy, particularly the domestic ones in larger countries where services industries constitute a much larger share of the economy; and 2) that nations' trade surpluses do not leave their people better off; rather they leave them poorer.

For example, China ran up a $426 billion global trade surplus in 2008 alone. But this surplus did not really boost China's living standards, because that value represents $426 billion of value that China transferred outside its borders; China's residents are actually poorer by this amount. In fact, if China didn't run this trade surplus, then Chinese households could see up to a 17 percent increase in their disposable income. In aggregate, this is an enormous figure; China could produce a dramatic increase in its citizens' standard of living if only it invested its surplus on products and services, such as medical, construction, and ICT products and services, which could increase the quality of life of its citizens, and this would simply require that China spend its would-be surplus on imports, instead of on Treasury bills.

In effect, mercantilist countries mistakenly believe that promoting exports rather than increasing productivity-across-the-board is the superior path to economic growth. Yet it is productivity growth—the increase in the amount of output produced by workers per a given unit of effort—that is the most important measure and determinant of economic performance for a nation. Economies can increase their productivity in two ways, either through the "growth effect" or the "shift (or mix) effect." In the first, all sectors in a country, all its firms and industries, become more productive, usually by investing in new technologies or improving the skills of its workers. For example, a country's retail, banking, and automobile manufacturing sectors all increase their productivity at the same time. The second method, the "shift (or mix) effect," is more dynamic and disruptive: low-productivity firms and/or industries lose out in the marketplace to high-productivity firms and/or industries that are more efficient and can cut prices or boost quality to gain market share. While both are important, this report explains in depth how across-the-board productivity growth, rather than a shift to higher-value-added sectors, will be more important for larger areas, including virtually all nations, because their consumers will capture a greater share of the productivity gains.

Indeed, the lion's share of productivity growth in most nations—and especially large- and medium-sized ones—comes not from changing the sectoral mix to higher-productivity industries, but from all firms and organizations, even low-productivity ones, boosting their productivity. Overall, the evidence shows that it is changes in organizations (e.g. businesses, government, non-profits, etc.) that drive productivity, with around 80 percent of productivity growth coming from organizations improving their own productivity and only about 20 percent coming from more productive organizations replacing less productive ones. Put succinctly, the productivity of a nation's sectors matters more than a nation's mix of sectors, and this means countries could grow more reliably and sustainably if they focused on raising the productivity of all sectors of their economy, not just blowing out their export sectors.

But perhaps the greatest weakness of countries' mercantilist-based, export-led growth strategies is that they are unsustainable—both for the world and for the country itself. First, the international economic system just can't sustain it any longer. Neither markets in the United States nor Europe—nor even both combined—are large enough if nations such as Brazil, China, Russia, and Japan continue to promote exports while limiting imports as their primary path to prosperity, making export-led growth strategies an unsustainable approach for the countries that practice them and for the rest of the world.

Second, a predominantly export-led growth focus is unsustainable for countries themselves. For example, Japan boasts many world-leading exporters of manufactured products—Sony, Toyota, Toshiba, etc.—but because it has never really focused on the non-traded sectors of its economy, only about one-quarter of its economy is growth-oriented, it can't boast of any world-class services firms, it trails badly in the usage of ICTs, and it conspicuously lacks its own eBays, Amazons, and Googles. Indeed, countries such as Argentina, China, Japan, India, South Korea, and others that have been far more concerned with ICT production than ICT consumption have missed a crucial point: the fact that the vast majority of economic benefits from technology, as much as 80 percent, come from the widespread usage of technology, while only approximately 20 percent of the benefits of technology comes from its production. As MIT's Erik Brynjolfsson has eloquently noted, it's about how firms like Wal-Mart use ICT to revolutionize their industries, not where those ICT products were manufactured, that truly drives countries' productivity and economic growth. But mercantilist countries have been more concerned with manufacturing ICT (and other high value-added) products and selling them on international markets rather than applying them to make their own domestic service industries more productive and competitive. Moreover, this mindset ignores that the lack of productivity gains in domestic service sectors can imperil the long-term competitiveness of nations' manufacturing industries producing their traded goods, because service industries represent intermediate inputs to other industries and boost those industries' competitiveness. Ultimately, countries relying predominantly on export-led strategies risk being a one-trick pony; they may reach the technological frontier and boost growth for a while, but they are liable to languish there, or perhaps even decline if global export markets become saturated, and as countries with more robust service sectors pass them by.

Per the points elaborated above, mercantilist policies that place high-tariffs or other import restrictions on general purpose technologies (GPTs) such as information and communications technologies (ICTs) are purely Bad and fail outright. Such policies have the effect of raising the cost of domestic ICTs and making local industries that need to leverage ICTs less competitive. For example, Argentina has imposed tariffs on assembled computers, though not on computer parts, with the goal of creating a domestic computer assembly industry. But the result has actually been to create an inefficient computer industry, where up to one-third of computers sold in Argentina are hand-assembled in small shops. Such policies have only served to raise the price of ICTs for domestic players, inhibiting the diffusion of information technology throughout domestic service sectors such as financial services, retail, and transportation, and causing productivity growth in these sectors to languish. As part of its import substitution industrialization strategy, for many years India placed high tariffs on ICTs in an effort to keep out foreign ICT products in an effort to spur creation of a domestic computer manufacturing industry. But research by Kaushik and Singh found that, in reality, for every $1 of tariffs India imposed on imported ICT products, the country suffered an economic loss of $1.30.

Finally, mercantilist strategies are flawed because they contravene the established rules of the international trading system and because they undermine confidence in trade's ability to produce globally shared prosperity, thus reducing global consumer welfare. What mercantilist countries like China must understand is that when they join the World Trade Organization (WTO) or other trade agreements, they are joining a trading system, not an exporting system, and if they want to reap the benefits of participating in a community of trading nations, then they must adhere to the commitments they made under the WTO, which bind them to not manipulate their currencies, to not offer export subsidies, to not manipulate standards, to not unfairly favor domestic products and services in government procurement, to not force intellectual property transfer or require local production as a condition of market access, etc.

If neither mercantilist-based, export-led growth strategies nor sole reliance on emerging high-technology industries are the path to sustainable economic growth, what is? The answer is "innovation economics," which holds that the path to higher incomes lies in raising productivity by boosting innovation in all firms in all sectors. Indeed, raising the productivity of domestic non-traded sectors such is not trivial; it can have profound economic impacts. For example, even despite some extremely productive and innovative multinational firms, overall Japanese productivity is just 70 percent of U.S. rates, while South Korea's productivity is just 50 percent of U.S. rates. The gap is even greater in developing nations. Overall productivity in India is but 8 percent of U.S. rates, while Chinese productivity is just 14 percent of U.S. rates. India's retail goods sector productivity is just 6 percent of U.S. levels and the productivity of its retail banking sector just 9 percent of U.S. levels. If India could raise productivity in those two sectors to just 30 percent of

U.S. levels, it would raise its standard of living by over 10 percent. Attracting more high-value-added export firms is not likely to be the major path to growth in the long-run; rather, boosting productivity in the vast swaths of the economy that are not traded internationally is the more effective strategy.

Therefore, the world must move beyond perceiving the pursuit of economic growth through innovation among nations as a zero-sum game to embracing a perspective that views mutual global prosperity as the goal. A new approach to globalization is needed, one grounded in the perspective that markets drive global trade; that countries should adhere to their trade agreements; that genuine, value-added innovation drives economic growth; and that constructive competition forces countries to ratchet up their game by putting in place constructive innovation policies that leave all countries better off.

To be sure, there is nothing sinister about countries engaging in fierce innovation and economic competition and there is nothing wrong with countries competing to win—so long as they are competing according to the rules of international trade established by the global community. In fact, when a county intensely competes to win, within the rules of the system, doing so benefits both itself and the world. This is because fair competition forces countries to put in place the right policies on technology transfer, the right tax policies on R&D tax credits, the right corporate tax policies with lower tax rates, the right education policies, etc. So when the United States expands its R&D tax credit, or France trumps the United States by offering an R&D tax credit six times more generous, or Denmark creates innovation vouchers for small businesses, or the Netherlands and Switzerland offer tax exempt status for profits generated from a newly patented product, or a country lowers its corporate tax rates because its public sector is so efficient, this is all tough, fair competition, that forces other countries to raise their games in kind by enacting many of the Good policies enumerated in this report. The problem comes when countries start to cheat and contravene the international economy's established rules. These practices—the Ugly ones enumerated in this report—can indeed help countries win. But not only do these policies harm other countries, they then encourage other countries to cheat, undermining the regime utility of the international trading system, causing the system to devolve into a competition where every country is incented to cheat, and to beggar-thy-neighbor, and so the overall system decays, the competition becomes worse, and the global economy suffers.

At the end of the day, developed countries are going to have to abandon the notion that countries using mercantilist policies are somehow going to play by the rules if we just play nice with them. The only way to stop countries' systematic manipulation to gain competitive advantage by beggaring their neighbors is if the nations which engage in it less than others—principally the United States, the Commonwealth nations, and most European countries—alongside with international organizations such as the World Bank and the International Monetary Fund (IMF) agree to cooperate to fight it.

The WTO must play a much more aggressive role in understanding that what has been transpiring in the global trading system is not occasional and random infractions of certain trade provisions by countries that need to be handled on a case-by-case basis, but rather that some countries continue to systematically violate the core tenets of the WTO because their dominant logic toward trade is predicated on export-led growth through mercantilist practices. The World Bank and other multinational development agencies need to reformulate their approach to development with a focus on fostering only globally constructive innovation policies, supporting the "Good" innovation policies when countries implement them and explicitly withdrawing support when countries attempt to implement "Ugly" or "Bad" innovation policies. If these measures prove insufficient, it may be time to think about establishing a new trade zone, perhaps modeled on the Trans-Pacific Partnership, which would exclude nations that persist in pursuing mercantilist policies that violate the principle of free and fair trade.

Ultimately, all nations need to balance their focus at least equally on their traded and non-traded sectors as economic growth and job creation engines, turning particular attention toward raising the productivity and innovativeness of their non-traded sectors, in part by ensuring that they deploy robust digital infrastructures and give their firms access to the most sophisticated general purpose technologies (GPTs), especially ICTs. The only sustainable path to raising living standards for the vast majority of citizens in developing and developed countries alike will be to leverage innovation to raise economies' productivity across-the-board.

In conclusion, this report offers the following policy recommendations and policy principles designed to maximize global growth and innovation through the implementation of Good innovation policies.

Policy Recommendations

- National and international economic, trade, and development organizations, including the World Bank, International Monetary Fund, Overseas Private Investment Corporation (OPIC), Agency for International Development (USAID), Export-Import Bank, European Bank for Reconstruction and Development, and others, should both stop promoting export-led growth as a solution to development and tie their assistance to steps taken by developing nations to move away from negative-sum mercantilist policies, thereby rewarding countries whose policies are focused on spurring domestic productivity.

- Policymakers should be cognizant of the nature of countries' innovation strategies, and promote those that benefit countries and the world simultaneously, while pushing back against those that benefit countries at the expense of other nations.

- The World Trade Organization should annually publish all new trade barriers (including non-tariff barriers), whether they are allowed by its rules or not.

- The United States, European nations, and others should form a new trade zone, modeled upon the Trans-Pacific Partnership, of like-minded countries committed to the principles of free and fair trade, excluding those countries whose "dominant logic" toward trade is characterized by mercantilist, export-led growth strategies.

Policy Principles

- The central goal of nations' economic policies should be spurring productivity growth and innovation in all firms and sectors, including both their traded and non-traded sectors, and in services as well as goods production. In doing so, countries need to balance the interests of both their workers and their consumers/taxpayers over both the short-term and the long-term.

- Countries' support both for factor conditions—including skills development, investing in innovation infrastructure, supporting knowledge production and transfer, and ensuring the widespread use of ICT—and for competitive domestic markets is fundamental to achieving productivity growth and innovation.

- Fair competition to implement the best "Good" innovation policies forces other countries to ratchet up their game, enhancing the competitiveness of all countries and raising the welfare of all citizens.

- As the WTO has established, markets should set currency rates, not governments; policymakers must insist that countries enjoying the privileges of WTO status adhere to this obligation.

- Corporations should make their own location decisions, not governments. Forcing offsets, transfers of intellectual property, or sourcing of production activities as a condition of market access should be unacceptable.

- Competitive domestic markets let foreign firms in and encourage foreign direct investment (FDI).

- Countries should respect property rights, while being neutral with regard to country of ownership.