

The Contributions of Intangible Property to the U.S. Economy

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About the Author

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Executive Summary

America today continues to confront a competitiveness challenge of too little economic growth and too few jobs. The good news is there is a future in which America can create millions of good, knowledge-intensive jobs connected to the world via international trade and investment. Doing so will require sound U.S. policies that are based on a sound understanding of how innovative American companies succeed in today's dynamic global economy. In particular, policymakers must understand the long-standing and increasingly important contributions that intangible property (IP) makes to American jobs and to American standards of living—and must understand the value of a tax system that does not discriminate against the IP performed by American companies. There are three central findings of this white paper.

- *IP has long played a central role in driving growth in U.S. output, jobs, and income—and this role will be even more important in the years ahead.* Discovering and developing IP—i.e., ideas with value—boosts output in existing companies and industries and creates entire new industries. All this innovation has long created new jobs and higher standards of living for all American workers and their families. Maintaining IP's central contributions to the U.S. economy will require smarter public policy now and in the future, given a number of indicators that America's innovation strength is waning.
- *Globally engaged U.S. companies, which create the large majority of America's IP, increasingly rely on their worldwide operations to maximize the creativity and benefits of their U.S. inventions.* Globally engaged U.S. companies have long performed the large majority of America's IP discovery and development. Increasingly central to America's IP success is the ability of U.S. companies to deploy their IP abroad, e.g., via foreign operations. To maximize the impact of and return on their U.S. innovations, American companies expand abroad not only through exports but also through foreign-affiliate production and sales that rely on U.S.-parent IP. Using U.S. ideas abroad tends to complement, not substitute for, American IP investments—both in terms of the quantity and the quality of U.S. innovation. The potential is great for American IP activity to connect with the continued expansion of global markets; indeed, this potential may be critical in halting America's innovation ebb.
- *Because foreign-affiliate production and sales tends to complement American IP investment, raising the U.S. tax burden on IP-related income of globally engaged U.S. companies—especially if this burden fell differentially on IP income compared to other sources of income—would tend to reduce the quantity and quality of IP activity in the United States. This would harm not just IP-intensive industries but the U.S. economy overall.* The logic that higher taxation of IP-related income would somehow boost IP activity in the United States is incorrect. A higher U.S. tax burden on IP-related income would stifle, not stimulate, the attractiveness of innovating in America. For America overall, this IP tax burden would also erode the strength of the U.S. economy, given IP's foundational role in boosting U.S. jobs and incomes. Today, amidst a still-fragile U.S. economic recovery, when the United States critically needs even more IP dynamism to boost output, jobs, and incomes, U.S. tax policy should not dampen this dynamism by discriminating against IP.

Section I
The Need to Foster Innovation and Intangible Property
for America Today and America in the Future

America today continues to confront a competitiveness challenge of too little economic growth and too few jobs. The fundamental economic question facing America today is whether the country can craft policies to sustain an environment in which innovative U.S. companies expand their activities in America connected to economic dynamism abroad.

The good news is there is a future in which America can create millions of good, innovation-intensive jobs connected to the world via international trade and investment. Doing so will require sound U.S. policies that are based on a sound understanding of how innovative American companies succeed in today's dynamic global economy. In particular, policymakers must understand the long-standing and increasingly important contributions that intangible property (IP) makes to American jobs and American standards of living—and must understand the value of a tax system that does not discriminate against the IP developed by American companies. There are three central findings of this white paper.

First, IP has long played a central role in driving growth in U.S. output, jobs, and income—and this role will be even more important in the years ahead.

Discovering and developing IP—i.e., ideas with value—boosts output in existing companies and industries and creates entire new industries. All this innovation has long created new jobs and higher standards of living for all American workers and their families. Indeed, for many generations, the overwhelming majority of growth in U.S. output, incomes, and overall standards of living has been driven by new ideas that fostered new products and processes.

In 2010 the 75 IP-intensive industries in America—defined based on the intensity of their creation of copyrights, patents, and trademarks—employed about 27.1 million Americans. Through their supply chains, these IP-intensive industries supported another 12.9 million U.S. jobs that year. Because of the high productivity of IP-intensive companies, their 34.8% share of U.S. gross domestic product (GDP) exceeded their 18.8% share of U.S. jobs. The average compensation in these IP-intensive industries was 42% higher than in the rest of the private sector—an income premium that had nearly doubled from just 22% in 1990.¹

IP's essential role in the health of the U.S. economy continues to rise both because of slowing labor-force growth and because of America's evolving comparative advantage in the global economy. Many rightly hope that America's innovation strengths will persist. However, maintaining IP's central contributions to the U.S. economy will require smarter public policy in the future, given a number of indicators that America's innovation strength is waning.

Second, globally engaged U.S. companies, which create the large majority of America's IP, increasingly rely on their worldwide operations to maximize the creativity and benefits of their inventions.

Globally engaged U.S. companies have long performed the majority of America's IP discovery and development. In 2010, the U.S. parents of U.S.-headquartered multinationals performed \$212.5 billion of R&D. This was about 68.8% of the total R&D performed by all U.S. companies—and was 84.3% of the worldwide R&D performed by these companies.²

Increasingly central to America's IP success is the ability of its companies to deploy that IP abroad. To maximize the impact of and return on their U.S. innovations, globally engaged U.S. companies serve customers through their foreign-affiliate production and sales that rely on U.S.-parent IP. U.S.-headquartered multinational companies in IP-intensive industries account for especially large shares of these industries in America, and their foreign-affiliate operations account for especially large shares of their global output.

Contrary to what is sometimes presumed, connecting foreign customers with U.S. ideas tends to complement, not substitute for, American IP investments—both in terms of the quantity and the quality of U.S. innovation. Over the past generation this synergy has grown thanks to many global forces, such as much faster economic growth abroad than in America. In the future, this synergy looks set to grow even stronger. The potential is great for American IP activity to connect with the continued expansion of global markets. Indeed, this potential may be critical in halting America's innovation ebb.

Third, because foreign-affiliate production and sales tend to complement American IP investment, raising the U.S. tax burden on IP-related income of U.S. multinational companies—especially if this burden fell differentially on IP income compared to other sources of income—would tend to reduce the quantity and quality of IP activity in the United States. This would harm not only IP-intensive industries but also the U.S. economy overall.

The logic that higher taxation of IP-related income abroad would somehow boost IP activity in the United States is incorrect. Through the many channels documented in this report, IP-intensive companies in America flourish when their innovations can be successfully used abroad as well as at home. Greater ability to connect U.S. IP with customers both abroad and at home supports, not supplants, knowledge discovery and development in America.

A higher U.S. tax burden on IP-related income would stifle, not stimulate, the attractiveness of innovating in America. For IP-intensive industries, this tax burden would likely be borne in several ways. It would tend to mean fewer start-up IP companies being created in the United States—at a time when new companies, which have long been a key source of America's innovation, have been born at declining rates in America. It would also tend to mean more innovation being done abroad in foreign-headquartered global companies that would not face the same U.S. tax burden on IP income.

For America overall, this IP tax burden would also erode the strength of the U.S. economy, given IP's foundational role in boosting U.S. jobs and incomes. Today America faces a still-fragile economic recovery, a still-damaged labor market, and a rising chorus of voices worrying that the country's IP dynamism has permanently faded. At this time when the United States critically needs even more IP dynamism to boost output, jobs, and incomes, U.S. tax policy should not dampen this dynamism by discriminating against IP income.

Section II
***Intangible Property's Contribution to the U.S. Economy:
Strong Past, Uncertain Future***

Intangible property (IP) has long played a central role in driving growth in U.S. output, jobs, and income—and this role will be even more important in the years ahead.³

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The Past: The Massive Contribution of Innovation and IP to America's Economy

Since the founding of the American republic, IP has played a central role in driving growth in U.S. output, jobs, and income. This central economic fact of knowledge discovery and development via innovation has been widely established by academic and policy research in recent decades, and it is widely recognized by leaders in business, in government, and beyond. For example, here is an opening of a recent White House report on innovation in America.

The history of the American economy is one of enormous progress associated with remarkable innovation ... Innovation—the process by which individuals and organizations generate new ideas and put them into practice—is the foundation of American economic growth and national competitiveness. Economic growth in advanced countries like the United States is driven by the creation of new and better ways of producing goods and services, a process that triggers new and productive investments.⁴

Here is a similar statement on the centrality of IP to America's economic growth and overall success from a new landmark study by the U.S. government of IP and the U.S. economy that focused on a subset of IP: patents, copyrights, and trademarks, or “intellectual property.”

Innovation, the process through which new ideas are generated and put into commercial practice, is a key force behind U.S. economic growth and national competitiveness ... Innovation protected by intellectual property rights is key to creating new jobs and new exports. Innovation has a positive pervasive effect on the entire economy, and its benefits flow both upstream and downstream to every sector of the U.S. economy. Intellectual property is not just the final product of workers and companies—every job in some way, produces, supplies, consumes, or relies on innovation, creativity, and commercial distinctiveness.⁵

IP created through innovation has been the foundation of America's economic strength. Over the arc of American economic history, many innovations have been incremental—slight refinements of products and processes that better served companies' customers. Other innovations have been truly disruptive and transformational, creating entire new industries and jobs—often while simultaneously displacing existing companies, jobs, and technologies.

The cumulative economic benefit of IP developed via innovation—indeed, the cumulative impact on the average standard of living of a country's citizens is best expressed in terms of productivity: the average value of output of goods and services a country produces per worker. The following quotation from Nobel laureate Paul Krugman makes this point concisely.

Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker ... the essential arithmetic says that long-term growth in living standards ... depends almost entirely on productivity growth ... Compared with the problem of slow productivity growth, all our other long-term economic concerns—foreign competition, the industrial base, lagging technology, deteriorating infrastructure, and so on—are minor issues. Or more accurately, they matter only to the extent that they have an impact on our productivity growth.⁶

The economics of this “essential arithmetic” for why productivity matters is very simple. Broadly defined, a country's standard of living rises with the quantity and quality of goods and services its citizens can consume: people achieve economic well-being by consuming goods and services such as food, clothing, and medical care. Consuming these items requires some means to pay for them, however. For almost all people, their income is the primary—often the only—means they have to pay for consumption. In turn, people's income comes from producing goods and services, usually by working with others in firms. Thus, the more and better quality goods and services people produce—that is, the more productive they are—the more income they receive and the more they can consume. Higher productivity means a higher standard of living.

How can a country raise its productivity? There are two basic means. One is to save and invest to accumulate the other inputs people work with to produce things. The most important other input people need is capital, broadly defined as goods and services that help people make other goods and services—e.g., buildings, machinery, and software.

The second way to raise productivity is to improve the technological know-how for transforming inputs into outputs thanks to innovation. New products and processes allow workers to make new and/or more goods and services. What makes innovation so potentially powerful for productivity is that many ideas don't depreciate with extensive use (unlike, e.g., capital goods). Thus, the more ideas a country has today, the easier it is to produce additional ideas tomorrow.

So, what do the data say has driven America's rising productivity—and thus average standards of living—over the generations? A large body of academic and policy research has found that the overwhelming majority of America's growth in productivity and living standards over the 20th century was driven by new IP and the resulting technological advances of new products and processes.

Robert Solow, in seminal work that ended up being a major reason for being awarded the Nobel prize in economics, calculated that the very large majority of U.S. growth during the first half of the 20th century was driven by innovation and technological progress. Of the rise in real GDP per person-hour in the United States from 1909 to 1949, he concluded that “It is possible to argue that about one-eighth of the total increase is traceable to increased capital per man hour, and the remaining seven-eighths to technical change.”⁷

Looking at the second half of the 20th century, an authoritative study found that for growth in U.S. per capita GDP from 1950 to 1993, 80% was accounted for by greater discovery and development of innovative ideas fostered by the combination of rising educational attainment and rising research and development (R&D) effort.⁸

And looking at the most recent period of strong U.S. productivity growth that ran for several years starting around 1995, the majority of that growth was driven by faster technological innovation in information-technology (IT)—one of the most IP-intensive industries. Post-1995, technical change has accounted for well over half of U.S. per capita GDP growth.⁹

Substantial research has found that IP and innovation matter because the social benefits of knowledge often exceed its private benefits—in the jargon of economics, discovery of ideas generates “positive externalities” through several channels (such as worker mobility, and the more-general property that ideas, different from nearly all goods and services, are easily shared). A number of studies have found that the social return to R&D exceeds the private return by a factor of at least two. Section IV of this report will return to the positive externalities of knowledge creation, in the context of discussing tax policy and IP creation by U.S. companies.¹⁰

Public policies that help foster and protect IP and innovation have long been an essential ingredient to America's overall economic success. Indeed, America's Founding Fathers thought the establishment and protection of IP rights to be so critical that the U.S. Constitution (Article I, Section 8, Clause 8) grants to the U.S. Congress the power to “promote the Progress of Science and useful Arts by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” Over time, through entities such as the U.S. Patent and Trademark Office, the U.S. government has sought to balance the IP rights needed to incent innovation investments against the economy-wide benefits that flow from broad dissemination of the new IP created by these investments. Here is how the USPTO describes this balance.

When companies are more confident that their ideas will be protected, they have the incentive to pursue advances that push efficiency forward, costs down, and employment up ... The granting and protection of intellectual property rights is vital to promoting innovation and creativity and is an essential element of our free-enterprise, market-based system. Patents, trademarks, and copyrights are the principal means used to establish ownership of inventions and creative ideas in their various forms, providing a legal foundation to generate tangible benefits from innovation for companies, workers, and consumers. Without this framework, the creators of intellectual property would tend to lose the economic fruits of their own work, thereby undermining the incentives to undertake the investments necessary to develop the IP in the first place.¹¹

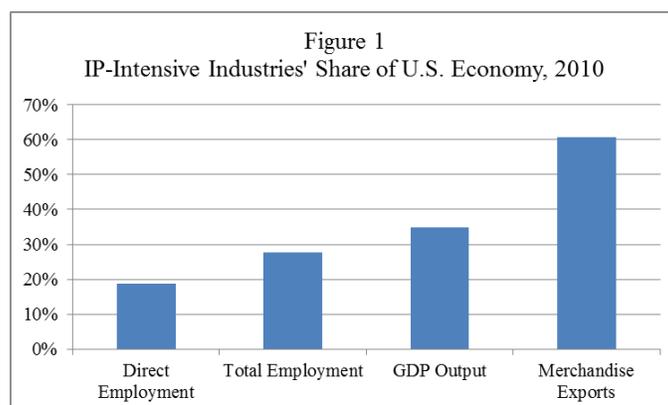
The strength of America's IPR system in fostering innovation has been widely acclaimed by leaders in both the private and public sectors: e.g., "The United States still has one of the best legal systems in the world to protect intellectual property rights. This has made America a leader in IP-intensive industries such as pharmaceuticals, software, and entertainment." More generally, this IPR system has been one key policy among many that have supported innovation in America: "Strong protection of intellectual property rights, business-friendly bankruptcy laws, a flexible labor force, and an entrepreneurial culture and legal system that favor risk taking and tolerate failure are among the framework conditions that have kept the U.S. at the forefront of innovation. Another crucial American advantage has been its openness to foreigners"—especially because of immigration's contribution to the talent, such as engineers and scientists, that discover, develop, and implement IP.¹²

Again, substantial academic and policy research has demonstrated how appropriate IPR and other public policies have fostered America's innovation strength—especially when compared to other countries that are far less innovative. "Differences in levels of economic success across countries are driven primarily by the institutions and government policies (or *infrastructure*) that frame the economic environment in which people produce and transact. Societies with secure physical and intellectual property rights that encourage production [capital accumulation, skill acquisition, invention, and technology transfer] are successful."¹³ As will be discussed below, one important policy that shapes America's overall innovation success is tax treatment of IP.

The Present: The Strength of IP-Intensive Industries in America's Economy Today

IP's central role in driving growth in output, jobs, and income for the overall U.S. economy can perhaps best be seen at the level of individual companies and industries. Examples of innovative companies achieving great success thanks to their IP abound in the public lore: think of companies starting up in the garages of Silicon Valley (sometimes literally, other times proverbially) to become global leaders in technology and many other IP-intensive industries. These examples are clearly borne out in more-systematic research. Companies that produce more IP tend to be more successful on several dimensions including profitability, revenues, employment, and stock-market capitalization.¹⁴ Looking more broadly, entire new industries have been created by new IP—new industries that, as explained above, have boosted national output, created jobs, and raised standards of living.

The U.S. Department of Commerce recently undertook a landmark study aiming both to identify IP-intensive industries and also to document their productivity-leading characteristics and the overall economy. Drawing on records and resources such as the USPTO, this study identified 75 industries (out of 313 total) that produce large amounts of IP measured by the three forms of IP protection that entail government-granted or government-recognized legal rights: patents,¹⁵ copyrights,¹⁶ and trademarks.¹⁷ These industries were collectively defined to be “IP-intensive.” Figure 1 reports their share of several key dimensions of U.S. economic activity in 2010.



The key message of Figure 1 is that America’s IP-intensive industries in 2010 perform large shares of America’s economic activities that together support high and rising standards of living.

- *Employment:* IP-intensive industries directly employed 27.1 million jobs, 18.8% of total U.S. jobs (counting payroll jobs plus the self-employed and also unpaid family workers). IP-intensive industries supported an additional 12.9 million jobs indirectly through their supply-chain intermediate-input purchases of goods and services needed to make IP-intensive products. So, IP-intensive industries supported a total of 40.0 million U.S. jobs, 27.7% of the national total. If anything, this jobs tally is conservative because it does not examine indirect jobs downstream, e.g., in distribution and trade of IP-intensive products.
- *Output:* IP-intensive industries produced 34.8% of all U.S. output (measured in terms of GDP)—nearly \$5.1 trillion.
- *Exports:* IP-intensive industries exported \$775 billion of merchandise to the rest of the world. This constituted 60.7% of total U.S. goods exports. From 2000 to 2010, IP-intensive exports expanded by 52.6%.

For workers in IP-intensive industries, the bottom line of all these productivity-enhancing activities has been high and rising earnings. In 2010, average weekly wages in IP-intensive industries were 42% above that of other industries (\$1,156 versus \$815). This IP compensation premium has been growing over time: from 22% in 1990 and 38% in 2000 to 42% in 2010.¹⁸

Part of this compensation premium is explained by the higher average talent of workers in IP-intensive industries. 42.4% of workers aged 25 and older in IP-intensive industries had a bachelor’s degree or higher—versus just 33.2% in the private sector. IP-intensive demand is commensurately lower for those with some college or an associate degree (27.4% vs. 27.7%), for high-school graduates (25.2% vs. 28.9%), and for high-school dropouts (5.0% vs. 9.2%).

A number of IP-intensive industries have experienced very rapid growth in productivity, consistent with high innovation fostering high productivity. Here are average rates of growth from 2000 to 2005 in output per worker hour: 4.5% for Chemicals (which contains Pharmaceuticals); 3.7% for Machinery; 7.4% for Computers; 6.0% for Motor Vehicles; 5.3% for Medical Equipment; and 7.5% for Software Publishers. The same picture holds true over longer time horizons. Here are the similar rates of productivity growth, 1987-2010: 11.2% for Computers; 3.9% for Motor Vehicles; 3.6% for Medical Equipment; 13.5% for Software; and 10.5% for Wireless Telecommunications.¹⁹

The contributions to the U.S. economy of IP-intensive industries looks strong not only in and of itself, as indicated above, but also in relation to other countries as well. In recent years the United States remains the world's largest producer of many IP-intensive goods and services: in 2010, \$3.6 trillion of knowledge-intensive services and \$386 billion in high-technology manufactures, according to estimates by the U.S. National Science Foundation.²⁰

The Future: Signs that America's IP Strength Is Waning

Despite America's historic strength in creating IP and transforming IP innovations into new products, companies, industries, and jobs, concern is rising among leaders in both the private and public sectors that America's IP strength is waning. Signs of waning strength are apparent in a number of indicators, not only in relative terms in comparison to other countries but also in absolute terms as well on many indicators.

Perhaps the most alarming case for America's waning innovation strength has been made by the 2007 initial and 2010 follow-up *Gathering Storm* reports—alarming, not alarmist, because of the breadth of data brought to bear in this pair of studies for the National Academies of Sciences and Engineering by a distinguished committee comprised of leading academics, university presidents, CEOs of global firms, and Nobel laureates.

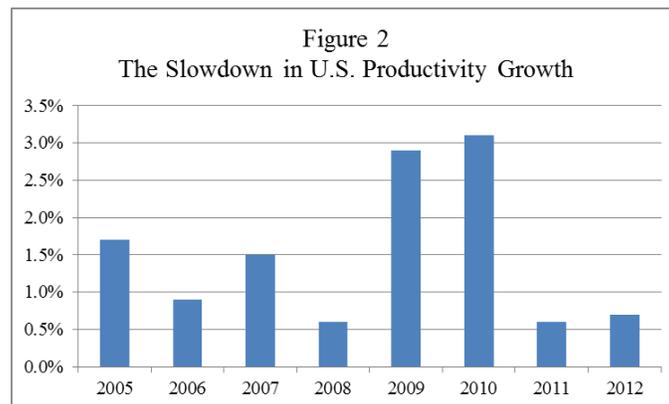
It is widely agreed that addressing America's competitiveness challenge is an undertaking that will require many years if not decades ... a primary driver of the future economy and concomitant job creation will be *innovation* ... So where does America stand relative to its position of five years ago when the *Gathering Storm* report was prepared? The unanimous view of the committee members participating in the preparation of this report is that our nation's outlook has worsened ... The only promising avenue, in the view of the *Gathering Storm* committee and many others, is through *innovation*. Fortunately, this nation has in the past demonstrated considerable prowess in this regard. Unfortunately, it has increasingly placed shackles on that prowess such that, if not relieved, the nation's ability to provide financially and personally rewarding jobs for its own citizens can be expected to decline at an accelerating pace ... The *Gathering Storm* Committee's overall conclusion is that ... the outlook for America to compete for quality jobs has further deteriorated over the past five years. The *Gathering Storm* increasingly appears to be a Category 5.²¹

The sobering message of this gathering-storm metaphor has been widely repeated: “America cannot rest on its laurels. Unfortunately, there are disturbing signs that America’s innovative performance slipped substantially during the past decade. Across a range of innovation metrics ... our nation has fallen in global innovation-ranked competitiveness.”²²

Start with assessments of America’s overall innovativeness compared to other countries. Several studies using many indicators and methodologies continue to reach the same startling conclusion: America’s overall innovativeness, though still high, is falling—in many ways at a rapid rate.²³

- The World Economic Forum’s latest ranking of countries’ “Total Competitiveness” has the United States at #5, down from #1, and down to #5 in the “Innovation” category.
- For 2012, the World Intellectual Property Organization (in conjunction with the business school INSEAD) ranks the United States at #10 in its Global Innovation Index—down from #1 in 2009.
- In 2009, the Information Technology and Innovation Foundation ranked 44 countries and regions on 16 core indicators of innovation capacity. The United States ranked #4. This was down from America’s #1 ranking based on 1999 data. But when assessing the rates of change in innovation capacity during 2000-2009 (that is, the rate of improvement on these 16 indicators), the United States ranked #43—ahead of only Italy. On this rate-of-improvement metric, China ranked #1.

Consistent with these studies of weakening U.S. innovativeness are the data on America’s slowing productivity growth. Figure 2 documents this productivity slowdown by reporting the annual growth in output per worker hour in the non-farm business sector (which many regard as the best indicator of the productivity of the U.S. private sector).²⁴



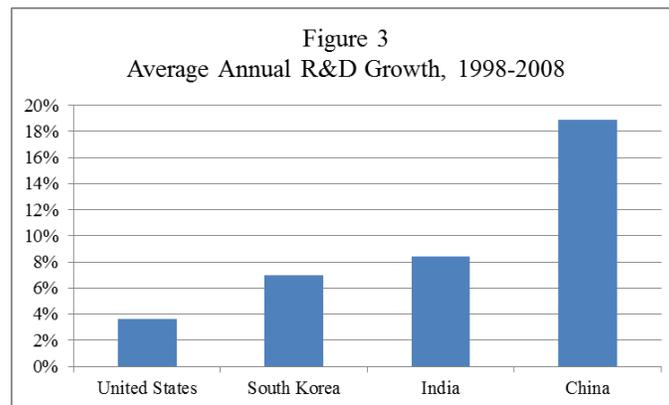
From the start of consistent U.S. data in 1947 through to 2004, this measure of U.S. productivity growth averaged 2.3% per year. Since that time, however, productivity growth has fallen to average just 1.5% per year. As Figure 2 shows, this post-2004 average was boosted by the unusually high rates of productivity growth in 2009 and 2010 that were driven primarily not by new IP and innovation but rather dramatic worker layoffs in the wake of the World Financial Crisis. Excluding those two unusual years, in the six other years in Figure 2 U.S. productivity growth has averaged just 1.0% per year—with just 0.6% growth in 2011 and 0.7% in 2012.

Several leading scholars on economic growth are now forecasting that U.S. innovativeness and productivity growth may be permanently lower. Indeed, one such scholar has recently forecast that, in contrast to the average growth in U.S. GDP per capita of the past 150 years of about 1.9%, “future growth in consumption per capita for the bottom 99% of the income distribution could fall below 0.5% per year for an extended period of decades.”²⁵

What explains America’s darkening IP and innovation outlook? Part of the cause is America’s waning investment in its innovation inputs—the people and resources dedicated to knowledge discovery and development. The pair of *Gathering Storm* reports cited above gather a wave of sobering evidence on America’s declining IP investments—both relative to America of the past and relative to more and more other countries of today.

- The U.S. share of global R&D spending dropped from 43.1% in 1998 to 37.3% in 2008.
- America now ranks 8th in OECD in national R&D spending as a share of GDP.
- The trend is even more worrisome. U.S. investment in R&D amounts to around 2.9% of GDP, a level that has changed little in three decades. In contrast, in the past generation South Korea has boosted R&D spending from less than 2% of GDP to 3.4%., Japan’s ratio has gone from 2.8% to 3.3%, and China’s from 0.7% to 1.7%.

Figure 3 documents America’s declining relative R&D performance. For several countries it shows the 1998-2008 annualized rate of growth of national R&D spending.²⁶



Over that decade, America’s average annual R&D growth of 3.6% has been far outstripped by South Korea’s 7.0%, India’s 8.4%, and China’s 18.9%. Overall, Asia in 2010 surpassed the United States in 2010 in the absolute dollar value of R&D spending—and the gap is only expected to widen.

At one level, the growth in innovation investments around the world presents a tremendous opportunity for America—to, if supported by the right public policies, connect its innovation efforts with those of the world. Indeed, the surge in global innovation investments has transformed how new ideas are discovered and developed—now much more across borders rather than just within. “The innovation process can no longer be confined within geographic boundaries. Globalization has ushered in a swiftly evolving new paradigm of borderless collaboration among researchers, developers, institutions, and companies spanning the world.”

This new global norm for discovering and developing IP is clearly evident in at the micro-level of patents, article writing, and other individual building blocks of IP. One prominent study examined nearly 20 million academic papers and over two million patents over 50 years and across all major disciplines “to demonstrate that teams increasingly dominate solo authors in the production of knowledge.”²⁷

At another level, however, *whether America can benefit from the rising IP strength around the world will depend on whether America can continue to design and implement public policies that maintain America’s IP strengths in this rapidly changing innovation world. It is possible that America will succeed in this way, but success is by no means guaranteed.* The assessment of many private and public leaders is that America’s position is precarious—in large part because U.S. policies across a wide range of areas, including tax policy, do not adequately reflect today’s globally-competitive reality. A recent report by a distinguished panel of government, business, and academic leaders framed the innovation challenge thus.

At the same time that the rest of the world is investing aggressively to advance its innovation capacity, the pillars of America’s innovation system are in peril ... It is not just policies directly addressing the development and deployment of new technologies but also policies concerning tax, trade, intellectual property, education and training, and immigration, among others that play a role in innovation ... In this dramatically more competitive world, the United States cannot return to a path of sustainably strong growth, much less maintain global leadership, by living off past investments and its capacity for innovation ... Nor can the U.S. compete on the basis of a policy approach that is the legacy of an era when American advantages were overwhelming and innovative activity tended to remain within our borders ... The U.S. has every opportunity to secure its economic leadership and national security well into the future. But it will require a fresh policy approach, one that ensures that the United States can compete, cooperate, and prosper in this new world of competitive innovation.²⁸

Whether America can restore its innovation strength will depend largely on whether America can craft IP-supporting public policies that reflect the competitive global economy of today—not the world economy of much of the 20th century when America was largely unrivaled in IP. That time of American predominance has passed. Today calls for policies—including, as will be discussed below, tax policies—that reflect the reality how America’s IP-intensive companies and industries actually operate in the 21st century global economy. This reality is addressed in the following sections of this report.

The central message of Section II is that IP has long played a central role in driving growth in U.S. output, jobs, and income. Discovering and developing new products and processes boosts output in existing companies and industries and creates entire new industries. This discovery and development has long created new jobs and higher standards of living for all American workers and their families. Maintaining IP’s many contributions to the U.S. economy will require smarter public policy now and in the future, however, given a number of indicators that America’s innovation strength is waning.

Section III

The Importance of Connecting American Intangible Property to the World

IP-intensive companies in America increasingly succeed not only because of their many important innovation activities documented in Section II but also because of their engagement in the global marketplace. Successful IP-intensive companies in America are deeply global as well—by exporting and importing and, even more so, by becoming multinational companies by establishing and expanding foreign affiliates via foreign direct investment (FDI).

One of the most important reasons for America's IP-intensive companies to engage the world is to access foreign customers in faster growing international markets. More than 95% of the world's population, with the large majority of the world's purchasing power, lives outside of the United States. New customers abroad can greatly expand a company's return on their innovation investments—and thus their overall revenues, profitability and employment—much more than can the U.S. market alone. Indeed, an important palliative of optimism against Section II's concerns about waning U.S. innovation strength is the potential—if U.S. tax and other policies are properly structured—for U.S. IP innovations to be deployed abroad as well as at home. Large and fast-growing global markets might greatly support U.S. IP investments by boosting their overall return far beyond what can be realized only in America.

High-innovation companies expand their access to foreign customers not only through exporting but also through sales to and/or of their foreign affiliates in those other countries. Each company uses a rich range of business strategies that must be continually refined to remain competitive. For most companies, however, foreign-affiliate sales dominate the role of exports.²⁹

America's Most Innovative, IP-Intensive Companies Tend To Be Global Companies

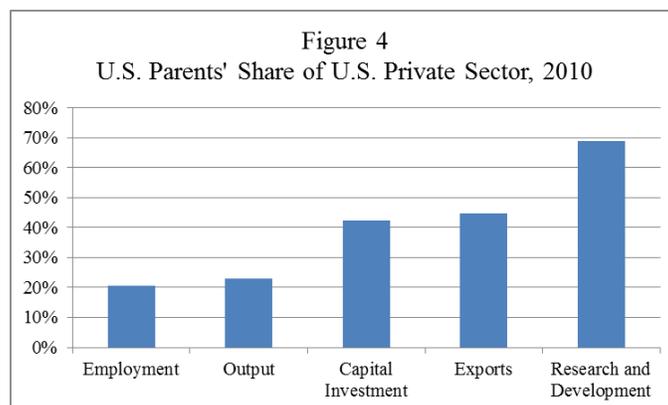
What do we know about the relationship between the IP, innovation, and productivity performance of companies and their global engagement?

Start with the following first important fact: there is now a large body of evidence for many countries that plants and/or firms exhibit large and persistent differences in innovativeness and productivity.³⁰ A second important fact that researchers have documented in recent years is a robust correlation between productivity and global engagement: plants and/or firms that export or, even more so, are part of a multinational enterprise tend to have higher productivity—and a bundle of other good-performance characteristics, such as innovative intensity and wages—than their purely domestic counterparts.³¹

Multinational companies are an important segment of globally engaged companies. *Multinational companies tend to exhibit even higher productivity than just exporters or importers do, and thus tend to appear at the very top of the productivity distribution of firms. They also tend to be very trade-intensive, capital-intensive, innovation-intensive, and high-wage not just relative to purely domestic companies but also just exporters and importers.*³²

The superior performance of U.S. parents of U.S.-headquartered multinational companies is shown below. Each year the Bureau of Economic Analysis (BEA) of the U.S. Department of

Commerce conducts a survey that, by legal mandate, tracks all multinational companies headquartered in the United States — for each multinational both its U.S. “parent” operations and also the operations of each of its foreign affiliates. Figure 4 reports the share of important activities in the overall U.S. private sector accounted for by the U.S. parent operations of U.S.-headquartered multinationals in 2010, the most recent year of available data.³³



The parent operations of U.S.-headquartered global companies perform large shares of America’s productivity-enhancing activities—capital investment, international trade, and R&D—that create tens of millions of well-paying jobs for their American workers.

- *Output:* Parent companies produced 23.0% of all private-sector output (measured in terms of GDP)—nearly \$2.9 trillion.
- *Capital Investment:* Parent companies purchased \$438.8 billion in new property, plant and equipment—42.3% of all private-sector capital investment.
- *Exports:* Parent companies exported \$573.3 billion of goods to the rest of the world. This constituted 44.8% of the U.S. total.
- *R&D:* To discover and develop new products and processes, parent companies performed \$212.5 billion of R&D. This was approximately 68.8% of the total R&D performed by all U.S. companies—a remarkably high share.

All these innovative activities contribute to millions of well-paying jobs in America. In 2010, U.S. parent companies employed more than 22.8 million U.S. workers, 20.5% of total private-sector payroll employment. Total compensation at U.S. parents exceeded \$1.6 trillion—a per-worker average of \$70,682, about a third above the average in the rest of the private sector.

Moreover, the important contribution of U.S. parent operations to the overall U.S. economy has been quite stable for decades. In 1988, for example, U.S. parents’ R&D spending was 72.5% of the economy-wide private-sector totals—not much above the 2010 share of 68.8%. This stability over time demonstrates their ongoing contributions to the overall U.S. economy.

The important fact that globally engaged companies—exporters, importers, and especially multinationals—exhibit higher innovativeness and productivity than do purely domestic companies begs the question about causation. Do high-productivity companies tend to become globally engaged? Or does global engagement trigger productivity gains? The answer is, “some of both.”

*First, there is clear evidence that high-innovation, high-productivity companies tend to select into being globally engaged—and, if particularly productive, being a multinational company.*³⁴ This resonates with much of the discussion above. More-innovative companies tend to be able to crack into foreign markets—and they also want to do so to boost returns on their IP investments.

Second, there is also clear evidence that global engagement spurs the productivity performance of companies. Some of the most comprehensive research on this issue has been conducted by the McKinsey Global Institute, which over the past generation has examined thousands of firms and industries in countries ranging from the United States to India. A repeated finding is that exposure to “global best-practice firms” via trade and FDI stimulates firm productivity, and conversely that protection from global best practices retards it. A clear statement of this globalization-to-productivity link appears in work of Nobel laureate Robert Solow.

A main conclusion of the studies ... has been that when an industry is exposed to the world’s best practice, it is forced to increase its own productivity ... The more a given industry is exposed to the world’s best practice high productivity industry, the higher is its relative productivity (the closer it is to the leader). Competition with the productivity leader encourages higher productivity.³⁵

This integration into the world economy boosts productivity in companies through many channels. One is the competitive pressure to reduce costs via innovating processes, creating or shifting firm scope towards new products, and becoming more capital intensive. Another is the spread of knowledge by learning from customers, suppliers, and competitors.

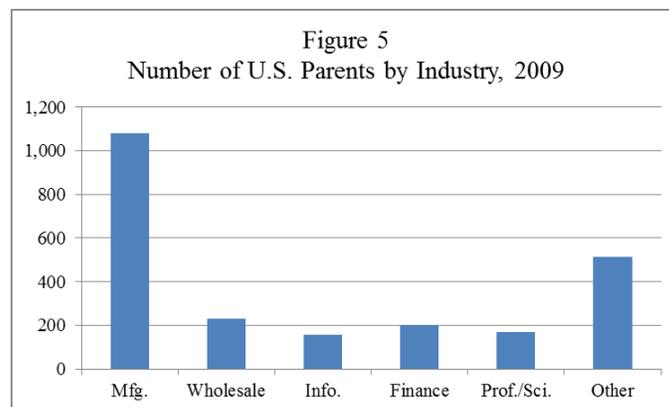
It is also important to stress that global engagement boosts industry-level productivity by spurring the reallocation of workers, capital, and other resources from struggling companies to more-productive innovators—often exporters and multinationals. As discussed in Section II, countries boost average productivity by reallocating resources across industries. Recent research has documented a very important second dimension of resource-reallocation gains: within all industries—regardless of the pattern of exports and imports—across companies towards the higher-productivity, globally engaged firms. An important part of this industry-level resource allocation is the contraction of low-productivity firms, along with the faster expansion of firms already engaged in international trade and investment. This reallocation from low- to high-productivity firms as a result of trade liberalization raises average industry productivity, a process that has been documented for the United States and for many other countries as well.

In addition to having very high productivity levels, for decades globally engaged U.S. companies have played an outsized role in driving aggregate U.S. productivity growth. This is the key finding of an important recent study that focused on productivity growth “because, even though studies of [multinational] performance based on microeconomic data have tended to identify effects on the *level* of productivity, if these underlying productivity-enhancing effects are spreading and/or filtering in over time, productivity aggregates will be affected in terms of growth rates (as well as levels).” Their results they rightly describe as “quite striking.”

Although the MNC [multinational corporation] sector accounts for only 40% of the output of nonfinancial corporations (NFCs) between 1977 and 2000, MNCs

appear to have accounted for *more than three-fourths* of the increase in NFC labor productivity over this period. Moreover, MNCs account for *all* of the NFC sector’s pickup in labor productivity in the late 1990s; accordingly, they account for *more than half* of the much-studied acceleration in aggregate productivity. And, while MNCs involved in the production of IT contributed significantly toward this acceleration, MNCs in other manufacturing and nonmanufacturing industries contributed significantly as well.³⁶

Lest one think from the above discussion that all globally engaged U.S. companies are monolithic, that is not the case. By virtue of having operations outside America, in scope and in aspiration all U.S.-based multinationals are expansive. Yet, there are striking differences in their size in terms of common metrics such as employment and sales. Figure 5 documents this wide range: For the most recent year of data available, 2009, it splits the 2,347 U.S.-based multinational companies into six groups measured by the number of U.S.-parent employees.³⁷



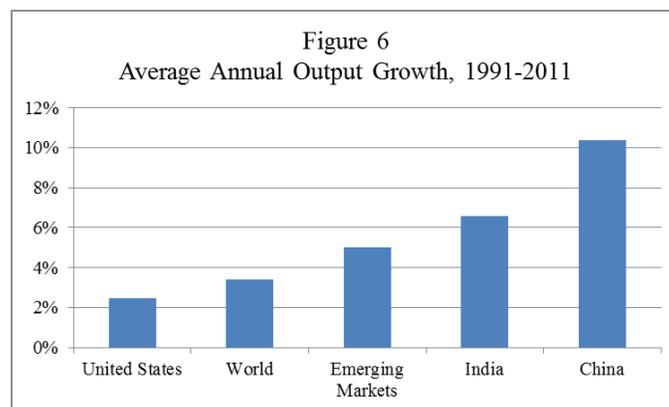
At one end of the spectrum, 415 companies each employ more than 10,000 people in America — indeed, an average of 43,630 workers each. At the other end of the spectrum, nearly 50% more multinationals, 613, each employ fewer than 500 people in America — and thus, as this report later discusses, fit the U.S. government definition of being a small or medium-sized enterprise (SME). Many of these SME multinationals are likely dynamic, fast-growth companies that were recently “born” into the group of U.S.-based multinationals by establishing their first foreign affiliate. Many of America’s largest and most successful companies today once started small, with the quintessential person pursuing a dream from a garage or dorm room. The fact that today 26.1% of U.S. multinationals are SMEs speaks to how diverse these important companies truly are. Section IV of this report will return to the important innovation role that small, start-up companies have historically played in America’s overall IP innovativeness.

The bottom line of this sub-section is that America’s most-innovative IP-intensive companies tend to also be globally engaged companies. A critical reason for this is that global engagement supports IP investments by boosting their potential return. The next sub-section will document that this imperative for connecting with the world has only been rising over time because of how much more quickly the rest of the world has been growing than America.

Growth in Demand Abroad Has Long Exceeded Growth in Demand in America

IP-intensive companies succeed in large part because they transform their new ideas into growth: they create new goods and services that they sell in expanding amounts to their customers. This demand growth is what underpins growth in profitability and, ultimately, jobs. Companies that are not growing revenues and profitability cannot sustainably boost their payrolls and paychecks, no matter how good their IP. *The demand growth that is the fuel for IP-intensive companies to succeed is increasingly outside of the United States.* This means that one of the main drivers of the global engagement of IP-intensive companies is access to demand and customers abroad. New customers abroad—served by activity both abroad and in America—can expand a company’s revenues, profitability and employment, much more than can the U.S. market alone.

The market-growth data are striking. Today the United States remains the world’s largest single-country market, with a 2012 GDP (the value of all newly produced goods and services) of \$15.7 trillion. Despite this still-large size of the U.S. economy, in the past generation the United States has been a slow-growth market compared with much of the world—and thus connecting with foreign customers has become more imperative for so many IP-intensive companies. Figure 6 reports average annual GDP growth for the past generation for the United States and elsewhere.³⁸



From 1991 through 2011, growth in U.S. GDP averaged about 2.4%. This was slower than what much of the world achieved during this time: averages of 3.4% for the overall world, 5.0% for emerging and developing countries, 6.6% in India, and a remarkable 10.4% in China. Indeed, one of the most notable features of globalization over the past generation has been the surge in economic growth in so many emerging markets—driven in large part by their governments opening their markets to international trade and investment.

The cumulative impact of much faster growth outside America is that the United States accounts for a steadily falling share of total world output. The U.S. share of world GDP steadily fell from 32.3% in 2001 to just 21.6% in 2011—a cumulative decline of 10.6 percentage points, or about one percentage point per year. Many fast-growth countries now account for rising shares of the world economy. Most notably, China in 2010 surpassed Japan as the world’s second-largest national economy. Another striking implication is by how much the dollar value of market-size growth in the United States is now exceeded by the rest of world. In 2011, GDP grew by \$568

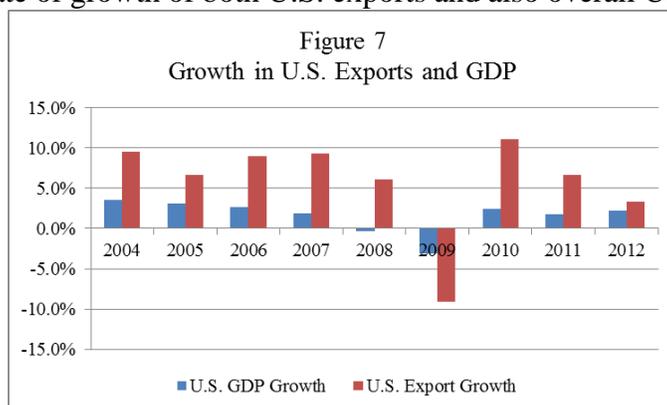
billion in the United States—but by more than \$6 trillion in the rest of the world and by a stunning \$1.2 trillion in China alone.

Rapid growth in foreign output has meant rapid growth in foreign income that fuels spending by both businesses and households abroad. The large size of the customer base in these foreign markets—and the size it soon may be—is striking. One recent study forecasts that, by 2025, annual household consumption in emerging markets will reach \$30 trillion—what they term “the biggest growth opportunity in the history of capitalism.” This study forecasts that the size of the world’s “consumer class” will rise from 2.4 billion people today to 4.2 billion people in 2025.³⁹

The bottom line is that to achieve strong revenue growth, many IP-intensive companies must expand their access to foreign customers. This has been increasingly true over the past generation, and all plausible forecasts are that this will remain true far into the future. Most current public and private forecasts are for the United States to average GDP growth of only about 2.5% over the next many years. For example, the nonpartisan Congressional Budget Office is currently forecasting U.S. real GDP will grow by an average of just 2.3% from 2012 to 2022. Future U.S. growth will be far below the market growth realized by dozens of other countries. The baseline economic growth that fuels much of the growth in U.S. IP-intensive companies—customers, revenues, profits, and jobs—will continue to be strongest abroad.

U.S. Companies Meeting Growth in Demand Abroad Through Exports

How do IP-intensive companies in America meet these expanding customer opportunities abroad? For many companies, exporting from America is an important way. Figure 7 documents how important exports have become for America overall. For several recent years, Figure 7 reports the rate of growth of both U.S. exports and also overall U.S. GDP.⁴⁰

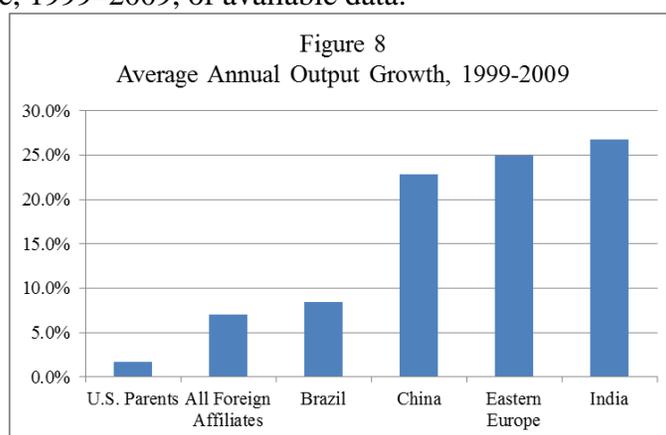


Every year since 2004, except during the trough of the worldwide recession in 2009, U.S. exports to the rest of the world have grown by more than has overall U.S. GDP. Much of this export surge has been driven by the faster GDP growth outside of America documented above. In absolute dollars, over the period covered by Figure 7, U.S. exports have more than doubled, from \$1.02 trillion in 2003 to \$2.18 trillion in 2012. Growth has been strong not just in exports of goods but also in exports of services. And growth has been strong in exports to a number of the fast-growth countries discussed previously. The net result has been a commensurate surge in the importance of exports to the total U.S. economy. In 2012, exports as a share of U.S. GDP exceeded 13.9%—the highest share since at least 1947 (the earliest year of these statistics).

Serving foreign customers via exports is increasingly essential to the competitive strength of IP-intensive companies in America.

U.S. Companies Meeting Growth in Demand Abroad Through Affiliate Sales

In addition to exports, many IP-intensive globally engaged U.S. companies serve foreign customers through another essential channel: sales by their foreign affiliates. Reflecting the broad global growth trends documented previously, U.S.-based multinational companies have grown revenues much faster outside America than inside. Figure 8 reports the average annual growth in real output for all U.S. parents, all foreign affiliates and affiliates in select regions over the most recent decade, 1999–2009, of available data.⁴¹



For U.S. multinational companies, output growth has been much faster abroad than at home. Over 1999–2009, value added grew much faster in their foreign affiliates—an annual average of 7.0%—than did value added in their U.S. parents—an annual average of just 1.7%. In turn, average affiliate output growth was even faster in many fast-GDP-growth countries discussed previously: 8.4% in Brazil, 22.8% in China, 24.9% in Eastern Europe and 26.8% in India.

And in contrast to the commonly heard assertion that foreign affiliates of globally engaged U.S. companies are producing goods and services simply to send back to America, these affiliate sales have long been predominantly to serve customers in host countries—especially fast-growing countries. In the words of the U.S. Department of Commerce, “The longstanding tendency for foreign affiliates to serve as a means for parents to access foreign markets rather than as a low-cost base of production from which to sell to their U.S. customers was evident in both 1999 and 2009.”⁴² The overwhelming majority of what affiliates produce abroad—91.1% in 2009—is sold abroad, rather than being imported back to the United States.

Rapid growth in revenues of foreign affiliates reflects a long-standing strategy for many U.S.-based multinationals of serving foreign markets through affiliate sales in host countries. Exporting is critical to many companies—but for many multinationals so, too, are affiliate sales.

There are several reasons to access foreign customers via affiliate sales of goods. One is avoiding the costs of political or natural barriers to exporting, such as host-country import tariffs and quotas. Another is after-sales maintenance and support. Many goods made by U.S. multinationals are IP-intensive; these intricate goods—aircraft engines, elevators, earth movers

—often require extensive after-sales maintenance and support services provided via affiliates. And a third is knowledge and goodwill gained from proximity to customers and local markets: on-the-ground presence is often required to understand the evolving needs of key customers. The importance of affiliate sales of services is immediately apparent. Wholesale trade, distribution, retail trade, consulting and financial services—the inherent nature of these and many other services means they cannot be cost-effectively exported. Indeed, many services can be made only when the producing firm physically co-locates with the consumer: retailers need local cashiers, insurers need local agents, hotels need local housekeepers and so forth.

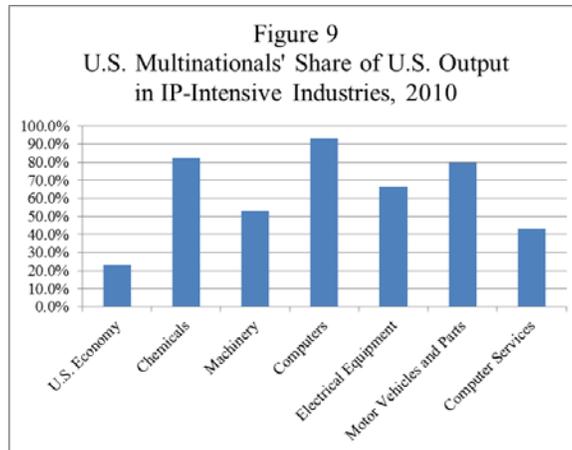
Just how critical affiliate sales are to U.S. multinationals successfully generating revenue in foreign markets can be seen by comparing the relative magnitudes of U.S.-parent exports and foreign-affiliate sales. In the most recent year of available data, 2010, U.S. parents exported \$573.3 billion in goods to foreign markets. That was a lot—but that same year the affiliates of these parents sold more than \$3.7 trillion in goods—over six times as much.⁴³

The optimal blend of parent exports and affiliate sales varies widely both across companies and over time. For U.S. multinationals altogether, the relative importance of affiliate sales has been rising over time. Some multinationals serve foreign customers almost entirely through parent exports; many others do it almost entirely through affiliate sales. To remain competitive, companies must continually refine their best strategy of exports and affiliate sales. No single strategy works best for all companies at all times. *The critical fact for U.S. IP-intensive companies is the support that foreign sales—through whatever mix of exports and foreign-affiliate sales—brings to their U.S. innovation investments. Foreign customers boost the returns on U.S. discovery and development efforts.*

*The Global Engagement of U.S. IP-Intensive Industries:
Even Stronger than for Other Industries*

The first part of Section III documented the important fact that America’s most-innovative IP-intensive companies tend to also be globally engaged. A critical reason for this is that global engagement supports IP investments by boosting their potential return. Further evidence on how important global engagement is to IP-intensive industries is revealed by looking within the group of all U.S. multinational companies to focus on those that are especially IP-intensive in that they operate in the set of IP-intensive industries examined in Section II.

Global engagement being especially important for IP-intensive companies should be reflected in these industries being even more “multinational-intensive” than other industries. One indicator of this multinational-intensity is the degree to which U.S. economic activity in industries is accounted for by the U.S. parents of U.S.-based multinationals. In IP-intensive industries, the share of activity accounted for by these U.S. multinationals should be higher than this share in other industries. Figure 9 documents just how critical multinationals are to U.S. IP-intensive industries. For the year 2010, the most recent year of available data, it reports the share of value-added output accounted for by the U.S. parent operations of U.S.-headquartered multinationals—first in the overall U.S. private sector, and then for six of America’s main IP-intensive industries for which this share can be calculated in publicly available data.⁴⁴



The key message of Figure 9 is that in America's IP-intensive industries, a much larger share of overall activity is accounted for by U.S.-headquartered multinational companies than is the case in the overall U.S. economy. The U.S. parents of these multinationals account for 23.0% of all private-sector output. But within IP-intensive industries, this share is much higher: 82.3% in Chemicals (which contains pharmaceuticals), 53.2% in Machinery, 93.0% in Computers, 66.4% in Electrical Equipment, 79.4% in Motor Vehicles, and 43.5% in Computer Services. The imperative for America's IP-intensive industries to support their innovation efforts by connecting with global markets is visible in how integral multinational companies are in these industries.

Global engagement being especially important for IP-intensive companies should be reflected in these industries being even more “multinational-intensive” than other industries in a second way: the degree to which their global sales is generated by their foreign affiliates rather than their U.S. parents. In IP-intensive industries, the share of revenues accounted for by the foreign affiliates should be higher than this share in other industries, insofar as IP-intensive industries need global sales for the added reason of boosting the value of their IP-investments.

Figure 10 documents just how critical multinationals are to U.S. IP-intensive industries in terms of their reliance on foreign-affiliate activity. For the year 2010, the most recent year of available data, it reports the share of worldwide sales (U.S. parents plus foreign affiliates) accounted for by the foreign affiliates of U.S.-headquartered multinationals—first for all multinationals across all industries, and then for six of America's main IP-intensive industries for which this share can be calculated in publicly available data.⁴⁵



The key message of Figure 10 is that in America's IP-intensive industries, a much larger share of the global sales of U.S.-headquartered multinational companies is accounted for by foreign affiliates than is the case for these multinationals overall. For U.S. multinationals across all industries, 34.6% of their worldwide sales is accounted for by foreign affiliates. But within IP-intensive industries, this share is higher: 44.5% in Chemicals (which contains pharmaceuticals), 40.1% in Machinery, 45.8% in Computers, 36.5% in Electrical Equipment, 47.6% in Motor Vehicles, and 38.2% in Computer Services. The imperative for America's IP-intensive industries to support their innovation efforts by connecting with global markets is demonstrated in how integral foreign-affiliate sales are in these industries. Consistent with this, recall from Section II how export-intensive these industries are compared to the overall U.S. economy: in 2010, they accounted for 60.7% of total U.S. exports of goods.

*How Foreign Activity by U.S. IP-Intensive Companies
Complements, not Substitutes for, Domestic IP Investment*

How exactly are American IP-investment and employment affected by the global demand growth discussed above? It is important to understand that U.S. IP jobs and investments are created not only by exporting to these markets but also by producing and selling in them through FDI in foreign affiliates. Contrary to what is often presumed, expansion abroad by globally engaged U.S. companies tends to complement, not substitute for, their domestic activity.

The link between exports and American jobs is clear. When companies in America gain new customers abroad for their goods and services, meeting this demand creates new American jobs in these companies. Because of the rich variety of goods and services America exports and the rich variety of production methods used by companies in America, the link from exports to jobs varies across companies, industries, and time. That said, as discussed earlier in Section III, research has documented the many ways in which exporting companies tend to be stronger than nonexporters—even in the same detailed industry.

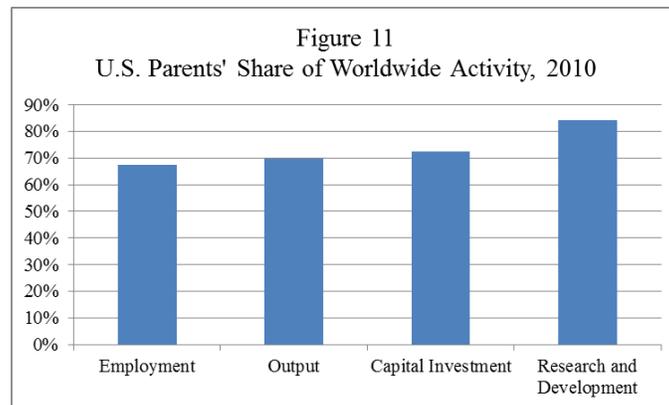
Less well understood is the link between jobs and IP investment in America and business growth abroad. Much of the public policy discussion surrounding U.S. multinationals assumes that engagement abroad necessarily substitutes for U.S. activity—in particular, for employment and R&D investment. This substitution concern misses the several channels through which the global engagement of U.S. multinationals tends to support, not reduce, their operations in America. As the studies presented below have found, foreign-affiliate activity tends to complement, not substitute for, key parent activities in the United States. Three crucial features of how multinationals work that belie the substitution idea are complementarity, scale and scope.

- For some given level of firm-wide output, when firms employ many kinds of workers and many non-labor factors of production, affiliate and parent labor can often be complements in which more hiring abroad also means more hiring in the United States. Complementarity is quite common in global production networks, in which U.S. workers operate not in isolation but rather in close collaboration with colleagues around the world.
- When affiliates are expanding abroad to boost their revenues, the resulting reduction in costs and boost in profits (thanks to greater scale and richer returns on IP) often spurs higher output in the company around the world, which can mean more U.S. hiring.

- Affiliate expansion often not only boosts firm scale but also, as discussed previously, refines the mix of activities performed across parents and affiliates. U.S. parents' employment can rise as they shift their scope into higher value-added tasks—especially R&D and other IP investments.

The concern that global expansion tends to hollow out U.S. operations is not supported by the facts of existing research—now presented below. Rather, the scale and scope of U.S. parent activities increasingly depends on their successful presence abroad.

To see this, start with the often-heard claim that globally engaged U.S. companies have somehow hollowed out their U.S. operations, leaving only activity abroad. Is that true? What about the magnitude of U.S. parent activities relative to the scale of their foreign affiliates? Figure 11 reports the share of U.S. multinationals' 2010 worldwide employment, output, capital investment, and R&D that was accounted for by their U.S. parent operations.⁴⁶



The key message of Figure 11 is that *the worldwide operations of U.S. multinational companies are highly concentrated in America in their U.S. parents, not abroad in their affiliates.*

- *Employment:* U.S. parents account for 67.3% of worldwide employment of U.S. multinationals—22.8 million parent workers versus 11.1 million at affiliates. This translates into a ratio of about 2.1 U.S. employees for every one affiliate employee.
- *Output:* U.S. parents account for 69.9% of worldwide output (in terms of value added) of U.S. multinationals—nearly \$2.9 trillion versus about \$1.2 trillion.
- *Capital Investment:* U.S. parents undertake 72.5% of worldwide capital investment by U.S. multinationals—\$438.3 billion versus \$166.3 billion. For every \$1 in affiliate capital expenditures, parents invested \$2.64 worth in the United States.
- *R&D:* U.S. parents perform 84.3% of worldwide R&D by U.S. multinationals—\$212.5 billion versus \$39.5 billion or \$5.38 in parent innovation and knowledge discovery and development for every \$1 by affiliates.

The United States, not abroad, is where U.S. multinationals perform the large majority of their operations. Indeed, this U.S. concentration is especially pronounced for R&D, which reflects America's underlying strengths of skilled workers and legal protections such as IP rights that together are the foundation of America's IP strengths, as discussed earlier.

This much larger scale of U.S. parents than foreign affiliates has been present for decades. A generation ago, the share of U.S. parents in the worldwide activity of U.S. multinationals was slightly higher. In 1988, U.S. parents accounted for 78.8% of U.S. multinationals' worldwide employment and 79.2% of their worldwide capital investment. So over the past generation, the foreign-affiliate shares of employment and investment have risen by about 0.5 percentage points per year. As this report documented above, however, this rise has been driven mainly by ongoing expansion of parents that was outpaced by even faster expansion of affiliates, not by parent contraction. Faster affiliate expansion, in turn, has been driven mainly by faster economic growth abroad and thus faster growth in customers there.

The bottom line is that the United States firmly remains where globally engaged U.S. companies locate the majority of their operations—especially their innovation activities—even as they have been growing more quickly abroad.

What does the evidence show about the key question of complementarity: has that foreign expansion complemented or substituted for their U.S. activities? Aggregate, industry and company-level research to date shows that foreign-affiliate expansion tends to complement U.S. parent employment, investment, sales—and innovation efforts via R&D.

One such recent study examined industry-level data for 58 U.S. manufacturing industries from 2000 through 2007. It found that the productivity gains and cost savings from expanding global production networks tended to boost overall U.S. employment in these industries—albeit with changes in the scope of U.S. activities being performed. It also found that more immigrants working in the United States in those industries boosted their overall U.S. employment. Similar studies to this one have repeatedly found that when American manufacturing industries invest more abroad, this outward investment stimulates U.S. exports.⁴⁷

Another study examined industry-level data for dozens of U.S.-based multinational companies in services over recent decades. It found that greater foreign-affiliate employment and sales correlated with greater U.S.-parent employment as well, consistent with the idea that affiliate and parent activity tend to, on net, complement each other.⁴⁸

A third important study, conducted at the level of individual companies, carefully analyzed all U.S. multinationals in manufacturing from 1982 to 2004. It found that a 10% increase in foreign-affiliate capital investment causes a 2.6% increase, on average, in that affiliate's U.S. parent capital investment. It similarly found that a 10% increase in foreign-affiliate employee compensation causes a 3.7% increase, on average, in that affiliate's U.S. parent employee compensation. These links were clearest when analyzing the changes in affiliate jobs and investment driven by changes in affiliate sales—the surge in which was documented previously.

How do these percentages translate into actual dollars? Strikingly, each additional dollar in an affiliate's employee compensation generates an average increase in its parent employee compensation of about \$1.11. And each additional dollar in an affiliate's capital investment causes an average increase in its parent's capital investment of about \$0.67. Of course, the exact magnitude of this linkage may well vary across companies, industries, and time—and may well

depend on whether U.S. policies support or retard these complementarities. What is central to see for the moment is that more affiliate activity tends to cause more, not less, parent activity.

Their findings of complementarity were especially compelling for how U.S.-parent R&D is supported by foreign-affiliate sales. They found that 10% faster sales growth in foreign affiliates raises U.S.-parent R&D spending by somewhere between 3.2% and 5.0%. The authors concluded, “Since foreign operations stand to benefit from intangible assets developed by R&D spending, it is not surprising that greater foreign investment might stimulate additional spending on R&D in the United States ... These results do not support the popular notion that expansions abroad reduce a [multinational] firm’s domestic activity, instead suggesting the opposite.”⁴⁹

One final important study also examined individual companies, but this time European-based multinationals. It linked within these multinationals the employment and patenting activity of these companies’ inventors across both parent and affiliate countries, to enable them to ascertain the effect of companies’ expanding use of researchers abroad on their use of researchers at home. Contrary to the common presumption that foreign researchers will substitute for parent researchers, this study found the opposite: “Our main result suggests that a 10% increase in the number of inventors abroad results in a 1.9% increase in the number of inventors at home.”⁵⁰

These academic studies resonate with a growing number of anecdotes about how foreign affiliates complement U.S. parents—even in efforts at IP discovery and development. Indeed, given the public-good nature of knowledge discussed in Section II, such IP complementarity is not surprising. As one recent report by a distinguished panel of government, business, and academic leaders concluded, “Technology-intensive multinational corporations have established numerous research centers in emerging economies, largely staffed with local talent ... offshore R&D centers have been the source of some remarkable achievements, demonstrating that they are becoming integral to the R&D strategies of global technology leaders.”⁵¹

The conclusion from research to date is that, on average, foreign affiliates and U.S. parents expand together—driven by the dynamism of complementarity, scale and scope. In particular, foreign-affiliate growth tends to stimulate, not reduce, U.S.-parent IP investments.

The central message of Section III is that globally engaged U.S. companies, which create the large majority of America’s IP, increasingly rely on their worldwide operations to maximize the creativity and benefits of their U.S. inventions. U.S. multinational companies have long performed the large majority of America’s IP discovery and development. Increasingly central to America’s IP success is the ability of its global companies to deploy that IP abroad. To maximize the impact of and return on their U.S. innovations, globally engaged U.S. companies serve customers abroad not just through exports but also through their foreign-affiliate production and sales that rely on U.S.-parent IP. Connecting foreign customers with U.S. ideas tends to complement, not substitute for, American IP investments—both in terms of the quantity and the quality of U.S. innovation. The potential is great for American IP activity to connect with global markets.

Section IV
***The Need for U.S. Tax Policy to Support,
 Not Discriminate Against, America’s Intangible Property Strengths***

*The Overall Setting for International Tax:
 The United States Is Already at a Growing Competitive Disadvantage*

Across a range of business and public-policy issues in America, there is widespread agreement that America’s current system of business taxation is increasingly a disadvantage for globally engaged U.S. companies seeking to compete in world markets. One of the most widely cited burdens is America’s relatively high statutory (and effective) tax rate. And a second is the high complexity of America’s business taxation—especially, for U.S.-headquartered multinational companies, their tax liability on their foreign earnings as well as their domestic earnings.

Figure 12 documents both these critical tax burdens facing U.S.-headquartered multinational companies. The Organization for Economic Cooperation and Development is an intergovernmental organization founded in 1961 that promotes policies aimed at economic and social development of its member states and the broader world. For each of the 34 OECD members, Figure 12 reports its 2012 federal statutory corporate tax rate. Countries with a tax rate indicated by a blue bar operate what are commonly referred to as *territorial* tax systems; that is, these countries exempt from taxation any foreign-affiliate earnings for multinational companies headquartered in them. Countries with a tax rate indicated by a red bar operate what are commonly referred to as *worldwide* tax systems; that is, these countries do impose a tax liability on any foreign-affiliate earnings for multinational companies headquartered in them.

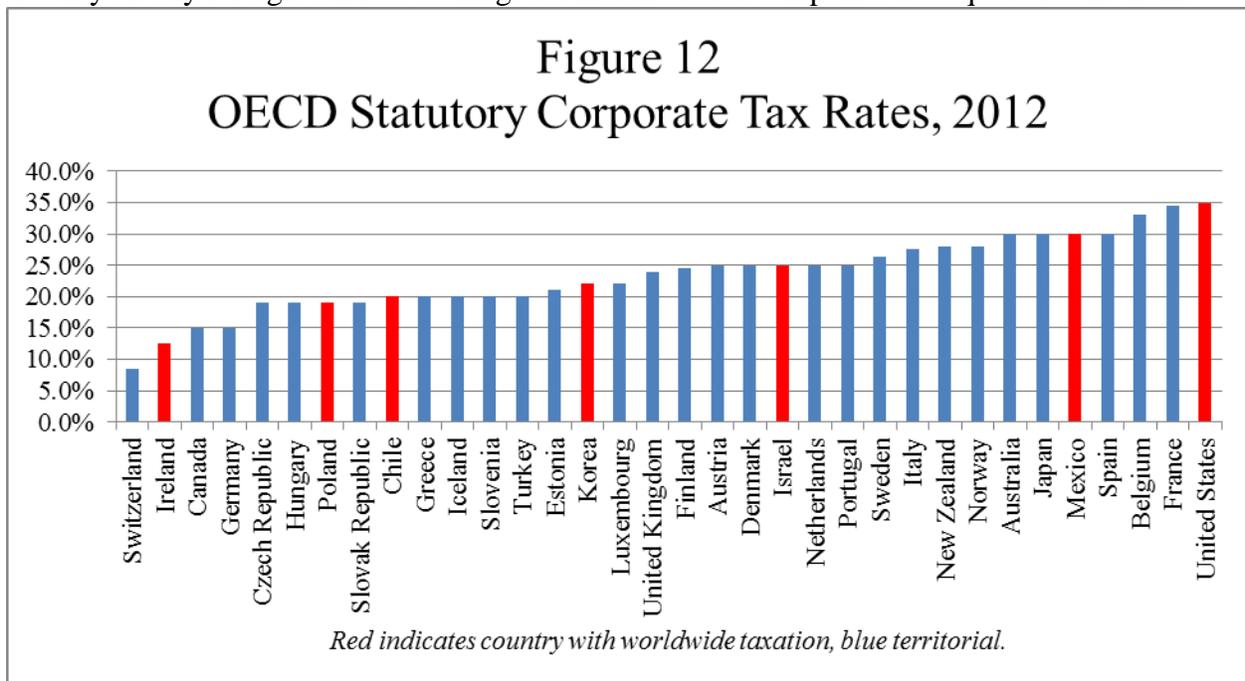


Figure 12 conveys two stark realities about the uncompetitive tax burdens facing U.S.-headquartered multinational companies. One is their high statutory corporate tax rate: at 35%, it is today the highest such tax rate of any of the 34 OECD members. The other is the added complexity of facing worldwide rather than territorial taxation. The United States is only one of

seven OECD countries whose corporate-tax regime is worldwide rather than territorial. Most of these other worldwide countries have much lower marginal tax rates—e.g., Ireland at just 12.5%. And, most of them are much smaller countries than the United States, and thus are not home to many of the world's biggest multinationals against which U.S.-based companies compete.

This combination of a high-rate, high-complexity U.S. tax regime is arguably the worst in the OECD—and well beyond—for supporting the global competitiveness of U.S. companies, both IP-intensive and otherwise. Consider an IP-intensive U.S.-headquartered multinational competing in world markets against another IP-intensive multinational headquartered in a territorial country. If those two companies earn the same pre-tax income in a third market, then the U.S. company faces a home-country tax liability that its foreign competitor does not.

Granted, current U.S. tax policy has numerous rules that determine exactly when and how much these foreign earnings would translate into a U.S. tax liability—another dimension of the complexity challenge in today's U.S. tax code. But the essential point is that even with deferral, U.S. IP-intensive companies face, all else equal, higher tax liabilities on their global earnings than do almost all of their global competitors. This current system of U.S. taxation thus disadvantages the ability of U.S. companies—both IP-intensive and otherwise—to undertake key strategic investments in productive new ideas for tomorrow.

The problems with America's high-rate, high-complexity tax regime are widely acknowledged in America. The recent White House report on business taxation, e.g., states this very clearly.

America's system of business taxation is in need of reform. The United States has a relatively narrow tax base compared to other countries ... This is combined with a statutory corporate tax rate that will soon be among the highest among advanced countries. As a result of this combination of a relatively narrow tax base and a relatively high statutory tax rate, the U.S. tax system is uncompetitive and inefficient. The system distorts choices, such as where to produce [and] what to invest in ... The system is also too complicated.⁵²

These problems are also acknowledged internationally. One recent academic study ranked OECD countries based on multiple tax criteria drawn from the countries' 2012 tax policies: the statutory federal plus state statutory corporate tax rate, the effective average corporate tax rate, and the effective marginal corporate tax rate. On these three tax criteria, among the 33 countries examined the United States ranked 32nd, 32nd, and 32nd.⁵³

It is important to recognize that America's uniquely burdensome corporate-tax regime was not always so. When America lowered its corporate tax rate as part of its last major tax reform in 1986, the U.S. statutory corporate tax rate was several percentage points below the OECD average. In the 27 years since, literally dozens of countries around the world have radically reformed their tax regimes—generally by cutting their tax rates and also by simplifying their overall systems, which in many cases involved switching from worldwide to territorial. If anything, the pace of worldwide tax reform seems to be accelerating, not slowing. In 2012 both Canada and Japan cut their statutory corporate tax rates by 1.5 percentage points; the United

Kingdom cut its by 1 percentage point (and in 2013 announced a similar cut); and both Japan and the United Kingdom have very recently transitioned from worldwide to territorial.

At a time when America's innovation strength is facing serious challenges, as documented in Section II, America's high-rate, high-complexity tax regime is growing only more burdensome.

*The Specific U.S. Tax Treatment of Intangible Property:
Support, Not Discriminate Against, IP Income Abroad*

The breadth and seriousness of America's innovation challenge means that policy makers need to support innovation much more broadly than in the past--well beyond traditional issues such as STEM education. Any reform of U.S. tax policy should support, not discriminate against, IP innovation in America. In particular, U.S. international-tax policy should not discriminate against foreign-affiliate income of IP-intensive activities.

Many leaders who have voiced alarm about America's innovation challenge argue that arresting it will require more and more-thoughtful innovation policies than in the past—and that wiser, pro-innovation tax policy needs to be part of the solution. A distinguished panel convened by the National Academy of Sciences has made this point very forcefully, for example.

The United States should assure that the tax framework supports new company creation and investment ... The United States should assess the impact of U.S. based innovation and production of tax policies, and consider appropriate adjustments. Where the tax code and regulatory costs are found to be serious impediments to U.S. investment and innovation, the government should seek to narrow or close these competitive gaps, not by abandoning well-grounded regulations, but by fully considering their competitive impact and undertaking measures to reduce the impact.⁵⁴

If America wants to succeed in today's global economy on a foundation of continued IP strength, then the nation's tax system should drive at supporting IP innovation in America. Section III of this report documented the abundance of evidence that for IP-intensive U.S.-headquartered multinational companies, their foreign-affiliate growth tends to stimulate, not reduce, U.S.-parent IP investments. This means that U.S. international-tax policy should not discriminate against the foreign-affiliate income of IP-intensive activities.

There is widespread agreement that, given the discussion of the previous sub-section, supporting U.S. innovation would mean lowering U.S. rates and/or moving from worldwide towards territorial. Again, from the National Academy of Sciences: "These alternatives for consideration could include a reduction in the corporate tax rate (now one of the highest nominal rates in the OECD), the limitation of residence-based taxation (which may in its present form provide incentive for new companies to incorporate outside the United States)."⁵⁵

In addition, support for U.S. IP activity should mean not discriminating against IP-intensive income relative to other forms of income. One important reason for this is simplicity. Part of the burdensome complexity of today's U.S. tax code is the many ways in which it already

discriminates against different forms of business. On the principle of tax simplicity alone, IP-related income should not be discriminated against. As one recent study of possible tax reforms concluded, “Limiting the application of anti-base-erosion rules to intangible income would spawn a whole new class of troublesome transfer pricing disputes, with taxpayers and the IRS battling on a case-by-case basis over the fuzzy dividing line between intangible income subject to the new tax and other income that is exempt.”⁵⁶ As was discussed in Section III, successful IP-intensive companies in America integrate their innovations throughout their global operations.

A second important reason not to discriminate against IP-intensive income is IP’s outsized contribution to U.S. economic growth and living standards. Recall from Section II how IP innovation has long generated positive externalities for the U.S. economy—and the related evidence that America has long been doing too little IP innovation, not too much. This implies that if U.S. tax policy were to favor certain business activities then it should favor, not disadvantage, IP-related income. Why pursue tax policies that will aggravate America’s underinvestment in innovation, not offset it? Tax reform should encourage the flourishing of America’s IP-intensive companies—and this should mean allowing them to flourish abroad as well as in America. A higher U.S. tax burden on IP-related income would stifle, not stimulate, the value of innovating in America relative to other business activities.

One of the ways a higher U.S. tax burden on IP-related income could stifle U.S. innovation might be to encourage IP-intensive multinational companies to incorporate outside of America rather than inside. Foreign-headquartered multinationals have long done a significant share of America’s IP discovery and development. In 2010, the U.S. affiliates of foreign-headquartered multinationals performed \$41.3 billion of R&D. This was about 14.3% of the total R&D performed by all U.S. companies—a share far above their approximately 5.0% share of U.S. private-sector jobs.⁵⁷ But outsized U.S. taxation of IP-related income may stifle this innovation activity—perhaps, as discussed below, by discouraging company formation in America. America’s share of the world’s multinational companies has already been declining: between 2000 and 2011, the United States “lost 46 headquarters from the Fortune Global 500”—a decline of 25.7%.⁵⁸

Discriminating Against IP Income Would Hurt Small-Business Start-Ups

If tax reform discriminates against IP income, where would this impact America’s IP innovation activity? There is good reason to worry that part of the impact would fall on small start-up businesses—at a time where America has already been seeing declines in new-business startups.

Research has long documented that young startup companies are a key source of America’s innovation dynamism. Younger, smaller firms tend to produce more innovations per dollar of innovation effort than do many older, larger companies. This innovation edge stems from a number of impediments facing many older and larger companies: worries about innovation disrupting existing lines of business; more-rigid bureaucracies that inhibit new ideas; and weaker individual incentives connected to innovation success.⁵⁹ (Of course, U.S.-based multinational companies tend to contradict this overall pattern; as documented in Section III, they are among America’s most dynamic and innovative companies—thus their ability to succeed globally.)

Tax policy that disadvantages the returns to IP income will be tax policy that inhibits the start-up of new IP-intensive companies in America. Recall from Section III that even today, 26.1% of U.S.-headquartered multinational companies fit the U.S.-government definition of being small businesses. Many small multinationals dream of growing much bigger tomorrow. For those that are IP-intensive, tax disadvantaging IP income would make achieving these dreams harder.

There is clear international evidence that tax burdens inhibit entrepreneurship. A recent study spanning 85 countries over decades estimated the drag of corporate taxes on entrepreneurship (measured either as new business establishments and also the rate of new-business registration). It found that a 10-percentage point increase in corporate tax rates reduces the rate of new-business startups by an average of 1.4 percentage points, which is 17.5% below the average startup rate of about 8%. This study also found that a similar increase in corporate taxes reduces a country's ratio of capital investment to GDP by a sizable 2-2.5 percentage points.

And it is important to recognize that America today is already facing an ongoing, worrisome decline in the rate of new-business start-ups. In the early-to-mid 1980s, each year about 12% to 13% of all U.S. firms were newly started that year. Starting in the late 1980s, however, this startup rate began to decline. This decline long pre-dates the World Financial Crisis, but its pace has quickened recently such that today only about 7% to 8% of all U.S. companies are startups. A consequence of this drop in the rate of new-business startups is that the share of the overall U.S. economy accounted for by young firms has been steadily declining. Defining young firms as those aged five or less, in the early 1980s nearly 50% of all U.S. companies were young. Today that share is down to less than 35%--the lowest on record—with falls across all states.⁶⁰

Taken together, these startup trends indicate the United States is becoming less entrepreneurial: it has a much lower rate of new-business startups and thus a much smaller share of new firms in the overall private sector. The underlying causes at play are not well known. That said, as with America's waning innovative strength, this worrisome development should be on the mind of policymakers. Given the historical importance of startups in many IP-intensive industries, tax disadvantaging IP-income runs the risk of dampening innovation in IP-startups.

The central message of Section IV is that because foreign-affiliate production and sales tends to complement American IP investment, raising the U.S. tax burden on IP-related income of U.S.-headquartered multinational companies—especially if this burden fell differentially on IP income compared to other sources of income—would tend to reduce the quantity and quality of IP activity in the United States. This would harm not only IP-intensive industries but also the U.S. economy overall. Higher taxation of IP-related income abroad would not somehow boost IP activity in the United States. A higher U.S. tax burden on IP-related income would stifle, not stimulate, the attractiveness of innovating in America. For America overall, this IP tax burden would also erode the strength of the U.S. economy, given IP's uniquely foundational role in boosting U.S. jobs and incomes. Today, amidst a still-fragile U.S. economic recovery, when the United States critically needs even more IP dynamism to boost output, jobs, and incomes, U.S. tax policy should not dampen this dynamism.

Section V *Conclusions*

Intangible property has long played a central role in driving growth in U.S. output, jobs, and income. Discovering and developing ideas with value boosts output in existing companies and industries and creates entire new industries. This innovation has long created new jobs and higher standards of living for all American workers and their families.

Maintaining IP's many contributions to the U.S. economy will require smarter public policy now and in the future, however, given a number of indicators that America's innovation strength is waning. In particular, policymakers must understand the long-standing and increasingly important contributions that IP makes to American jobs and American standards of living—and must understand the value of a tax system that does not discriminate against the IP performed by American companies.

Such a tax system needs to recognize the global nature of America's IP innovators. U.S.-headquartered multinational companies, which create the large majority of America's IP, increasingly rely on their global operations to maximize the creativity and benefits of their U.S. inventions. These globally engaged U.S. companies have long performed the large majority of America's IP discovery and development. Increasingly central to America's IP success is the ability of its multinational companies to deploy that IP abroad. To maximize the impact of and return on their U.S. innovations, U.S. multinationals serve customers abroad not just through exports but also through their foreign-affiliate production and sales that rely on U.S.-parent IP. Connecting foreign customers with U.S. ideas tends to complement, not substitute for, American IP investments—both in terms of the quantity and the quality of U.S. innovation.

The potential is great for American IP activity to connect with global markets. Tax policy should support, not inhibit, this potential. Today, America's IP-intensive global companies are encumbered with one of the world's highest-rate, highest-complexity tax regimes. Because foreign-affiliate production and sales tends to complement American IP investment, raising the U.S. tax burden on IP-related income of U.S. multinational companies—especially if this burden fell differentially on IP income compared to other sources of income—would tend to reduce the quantity and quality of IP activity in the United States. This would harm not only IP-intensive industries but also the U.S. economy overall.

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Endnotes

¹ These statistics come from the recent path-breaking study by U.S. Department of Commerce (2012).

² These data on U.S.-headquartered multinational companies come from the U.S. Bureau of Economic Analysis as reported in Barefoot (2012).

³ The Internal Revenue Service defines intangible property to include the following six broad sets of ideas and related economic manifestation thereof: “computer software; patents, inventions, formulae, processes, designs, patterns, trade secrets, or know-how; copyrights and literary, musical, or artistic compositions; trademarks, trade names, or brand names; franchises, licenses, or contracts; methods, programs, systems, procedures, campaigns, surveys, studies, forecasts, estimates, customer lists, or technical data.” See this definition and related discussion at http://www.irs.gov/irm/part4/irm_04-048-005.html. This paper follows this definition of intangible property.

⁴ The White House (2011), p. 7.

⁵ U.S. Department of Commerce (2012), p. 1.

⁶ Krugman (1990), pp. 9-13.

⁷ Solow (1957), p. 316. See also the closely related work in Solow (1956).

⁸ Jones (2002).

⁹ See, for example, Feenstra, Mandel, Reinsdorf, and Slaughter (2013).

¹⁰ Jones and Williams (1998), p. 1121, estimate “the social return [to R&D] of 30% and a private rate of return of 7 to 14%: optimal R&D spending as a share of GDP is more than two to four times larger than actual spending.” Bloom, et al (2012), p. 3, report, “We find that technology spillovers dominate, so that the gross social returns to R&D are at least twice as high as the private returns ... We estimate that the (gross) social return to R&D exceeds the private return, which in our baseline specification are calculated at 55% and 21%, respectively. At the aggregate level, this implies under-investment in R&D, with the socially optimal level being over twice as high as the level of observed R&D.”

¹¹ U.S. Department of Commerce (2012), p.5. Of course, optimal IP policy is not everywhere and always to strengthen rights of discoverer. The creation of monopoly power inherent in IP rights aims to balance private returns of inventors against social benefits of knowledge diffusion. U.S. IP policy has continually adjusted based on balancing these considerations in light of overall economy, nature of innovations, etc. See the Winter 2013 symposium on patents in the *Journal of Economic Perspectives* for a discussion of the challenges in patent policy.

¹² Both quotations in this paragraph come from National Research Council of the National Academies (2012), p. 65 and p. 43, respectively.

¹³ Hall and Jones (1997), p. 173.

¹⁴ See, for example, Bloom and Van Reenen (2002).

¹⁵ This U.S. Department of Commerce (2012) study focused on utility patents, which it defines (p. 5) as “patents which assist owners in protecting the rights of inventions and innovative processes.” Utility patents can be applied to processes, machines, articles of manufacture, and compositions of matter. The other two categories of U.S. patents are design patents, which cover the design of items (rather than the items themselves), and plant patents, which cover innovations of living plants. Patents enable the owner to pursue legal action to exclude, for a finite amount of time, others from making, using, or selling that invention in America. Patents are issued to individual inventors, who as they like can assign ownership rights to other individuals, corporations, universities, other organizations.

¹⁶ As described by U.S. Department of Commerce (2012), p. 29, copyrights protect “original works of authorship. These works must be fixed in a tangible form of expression, meaning that concepts that never leave the confines of our minds cannot be copyrighted. Protection under copyright, which lasts for the life of the author plus an additional 70 years, is secured automatically when a work is created. Neither publication nor registration with the U.S. Copyright Office is required to secure copyright protection. But registering a copyright does establish a public record of the copyright, and it can be beneficial because of incentives provided to encourage registration.” Works eligible for copyright protection include literary works, computer programs, musical works, dramatic works, pictorial and graphic works, motion pictures, and sound recordings. More than 33.7 million copyrights have been registered in America since Congress enacted the first copyright law in 1790. In 2009, more than 382,000 new basic copyrights were registered.

¹⁷ Trademarks protect the brands of goods and services. As defined by the U.S. Department of Commerce (2012), p. 11, a trademark is “a word, phrase, symbol, design, or combination thereof that identifies and distinguishes the source of the goods of one party from those of others ... Unlike a patent, which protects an invention, or a copyright, which protects a work of original authorship, a trademark does not protect a new product or service per se. A trademark instead confers protection upon the brand or identity of a good, thus preventing competitors from leveraging another firm’s reputation and confusing consumers as to the source of the goods. Service marks are similar in nature to trademarks, but distinguish the source of a service rather than a good.” With payment of a nominal fee, any company or individual, American or foreign, can apply to register a trademark with the United States Patent and Trademark Office. Once granted, trademark registrations can remain in force indefinitely as long as the trademark remains in active use and maintenance payments are made.

¹⁸ What is tracked here is average weekly earnings of private wage and salary workers. Included in wages are pay for vacation and other paid leave, bonuses, stock options, tips, cash value of meals and lodging, contributions to deferred compensation plans such as 401(k) plans. All data in this paragraph, in the following paragraph, and in the above Figure 1 and related discussion come from U.S. Department of Commerce (2012).

¹⁹ The statistics in this paragraph on industry growth in productivity all come from the U.S. Bureau of Labor Statistics and are all available at <http://www.bls.gov/data/#productivity>.

²⁰ National Science Board (2012), Figures O-27 and O-28.

²¹ National Academy of Sciences, National Academy of Engineering, and Institute of Medicine (2010), pp. 1-5.

²² The White House (2011), p. 8.

²³ For the three studies listed below, see World Economic Forum (2012), World Intellectual Property Organization and INSEAD (2012), and Atkinson and Ezell (2012).

²⁴ In Figure 2 and the related text, the productivity data were obtained online from the U.S. Bureau of Labor Statistics at <http://www.bls.gov/data/#productivity>.

²⁵ Gordon (2012), p. 1. See also, e.g., Cowen (2012). *The Economist* (2012) summarizes much of this recent academic work.

²⁶ In Figure 3 and the related text, the R&D data were obtained from the National Science Board (2012).

²⁷ In this paragraph, the first quote comes from National Research Council of the National Academies (2012), p. xvi. The second quote comes from Wuchty, Jones, and Uzzi (2007), p. 1036, who report (p. 1036) that, “Research is increasingly done in teams across nearly all fields. Teams typically produce more frequently cited research than individuals do, and this advantage has been increasing over time. Teams now also produce the exceptionally high-impact research, even where that distinction was once the domain of solo authors. These results are detailed for sciences and engineering, social sciences, arts and humanities, and patents, suggesting that the process of knowledge creation has fundamentally changed.”

²⁸ National Research Council of the National Academies (2012), p. 12.

²⁹ Portions of Section III are excerpted and modified from Slaughter (2013).

³⁰ In their survey of micro-level studies of productivity, Bartelsman and Doms (2002, p. 578) state that, “Of the basic findings related to productivity and productivity growth uncovered by recent research using micro data, perhaps most significant is the degree of heterogeneity across establishments and firms in productivity in nearly all industries examined.” This heterogeneity in productivity and other characteristics (e.g., size) appears in both developed countries (e.g., Olley and Pakes, 1996, and Syverson, 2004 for the United States) and developing countries (e.g., Cabral and Mata, 2003).

³¹ Superior productivity of U.S. exporters is usefully summarized in studies including Lewis and Richardson (2001) and Bernard, et al (2007), which states the following (pp. 110-111): “Firms that export look very different from non-exporters along a number of dimensions ... even in the same

detailed industry. Exporters [in 2002 were] significantly larger than non-exporters, by approximately 97% for employment and 108% for shipments; they are more productive by roughly 11% for value-added per worker and 3% for TFP; they also pay higher wages by around 6%. Finally, exporters are relatively more capital- and skill-intensive than non-exporters by approximately 12 and 11%, respectively.”

³² Representative evidence of this performance advantage for U.S. multinationals appears in Doms and Jensen (1998), who documented how plants that are part of multinational companies—both U.S. parent companies of U.S.-based multinationals and U.S. affiliates of foreign-based multinationals—tend to exhibit higher TFP, labor productivity, and other performance characteristics such as capital intensity, skill intensity, and wages. This superior performance of multinationals has also been documented in many other countries: e.g., Criscuolo, Haskel, and Slaughter (2010) for the United Kingdom.

³³ In Figure 4 and the supporting text, BEA data on U.S. multinational companies have been matched as needed with private-sector economy-wide data from appropriate government sources. The BEA data are available online at www.bea.gov. Details on the source and definition of these non-multinationals data are as follows, where all data — in Figure 4 and all subsequent figures — were obtained online or from Barefoot (2012). Employment: Bureau of Labor Statistics, U.S. Department of Labor — U.S. private-sector nonfarm payroll employment. Output: BEA — Private-sector value-added output adjusted to exclude value added in depository institutions and private households, imputed rental income from owner-occupied housing, and business transfer payments. Investment: BEA National Income and Product Accounts — Table 5.2.5 (Gross and Net Domestic Investment by Major Type) Line 10 (Nonresidential gross private fixed investment). Research and Development: National Science Foundation — Total R&D performed by the industrial sector, current dollars. Exports and Imports of Goods — BEA National Income and Product Accounts, as reported in Barefoot and Mataloni (2011). Compensation Premium for U.S. Multinational Companies: The national measure of private-sector labor compensation comes from the BEA National Income and Product Accounts Table 6.2 (Compensation of Employees by Industry) Line 3 (Private Industries). Employee compensation as measured in the BEA data includes wages, salaries and benefits — mandated, contracted and voluntary. Finally, note that at the time of writing NSF R&D data for 2010 were not yet available, so in Figure 4 shares of U.S. private-sector R&D for 2009 are reported.

³⁴ “Results from virtually every study across industries and countries confirm that high productivity precedes entry into export markets. These findings are suggestive of the presence of sunk entry costs into export markets that only the most productive firms find it profitable to incur” (Bernard, et al, 2007, p. 111). This fact of high-productivity companies selecting into global engagement has spurred a large and ongoing literature in international economics with a variety of new general-equilibrium models built on the foundation of this fact. For example, a now standard research framework of multinational firms (e.g., Markusen, 2002) assumes these firms obtain high-productivity knowledge assets that are transferred from home-country parents to host-country affiliates.

³⁵ Baily and Solow (2001), pp. 166-167.

³⁶ Corrado, Lengermann, and Slifman (2009), p. 333.

³⁷ In Figure 5, data were obtained from the BEA multinationals data online.

³⁸ In Figure 6, data on U.S. GDP growth come from the BEA; the reported 1991–2011 average rate of growth incorporates the major BEA data revisions released on July 27, 2012. Data on GDP growth for other countries come from the International Monetary Fund (2012).

³⁹ McKinsey & Company (2012), pp. 20–22.

⁴⁰ In Figure 7, data on growth in U.S. GDP and in U.S. exports come from the BEA; they incorporate the major BEA data revisions released on July 27, 2012.

⁴¹ In Figure 8, data were obtained from the BEA multinationals data online.

⁴² Barefoot and Mataloni (2011), p. 35.

⁴³ These data were obtained from the BEA multinationals data online. The BEA does not track exports of services by U.S. parents, so the text reports only exports and sales of goods.

⁴⁴ In Figure 9, data on value added output both for U.S. parents of U.S.-headquartered multinationals and for overall U.S. industries comes from the BEA. Many U.S. multinationals operate in more than one line of business. That said, almost all have a predominant industry that accounts for the majority of activity. Each year, to produce and disseminate data on multinational companies disaggregated by industry, the BEA categorizes each multinational's operations into a single industry based on each company's predominant industry of sales. To avoid disclosure of individual companies, however, BEA suppresses industry-level data where it deems necessary. This sharply limits the availability of multinationals' value added by the various IP-intensive industries.

⁴⁵ In Figure 10, all data on multinationals' output comes from the BEA. The same challenges of industry definition and disclosure suppression are present here as in Figure 9; see note 44.

⁴⁶ In Figure 11, data for the shares were obtained from the BEA multinationals data online.

⁴⁷ Ottaviano, Peri, and Wright (2010). Studies that find a link from outward investment and U.S. exports are well summarized in Moran (2009).

⁴⁸ United States International Trade Commission (2011).

⁴⁹ Desai, Foley and Hines (2009), p. 195 and p. 181.

⁵⁰ Abramovsky, Griffith, and Miller (2012), p. 1.

⁵¹ National Research Council of the National Academies (2012), p. 37.

⁵² The White House (2012), p. 1.

⁵³ Bilicka and Devereux (2012). Japan ranked 33rd in all three of these tax-competitiveness categories.

⁵⁴ National Research Council of the National Academies (2012), p. 179. Another example of this argument to conceive of tax treatment more broadly is Graetz (2012), p. 634: “The fundamental problem is that in today’s international economy, the United States can no longer afford to rely so heavily on income taxation to finance federal expenditures. What our nation needs is a new and better tax system, one that is far simpler, fair, and more conducive to economic growth.”

⁵⁵ National Research Council of the National Academies (2012), p. 179.

⁵⁶ Sullivan (2013).

⁵⁷ These data were obtained from the BEA multinationals data online.

⁵⁸ Neubig, Kinrade, and Young (2011), p.1.

⁵⁹ See surveys in, e.g., Cohen and Klepper (1996) and Acemoglu, et al (2012).

⁶⁰ Startup statistics in this and the previous paragraph come from Haltiwanger, et al (2012).