



Tax Policy Center
Urban Institute and Brookings Institution

**INTERNATIONAL TAX POLICY FORUM/
THE URBAN-BROOKINGS TAX POLICY CENTER**

SEMINAR

Tax Policy and U.S. Manufacturing in a Global Economy

March 15, 2013



INTERNATIONAL TAX POLICY FORUM

www.itpf.org



International Tax Policy Forum

INTERNATIONAL TAX POLICY FORUM /
URBAN-BROOKINGS TAX POLICY CENTER SEMINAR

Tax Policy and U.S. Manufacturing in a Global Economy With a Keynote Address by Laura Tyson

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Tax Policy and U.S. Manufacturing in a Global Economy

With a Keynote Address by Laura D'Andrea Tyson

Friday, March 15, 2013, 8:30 am - 12:30 pm

The Brookings Institution, Falk Auditorium, 1775 Massachusetts Ave, NW, Washington, DC

In his 2013 State of the Union address, President Obama stated "Our first priority is making America a magnet for new jobs and manufacturing." His 'Framework for Business Tax Reform' would support this priority by focusing and deepening the existing tax deduction for domestic manufacturing activities. Others, including Senator Orrin Hatch, ranking minority member of the Finance Committee, are cool to the idea, saying, "We're starting to come back in manufacturing, and I don't think you need the government to show the way for them."

This conference, cosponsored by the Urban-Brookings Tax Policy Center and the International Tax Policy Forum will assess the current state of U.S. manufacturing, its contribution to U.S. economic growth, and whether tax reform should change the tax treatment of manufacturing income.

- 8:30 am REGISTRATION
- 8:50 am WELCOME
Presenters: **William Gale** (Senior Fellow, The Brookings Institution)
 John Samuels (VP and Senior Counsel, General Electric)
- 9:00 am THE STATE OF U.S. MANUFACTURING
Moderator: **William Gale** (Senior Fellow, The Brookings Institution)
Panelist: **Martin Neil Baily** (Senior Fellow, The Brookings Institution)
- 9:45 am IMPACT OF TAXATION ON LOCATION OF MANUFACTURING ACTIVITIES
Moderator: **Mihir Desai** (Professor of Finance, Harvard University)
Panelists: **Paul Oosterhuis** (Partner, Skadden, Arps, Slate, Meagher & Flom LLP)
 Fritz Foley (Professor of Business Administration, Harvard Business School)
- 10:45 am SHOULD THE U.S. REFORM THE TAXATION OF MANUFACTURING?
Moderator: **James R. Hines, Jr.** (Professor of Economic and Law, University of Michigan)
Panelists: **Damon Silvers** (Director of Policy and Special Counsel, AFL-CIO)
 Donald Marron (Director, Urban-Brookings Tax Policy Center)
 Pamela Olson (Deputy Tax Leader, PricewaterhouseCoopers)
 Robert Atkinson (President, Information Technology and Innovation Foundation)
- 11:45 am KEYNOTE SPEAKER
Introduction: **John Samuels** (VP and Senior Counsel, General Electric)
Speaker: **Laura D'Andrea Tyson** (Chair in Global Management, Haas School of Business)
- 12:30 pm ADJOURN

Event Registration:

By phone: Brookings Office of Communications at 202.797.6105

Online: <http://www.brookings.edu/events>



International Tax Policy Forum

Web site: www.itpf.org

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About the International Tax Policy Forum

Founded in 1992, the International Tax Policy Forum is an independent group of more than 40 major U.S. multinationals with a diverse industry representation. The Forum's mission is to promote research and education on the taxation of multinational companies. Although the Forum is not a lobbying organization, it has testified before the Congressional tax-writing committees on the effects of various tax proposals on U.S. competitiveness. The ITPF also briefs Congressional staff periodically and sponsors public seminars on major international tax policy issues. The 2012 conference on "Taxation of Innovation in a Global Economy" was co-sponsored with the American Enterprise Institute.

On the research front, the Forum has commissioned over 20 papers on international tax policy topics such as the effects of the interest allocation rules on the competitiveness of U.S. firms, the compliance costs of taxing foreign source income, and the linkages between foreign direct investment and domestic economic activity (see www.ITPF.org).

Members of the Forum meet three times a year in Washington, DC to discuss key international tax policy issues with leading experts in government, academia, and private practice.

PricewaterhouseCoopers LLP serves as staff to the Forum. **John Samuels**, Vice President and Senior Counsel for Tax Policy and Planning with General Electric Company, chairs the Forum. The ITPF's *Board of Academic Advisors* includes ITPF Research Director Prof. **James Hines** (University of Michigan), Prof. **Alan Auerbach** (University of California, Berkeley), Prof. **Mihir Desai** (Harvard), Prof. **Michael Devereux** (Oxford), Prof. **Michael Graetz** (Yale), and Prof. **Matthew Slaughter** (Dartmouth).

ITPF Mission Statement

The primary purpose of the Forum is to promote research and education on U.S. taxation of income from cross-border investment. To this end, the Forum sponsors research and conferences on international tax issues and meets periodically with academic and government experts. The Forum does not take positions on specific legislative proposals.



Tax Policy Center

Urban Institute and Brookings Institution

The Tax Policy Center, a joint venture of the Urban Institute and the Brookings Institution, has been filling a critical need for effective tax policy analysis since it opened its doors in April 2002. Our objective, timely, and accessible information helps policymakers, journalists, academics, and taxpayers identify and evaluate current and emerging tax policy options. We believe that better information, rigorous analysis, and fresh ideas injected at key points in the policy debate can forestall bad policies and reinforce good ones. Since its inception we have focused on four overarching areas:

Fair, simple, and effective taxation. Virtually everyone agrees that taxes should be simple, fair, and efficient. But policymakers disagree over how to define and achieve those objectives. We quantify trade-offs among these goals and identify reforms that increase simplicity, equity, and efficiency

Social policy in the tax code. Over the past decade, much of social policy has shifted from direct expenditures to tax subsidies. A full assessment of social policy as well as tax progressivity, marriage penalties, and related issues requires consideration of both tax and spending programs. The TPC is evaluating this revolution in tax and social policy.

Long-term implications of tax and budget choices. The U.S. faces a dismal fiscal future in part because of unfunded public obligations related to rising health care costs and the retirement of Baby Boomers. We examine the implications of current policies and proposed tax changes on future generations.

State tax issues. Many Americans pay more in state and local taxes than they do in federal ones, and like the federal government, states often use the tax system to encourage business development and help low-income families. As part of UI's State and Local Finance Initiative, TPC experts analyze how federal state and local tax policies interact and evaluate the fairness and efficiency of different ways that governments raise revenue.

Awarded 2012's Tax Notes Person of the Year by Tax Analysts

Awarded 2012's Best Think Tank by the Washington Post's Wonkblog

"The Tax Policy Center, if anything, comprises a gang of raging moderates from both parties who have infuriated ideologues for years by simply telling the truth about the tax system. It has one of the more reliable and unbiased computer models of the nation's tax system."

David Firestone, *New York Times*

"In a highly polarized political environment many did not know whom to believe. The Tax Policy Center was there to help. The Center provides non-partisan, expert but common language analysis of the likely implications of tax policies and proposals, making it a key resource for journalists, policy makers, and citizens."

The John D. and Catherine T. MacArthur Foundation, in awarding the Center a 2010 MacArthur Award for Creative and Effective Institutions

"In a tax debate in which bombast and sound bites often crowd out facts, figures, and reasoned analysis, the Tax Policy Center provides all three, in a easy-to-access, easy-to-understand fashion."

David Wessel, *Wall Street Journal*

TaxVox the Tax Policy Center blog

Timely commentary on tax and budget issues. It's syndication partners include *Forbes* and the *Christian Science Monitor*.

THE NUMBERS

Tables and estimates from TPC's state-of-the-art microsimulation model of the federal tax system.

STATE & LOCAL FINANCE DATA QUERY SYSTEM

Information from the Census of Governments for all 50 states and the District of Columbia over time.

TAX FACTS

Tax information for citizens, policy analysts, legislators, and the press on federal, state, local, and international tax systems.

TAX TOPICS

Explanatory and analytical publications, distributional and revenue estimates, and background information on the nation's pressing tax issues.



THE TAX POLICY BRIEFING BOOK

"A handy primer on how the tax system works."

Tom Herman, *The Wall Street Journal*

Tax Incentives to Conduct Offshore Manufacturing under Current Law

Paul Oosterhuis

Moshe Spinowitz

March 15, 2013

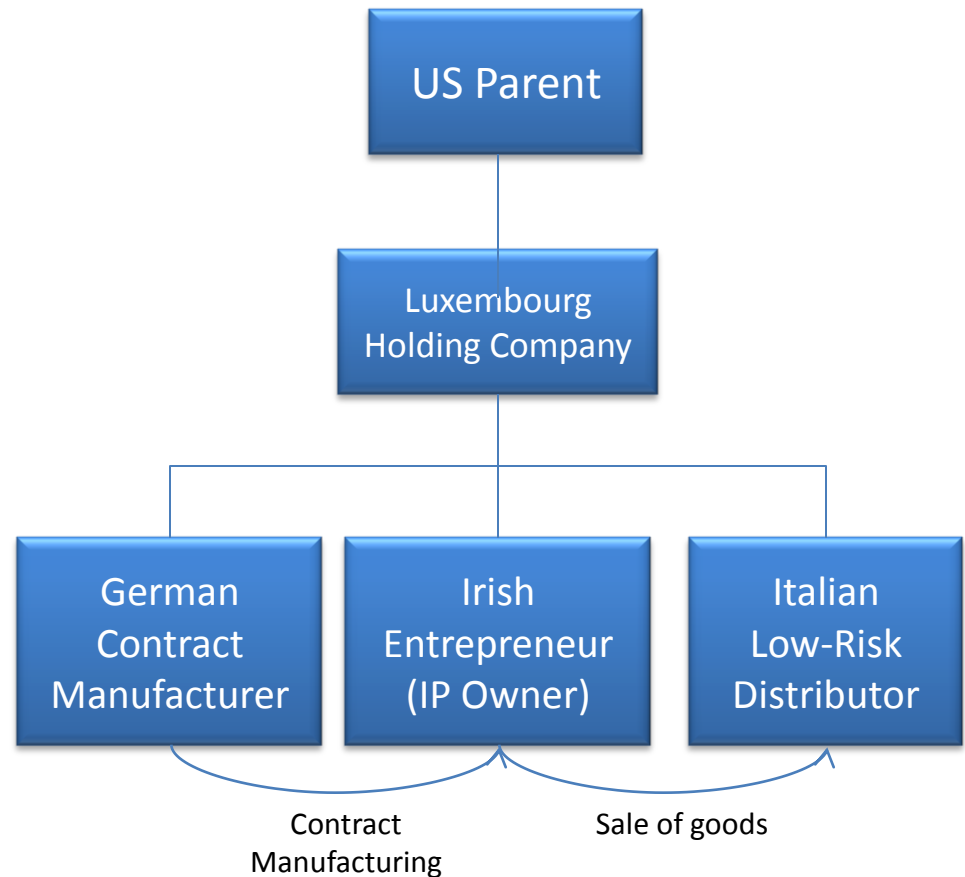
Manufacturing Location Decisions under Current Law

- U.S. multinational corporations often seek to maximize their tax-deferred foreign earnings by holding high-profit intellectual property in foreign subsidiaries (CFCs).
- To do so, U.S. multinationals must structure their operations so that the CFC's income is not subject to current taxation in the United States, under subpart F or otherwise.
- In most situations, a CFC can most readily earn IP income without being subject to current U.S. taxation if the CFC, either directly or through a contract manufacturer, conducts manufacturing activities *outside the United States*.
- As a result, under the current system of worldwide taxation with deferral as limited by subpart F, U.S. multinationals face significant hurdles in conducting domestic manufacturing to the extent the associated intellectual property is held outside the United States.

Common Foreign IP Holding Structures

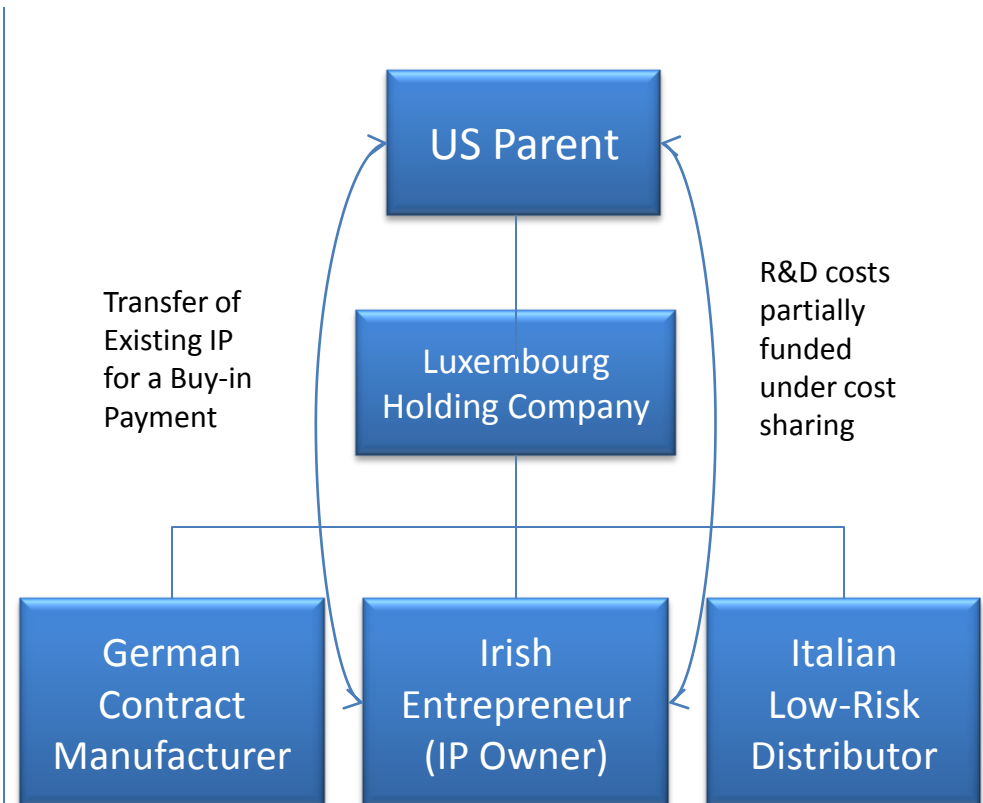
Common IP Holding Structures: Principal Structure

- U.S. multinationals will often structure their operations such that their intellectual property, or some portion thereof, is managed and exploited by a central foreign IP holding company (“Foreign Entrepreneur”) that assumes the business risks – and earns the profits – associated with IP ownership and management.
- IP is transferred through a cost-sharing or licensing arrangement.
- The affiliated Foreign Entrepreneur will be responsible for manufacturing directly or hiring and supervising contract manufacturers, and reselling product to low-risk distribution affiliates in the countries of sale.
- The Foreign Entrepreneur will earn the residual profit associated with the purchase and resale of goods.



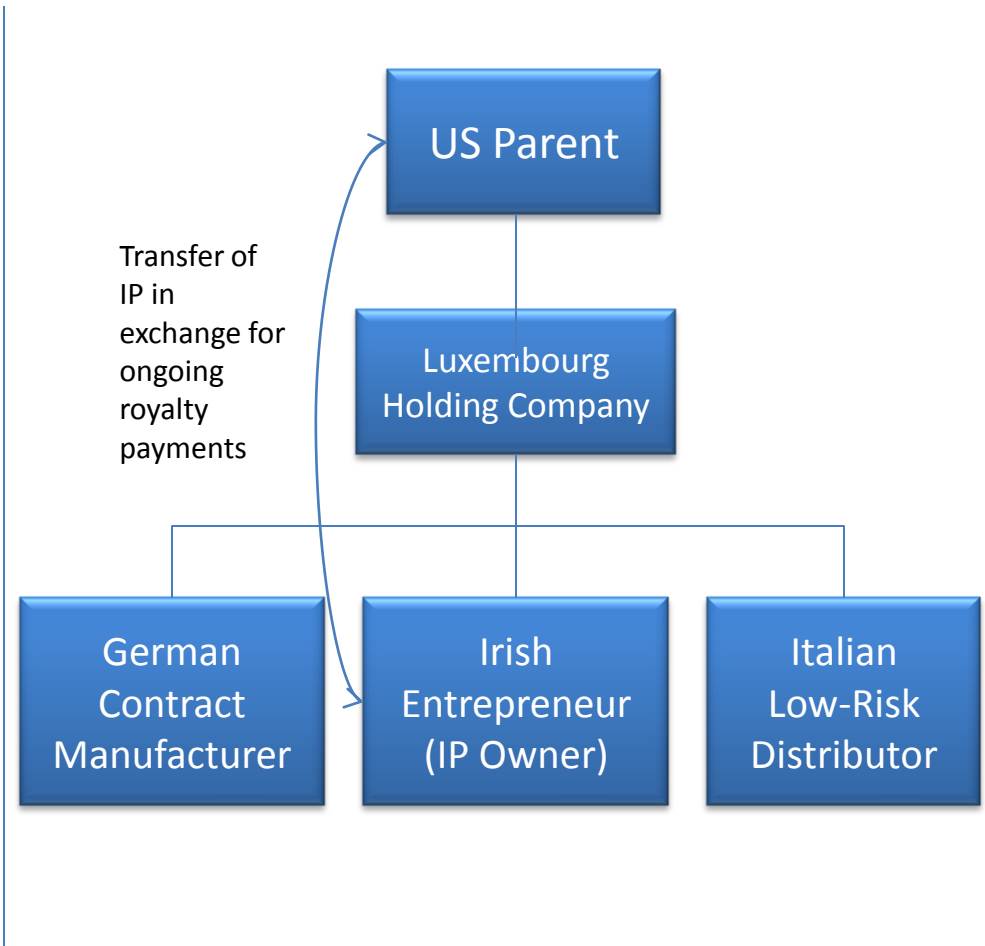
Common IP Holding Structures: Cost Sharing

- In a cost sharing structure, the U.S. Parent will transfer the rights to existing intangibles – generally only in foreign markets – to a foreign affiliate (the Foreign Entrepreneur) in exchange for an initial buy-in payment.
 - The buy-in payment will constitute taxable income of the US Parent.
 - The payment can take the form of a one-time payment or a royalty to be paid over time.
- Thereafter, the Foreign Entrepreneur will be responsible for funding the portion of global R&D costs associated with the ongoing development of IP in its territory.
 - The portion funded by the Foreign Entrepreneur is typically determined by the ratio of foreign sales revenue to global sales revenue of products related to the funded IP.
- One or more domestic affiliates will perform the R&D services funded under the cost-sharing agreements.
- The Foreign Entrepreneur will then directly or through affiliates manufacture and distribute the product, and the Foreign Entrepreneur will earn the profit associated with the ownership of the IP in its territory.



Common IP Holding Structures: Licensing

- In a licensing structure, the U.S. parent will transfer the rights to existing intangibles to a foreign affiliate (the Foreign Entrepreneur) in exchange for ongoing royalty payments.
- The royalty payments will constitute taxable income of the US Parent.
- The Foreign Entrepreneur may fund future R&D related to the licensed products.
- The Foreign Entrepreneur will then directly or through other affiliates manufacture and distribute the product, and the Foreign Entrepreneur will earn the profit associated with the IP rights it has licensed.



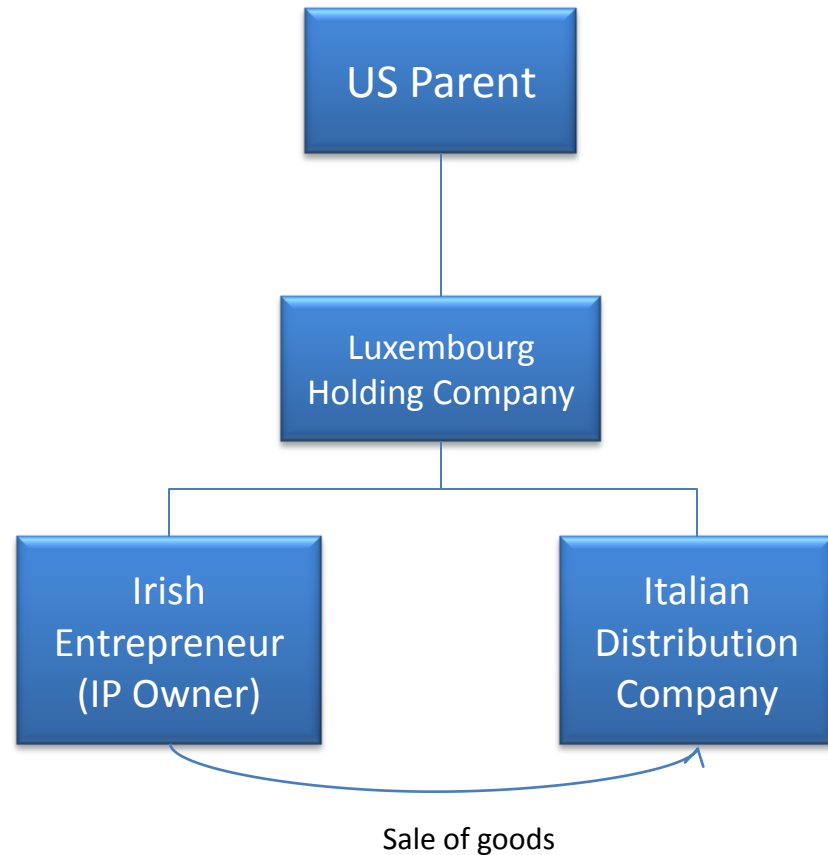
Obtaining Deferral on Income from Manufacturing for Foreign Markets

Manufacturing in U.S. for Export

- A domestic corporation that manufactures in the U.S. for export is subject to taxation on its income at a 35% statutory rate.
- Various tax incentives that were designed to reduce the tax rate on such export income – e.g., DISC, FSC, and ETI – were rejected under the GATT and WTO rules.
- The effective tax rate on export income can be reduced by:
 - accelerated depreciation;
 - the section 199 deduction for domestic production activities;
 - the use of third-party debt financing;
 - cross-crediting
 - 50% of export income is characterized as foreign source income, increasing a domestic corporation's foreign tax credit limitation and potentially allowing the corporation to claim additional credits on other high-tax foreign income.
 - Over the past ten years, the value of cross-crediting has substantially diminished as foreign countries have reduced their corporate tax rates.
- For products with high IP values, the value of depreciation and interest deduction in reducing the domestic effective tax rate can be relatively small given how much of the income is attributable to intellectual property. For example, the cost of manufacturing many pharmaceutical products is 5% or less of customer revenues while overall product margins on such products can be 30% of revenues or greater.

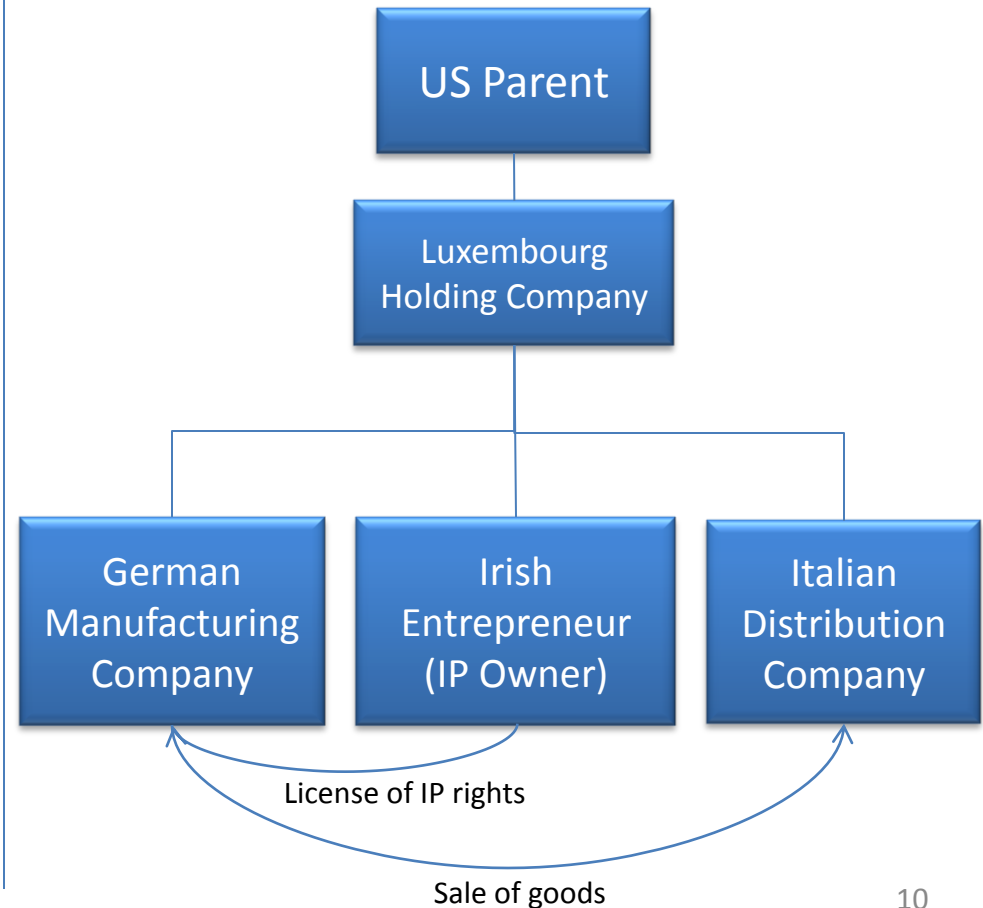
CFC Manufacturing in Low-Tax Foreign Jurisdiction

- As a general matter, CFCs are not subject to taxation in the U.S. unless they have a permanent establishment in the U.S.
- The U.S. Parent can be taxed on the CFC income on a current basis if the income is includible under subpart F.
- Two categories of subpart F income are potentially relevant in this context:
 - foreign personal holding company income
 - foreign base company income
- Where the Irish Entrepreneur manufactures the goods in its own factory and sells them to the Italian distribution company for resale in Italy, the CFCs' income will not be subject to current under subpart F.
- If the Irish Entrepreneur owned manufacturing facilities in the U.S., all IP profit would be subject to direct U.S. tax.



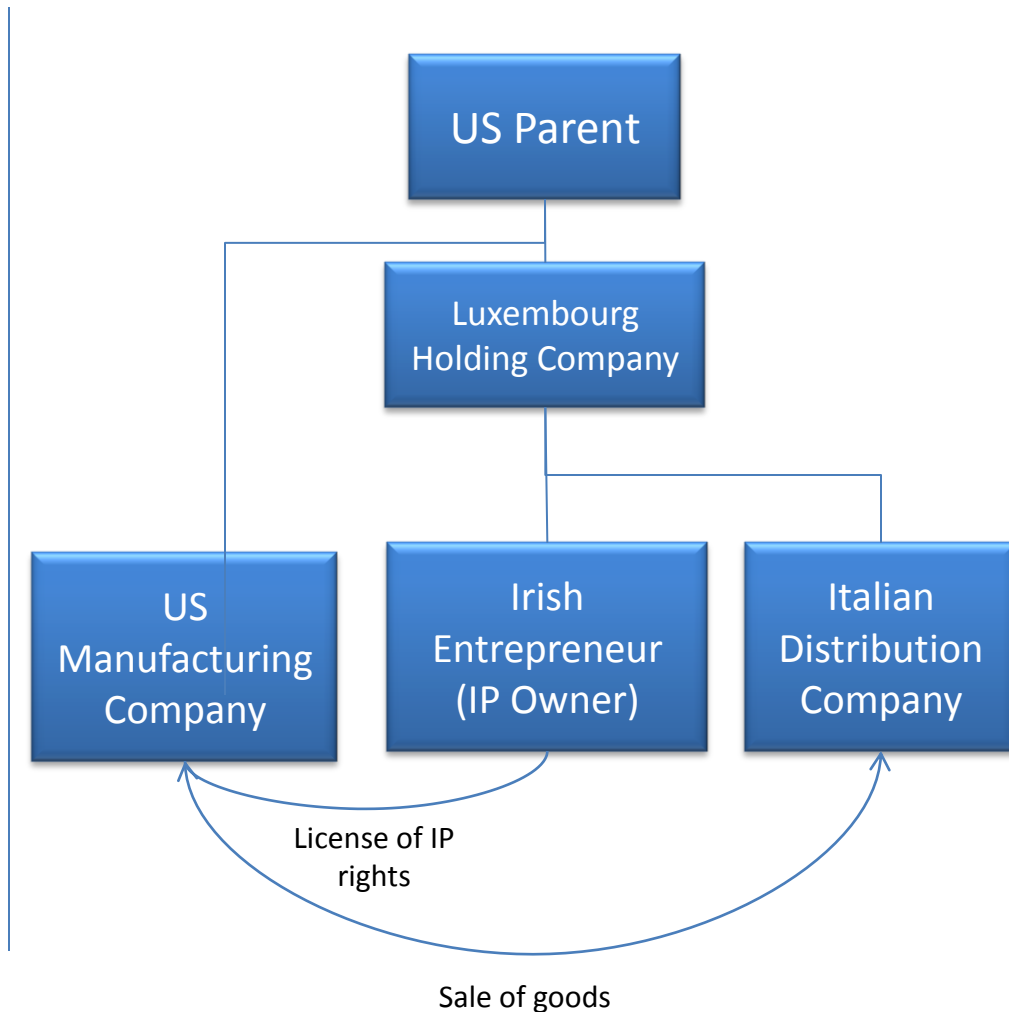
CFC Manufacturing in High-Tax Foreign Jurisdiction – Royalty Model: Avoiding Subpart F Foreign Personal Holding Company Income

- In this scenarios, the Irish Entrepreneur earns royalty income from the German manufacturer.
- Royalty income is generally subject to inclusion as foreign personal holding company income under section 954(c)(1)(A).
- However, under section 954(c)(6), the royalty income paid by the German company to the Irish company will not be includible under subpart F.
- Section 954(c)(6) is currently set to expire at the end of 2013.
- In the absence of section 954(c)(6), the U.S. Parent could check-the-box to treat the German company and the Irish Entrepreneur as disregarded entities, thereby eliminating the intercompany royalty for U.S. federal income tax purposes.



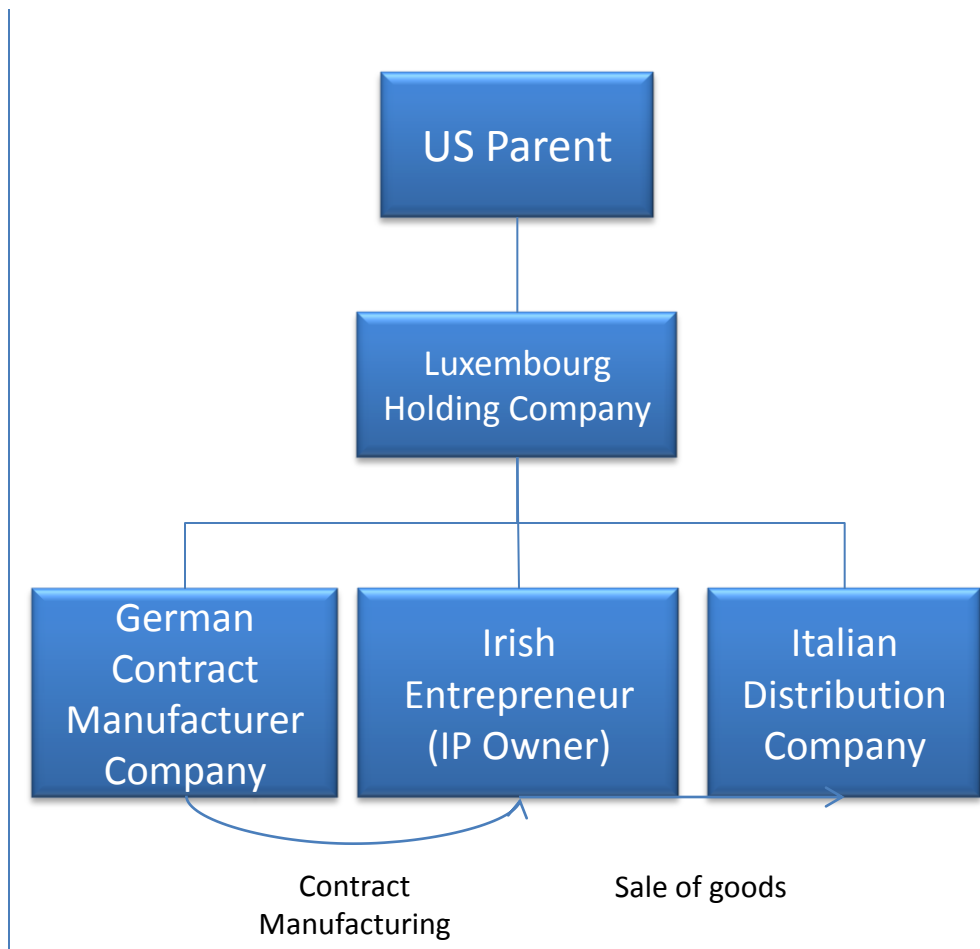
Comparison to Irish Entrepreneur Using a U.S. Manufacturing Company

- In this scenarios, the Irish principal company will earn royalty income from the US manufacturer.
- Section 954(c)(6) does not apply to the royalty paid to the Irish Entrepreneur by a U.S. company, and check-the-box planning would result in direct U.S. taxation of the IP income.
- As a result, the use of a U.S. manufacturer would result in little if any deferral benefit for the Irish Entrepreneur.



CFC Manufacturing in High-Tax Foreign Jurisdictions – Contract Manufacturing Model: Avoiding Subpart F Foreign Base Company Sales Income

- Under section 954(d), the Irish company's income from its buy-sell operation will be foreign base company sales income unless the Irish company is considered the "manufacturer" of those goods.
- A CFC is considered the manufacturer of goods if it "substantially contributes" to the manufacture of the goods through its oversight of a contract manufacturer. Treas. Reg. 1.954-3(a)(4)(iv).
- The "substantial contribution" regulations were promulgated in 2008; prior to that time the law in this area was unclear.
- The CFC's "substantial contribution" must be done using its own employees.



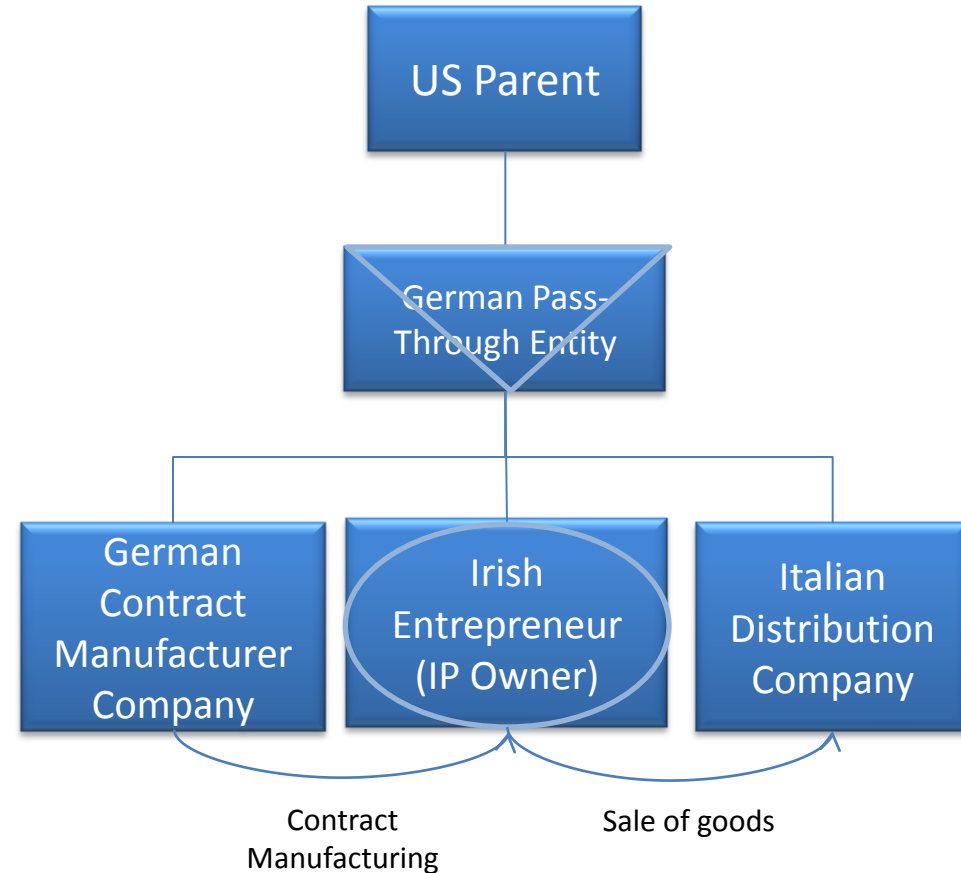
Contract Manufacturing: Substantial Contribution

- Treasury Regulation § 1.954-3(a)(4)(iv)(b) sets forth the following non-exclusive list of activities involved in determining whether a CFC satisfies the substantial contribution test:
 - Oversight and direction of the manufacturing process
 - Material selection, vendor selection, or control of raw materials, work-in-process, or finished goods
 - Management of manufacturing costs and capacities (e.g., management of risk of loss or cost efficiency initiatives)
 - Control of manufacturing related logistics
 - Quality control
 - Developing or directing the use or development of product design, trade secrets, or other IP for use in manufacturing.
- The Irish Entrepreneur must satisfy this test without being deemed to have a permanent establishment in Germany.
- The Irish Entrepreneur must satisfy the German tax authority that the German contract manufacturer is adequately compensated.

Contract Manufacturing Model: Same Country Exception

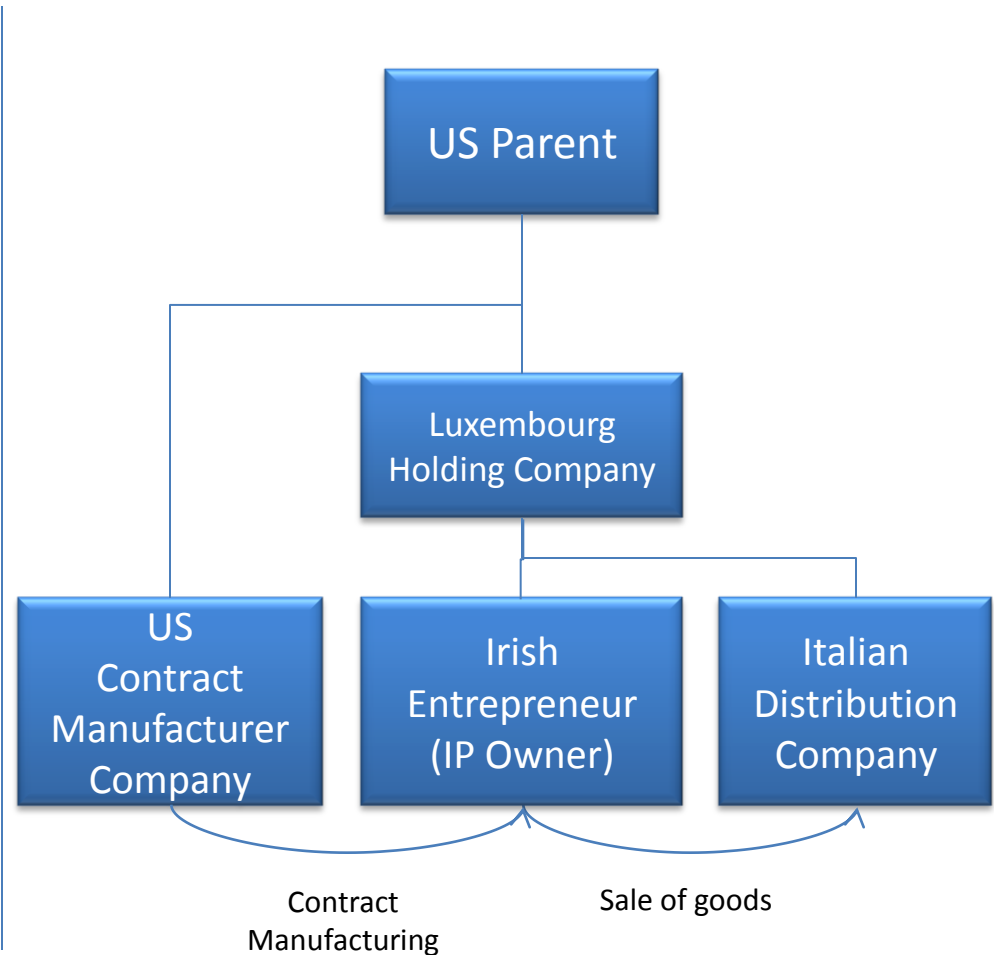
Avoiding the Substantial Contribution Requirements

- Under section 954(d)(1)(A), a CFC's income from the sale of goods to a related party will not be foreign base company sales income if the good is manufactured by the CFC or another party in the CFC's home country.
- The German Pass-Through Entity is treated as a pass-through for German tax purposes, but US Parent elects to treat it as a corporation for U.S. tax purposes. The German Contract Manufacturer and Irish Entrepreneur are treated as disregarded entities.
- The income of the German Contract Manufacturer and the Irish Entrepreneur is treated as income of the German Pass-Through Entity for U.S. tax purposes, and is not foreign company sales income because the good sold to the related party distributor is manufactured in the German CFC's home country.
- From a foreign perspective, the IP income is earned by an Irish entity and is not subject to taxation in Germany.



Comparison to Irish Entrepreneur Using a U.S. Contract Manufacturer

- Subpart F Risk
 - The Irish principal company must meet the “substantial contribution” test to avoid current taxation under subpart F.
 - Practical limitations of having the Irish Entrepreneur supervising the U.S. manufacturing affiliate of a U.S. parent company.
- PE Risk
 - The “substantial contribution” activities of the Irish company might constitute a U.S. permanent establishment.
 - Practical limitations of having the Irish Entrepreneur supervise the U.S. manufacturer from outside the United States.
- Transfer Pricing Risk
 - Given that the U.S. is performing R&D for U.S. sales, conducts manufacturing for U.S. sales, and indirectly distributes for U.S. sales, it may be difficult to argue that the residual profit is allocated to the Irish Entrepreneur. For export sales, the argument is stronger but still difficult.



Summary of Current Law Impediments to Domestic Manufacturing

- **Subpart F – foreign personal holding company income (section 954(c)) and foreign base company sales income (Section 954(d))**
- **US PE Risk**
- **US transfer pricing risk**

Options for Reform

- Expand Subpart F
 - Repeal section 954(c)(6) and the check-the-box rules.
 - Expand foreign base company sales income by prohibiting contract manufacturing (i.e., not treating the supervisor of a contract manufacturer as satisfying the manufacturing exception), and eliminating the same country exception.
 - These would have the effect of substantially curtailing the availability of deferral on foreign earnings, where the manufacturing operations are conducted outside the low-tax country.
 - Low-taxed CFCs that own their own manufacturing facilities would continue to be able to obtain deferral on their IP income.

- Narrow Subpart F & Clarify Transfer Pricing Rules
 - Subpart F could be narrowed, particularly in the context of broader international tax reform, to end the bias against U.S. manufacturing for export with minimal risk of raising a WTO challenge.
 - Eliminate the foreign base company sales income rules so that a CFC could use either a U.S. or foreign contract manufacturer without its buy-sell income being subject to current U.S. taxation.
 - Exclude from foreign personal holding company income any royalties paid by a domestic manufacturer to a CFC, so that a CFC could license its IP to either a foreign manufacturer or a domestic manufacturer without the royalty income being subject to current taxation.
 - To protect the U.S. tax base, U.S. tax might be imposed on income from the sale of goods by low-taxed CFCs into the U.S. market.
 - Make clear, by regulation or otherwise, that the appropriate compensation to be earned by a domestic contract manufacturer is the same as the compensation that would be earned by a third-party contract manufacturer under the same circumstances.

U.S. Manufacturing: Understanding its Past and its Potential Future

Martin Neil Baily and Barry P. Bosworth

Brookings

February 17, 2013

As recently as 2010, the United States had the world's largest manufacturing sector measured by its valued-added and, while it has now been surpassed by China, the United States remains a very large producer. Nor is it correct to say the sector is disappearing, since the growth rate of manufacturing real value-added has consistently equaled or exceeded that of the total economy, maintaining a constant ratio to real GDP. There is also evidence that technological innovation is proceeding at a rapid rate; for example the rate of issuance of patents to US residents has increased substantially since the 1970s.¹ However, as a source of income and employment, the sector's importance has declined dramatically. The manufacturing share of *nominal* GDP has fallen from about 25 percent in 1960 to 12 percent today, with an even larger drop in the employment share (from 24 to 9 percent).

The decline in employment share is longstanding, but the rapid recent decline in the absolute level of manufacturing jobs has led to talk of a crisis in the sector. After holding steady at 17 million jobs throughout the 1990s, payroll employment fell by 6 million between 2000 and 2010. It has recovered about 500,000 jobs since then, through 2012. The other aspect of the manufacturing crisis, if it is a crisis, is the deficit in international trade. The large U.S. trade and current account deficits are more than accounted for by the shortfall of manufacturing exports over imports. U.S. manufacturing does not seem to be competitive globally at prevailing exchange rates despite the fact that compensation per hour is lower than in many European

¹ Based on data from the US Patent and Technology Office. While the rise in the number of patents is striking there are problems of comparability over time with changing standards of what can be patented and how quickly patents are processed.

economies. The fact that the decline in manufacturing employment has coincided with the emergence of a huge bilateral trade imbalance with China has caused both popular and academic writers to “put two and two together” and blame China for the problems of U.S. manufacturing.

This paper tries to understand the different and conflicting trends in U.S. manufacturing and uses that understanding as a way to see how the sector may evolve in the future.

Output and Employment Trends

There are two striking and somewhat contradictory features of the long-term development of the manufacturing sector dating back more than half a century: First, the growth of real output in the sector, measured by value-added, has equaled or exceeded that of total GDP. Second, there is an equally long-standing and very steady decline in the share of total employment attributable to manufacturing.² Both of these trends are highlighted in Figure 1, and both seem inconsistent with stories of a sudden crisis in the sector.

The constancy of the output share is perhaps the most surprising indicator and also potentially the most misleading because it is largely due to technological developments in a single industry, computers and electronic products. That industry encompasses many of the new technologies for electronic products; and, while several of the latest areas of innovations (cellular phones, flat-screen TVs, and tablets) have largely bypassed U.S. manufacturers, the US-based industry continues to generate rapid rates of real output growth driven by quality improvement.

The importance of the computer and electronic products industry is highlighted in Table 1. We only have consistent industry-based data back to 1987, but over the 1987-2011 period, real value added in manufacturing expanded at precisely the same rate as GDP as a whole, 2.5 percent per annum. The exclusion of computers and other electronics, however, reduces the

² Edwards and Lawrence (2013) highlight this trend.

growth rate to 0.6 percent. Even though the industry represented only about ten percent of nominal value added in manufacturing, its real growth rate averaged nearly 20 percent annually—30 times that of the rest of the sector—and its effects on the growth of the overall sector are dramatic. The exclusion has an even larger impact on the production of durable goods, whose annual growth rate declines from 4.0 to 0.6 percent. It is also very evident that outside of the computer and electronics industry, there is a secular decline in manufacturing's share of real GDP.

The measures of value added are constructed by the Bureau of Economic Analysis (BEA) within an input-output framework that provides nominal values for gross output of the industry, purchases of intermediate inputs, and value added. Indexes of the prices of gross output and intermediate inputs are assembled from the price index programs of the Bureau of Labor Statistics (BLS). In effect, the estimate of real value added is a residual of the calculation of the real values of gross output and intermediate materials³, and the price of value added is an implicit price obtained from the ratio of the nominal and real values. The various component estimates of the computer and electronic products industry are summarized in Table 2. The rapid growth of real value added in the industry is largely driven by the evidence of large declines in the quality-adjusted prices of its gross output. Because value added has typically accounted for less than half of gross output, changes in the latter are greatly amplified in their impact on value added. Hence a 6 percent average annual rate of decline in the price of gross output translates into a 13 percent rate of decline in the value-added deflator, and a 20 percent annual rate of growth for real value added.

³ The growth of real value added is the growth of gross output minus the growth of inputs, weighted by the nominal share of inputs in value added.

The Employment Decline

The decline in manufacturing employment as a share of the economy-wide total is a longstanding phenomenon, dating back to the 1960s, and is a trend shared by all advanced economies.⁴ Looking at manufacturing as a single sector, one can tell a simple story in which it looks very much like agriculture. Output per worker grows more rapidly in this sector than in the rest of the economy, which contributes to a fall in the relative price of manufactured output, but the joining of income and price elasticities of demand is insufficient to raise output as a share of real GDP (the income elasticity is estimated to be around unity and the price elasticity slightly less than unity in absolute value). The combination of a stable output share and above-average growth of productivity, leads to a downward trend in the manufacturing share of total employment. The fact that all other advanced economies show declining employment shares suggests that fundamental economic forces are at work, rather than a story of a specific US problem.

Breaking the sector down into computers and the rest of manufacturing makes this story more complex. Output per worker in the non-computer part of the sector is not always faster than in the rest of the economy and its share of real GDP steadily declines. More of the downward trend in employment in manufacturing ex-computers can be attributed to the slow growth of demand for non-computer goods made in the United States and less to faster productivity growth. In turn, that raises the question why output growth has been so slow and three answers are, first, that overall GDP growth has been slow since 2000, second, the trade

⁴ Data from the Bureau of Labor Statistics (2012) indicate that the decline in the share of U.S. employment accounted for by the manufacturing sector over the past 40 years (about 14 percentage points) is equal to the average of the G-7 economies.

deficit rose from the mid-1990s until 2007 and, third, the income elasticity of demand for this part of manufacturing output may be less than unity.

It is possible of course to disaggregate manufacturing further than just computers and the rest and we should expect to see differences in output and employment trends as income elasticities, price elasticities and productivity growth vary by industry. With greater disaggregation, there is more room for substitution in response to relative price changes, and opportunities for trade and specialization on a global scale greatly expand the room for differential patterns of growth. Table 3 shows data on output, labor input, labor productivity and multifactor productivity for 18 manufacturing industries and for total manufacturing and durables and non-durables from the BLS. BLS figures for output are based on the gross output of the industry, netting out intra-industry flows.⁵ The pattern of extraordinary productivity growth within the computer industry is clear in these data also, and it is notable that the largest rates of employment decline occur in apparel and textiles where the U.S. industry has lost comparative advantage. Manufacturing growth is strongest in machinery, transportation, and electronics; but the fall in employment is pervasive; all but one of the industries shows a decline in labor input between 1987 and 2010.

Box: Bias in the measurement of manufacturing inputs

As we have pointed out, the rapid rise in both manufacturing labor productivity (real value added per hour) and in MFP is the result of a large rise in real gross output, almost all of which comes from computers, and very slow growth in real purchased material inputs (a decline

⁵ There is relatively little difference between the BEA series for persons engaged in employment and the BLS hours worked data. There is a big effect, as we noted earlier, between growth in real gross output and real value added.

in real inputs in the computer industry). A series of valuable papers has explored possible biases in the measurement of material inputs coming from the input price deflators.

Outlet substitution bias is a familiar issue arising in output price deflators and a similar bias arises in constructing import price indexes. If a US-based manufacturer shifts its purchases of components from one producer to another in order to get a lower price, then the price decline is missed. The components from the new source are treated as different products from the components from the previous supplier. This problem arises even if the buyer switches suppliers within the United States, but has become of greater importance as American companies started buying more low-price components from Asia or Mexico. The traditional outlet substitution bias causes inflation to be overstated and productivity growth to be understated but the bias on the purchased input side will cause real inputs to the manufacturing sector to be understated and hence manufacturing productivity overstated. Susan Houseman et al.(2011) use approaches developed by Diewert and Nakamura (2009) to make an estimate of the bias and find that real value added is overstated by about 0.2 percent a year. Feenstra et al. (2013) draw on the economics of variety from the international trade literature and give a more expansive analysis of biases, one that includes outlet substitution bias but also estimates the impact of the increased number of suppliers that is now available.⁶ They consider the whole business economy, not just manufacturing, and estimate that growth in GDP (real value added) originating in this sector is overstated by about 0.15 percent a year. Most of this bias occurs in manufacturing, however, and we think their findings imply about 0.7 percent a year overstatement of manufacturing real value added growth, coming roughly half and half from outlet substitution and from the impact of the greater variety of input sources.

⁶ They also look at the impact of changes in tariffs and how they are treated in price and quantity indexes. They say these policy shifts did induce a bias in import price indexes but only a very small one.

One caution to these estimates of bias in the measures of value added is that there may be offsetting biases elsewhere. The matched model approach is used for a large fraction of manufacturing output as well as for inputs, so there is likely an understatement of real gross output that offsets some of the understatement on the input side. (Feenstra et al. stress this point.)

The biggest potential bias in the data is in the computer and electronics industry.⁷ Starting after 1997, the output price index for this industry was changed from a matched model approach to a hedonic-based index with no corresponding shift in the price index for inputs. Measured real value added exploded after 1997, an effect large enough to move output and productivity measures for the whole manufacturing sector. BLS should take a hard look at its input price indexes and correct biases it can verify. However, with reported MFP growth of over 10 percent a year, fueled by the continuation of Moore's law and other advances, correcting the input price data is unlikely to change substantially the basic story for this industry or for the rest of manufacturing.

End Box

The Role of Trade

The United States last achieved a balance of trade in manufactures in the early 1980s, and the size of the trade deficit has steadily grown over time. In the mid-2000s, it represented nearly half of manufacturing value added and is still equivalent to about 40 percent. Furthermore, the deficit in manufacturing trade (\$440 billion in 2011) exceeds the total current account imbalance of \$416 billion since the United States has a surplus in services trade and records a net inflow of

⁷ Both papers stress the importance of this sector.

income on its foreign investments.⁸ These statistics are often used to argue that the trade deficit has the primary cause of the decline in manufacturing value added and employment. However, those numbers provide a misleading impression of the effects of the trade deficit or its elimination on manufacturing output and employment. First, the reduction or elimination of the manufacturing trade deficit would not imply an equal increase in manufacturing value added. Manufacturing value added is only about a third of gross output. Increasing the gross output of manufactured goods within the U.S. economy in order to replace net imports would of course generate greater value added output and employment in the sector, but much of the gain would be added output of other sectors that supply manufacturing, including increased imports of energy and other non-manufactured inputs.⁹ To make a rough estimate of the impact of the trade deficit on manufacturing, therefore, we look at its size relative to gross output. The deficit has risen over time, but as a share of manufacturing gross output, it increased from a rather low level of 5 percent in 1990 to a peak of 16 percent in the mid-2000s. It then fell to 12 percent in 2009 with the recession, and was 13 percent in 2011.¹⁰

As a very simple exercise, we can explore some of the consequences of an elimination of the manufacturing trade deficit on the assumption that there are sufficient domestic resources to absorb the increase in production. The elimination of the 2011 trade deficit would suggest an increase in labor and other inputs into manufacturing of a matching 13 percent, or about 1½

⁸ In 2011, the manufacturing trade deficit was \$440 billion compared to a balance on goods and services of \$560 billion and \$470 billion for the current account (inclusive of factor income and transfers).

⁹ To achieve a large reduction in the manufacturing deficit would require a major macroeconomic adjustment and practical problems of whether the technology, capital and skills would be available in the US currently to increase manufacturing output quickly. We are ignoring these complications. The exercise here is to provide an order-of-magnitude estimate of the possible impact of a smaller trade deficit.

¹⁰ The manufacturing trade data are reported on a NAICS basis after 1997. For earlier years, we estimated the trade by applying a constant ratio to the SIC-based data provided in Schott (2010).

million additional jobs.¹¹ This is a lot of jobs, but still a relatively small gain when contrasted against the net loss of 6 million manufacturing jobs between 1990 and 2011, when the manufacturing share of total employment fell from 15 percent to 9 percent. The primary lesson that, while the manufacturing trade deficit has important employment consequences, the fall in the sector's share of total employment is largely attributable to above average gains in productivity, and slow growth in manufacturing demand.

Second, both the trade deficit and the level of employment in manufacturing have been strongly affected by the domestic business cycle. Much of the trade deficit developed during a period, 1990 to 2007, when the domestic economy was particularly strong; the Congressional Budget Office estimates that the utilization of potential GDP averaged 99.9 percent. It is a reminder that there is not a simple line of causality from the trade deficit to domestic employment in manufacturing. Two successive spending booms in the United States, in the late-90s and then 2002-07, pulled in imports from abroad. Domestic demand led the way, as the share of GDP devoted to personal consumption expenditures soared by more than 6 percentage points between the early 1980s and the mid-2000s, the national saving rate plummeted, and the real exchange appreciated substantially—all consistent with a surge of domestic spending, and not with trade pressures originating abroad. Given the high utilization rate, any reduction in the manufacturing trade deficit would have had to be absorbed largely by a reallocation of domestic employment rather than an increase the total. Such a reallocation would have had distributional consequences, helping workers and communities where manufacturing is important to the economic base (see for example, Autor et al., 2013). China has played a key role in the

¹¹ Similar numbers are obtained by Lawrence and Edwards (2013) who rely on a more refined calculation using a detailed input-output table.

emergence of a large trade deficit, but the causal flow runs as much from U.S. policies as those of China.

The two spending booms were different in character. In the 1990s there was a surge of investment in new technologies. That boom was favorable for manufacturing output and employment with peak levels of auto and capital goods production. Total employment grew rapidly, and the absolute level of manufacturing employment remained constant over this period. The boom from 2002-07 was driven by housing and a surge in consumption fueled by the rise in housing prices. The unemployment rate moved below 5 percent in the post-2000 boom but this was largely a product of low labor force growth. Payroll employment in the private sector rose by only 3.5 percent 2000-2007 compared to 20 percent in the prior seven years. With manufacturing employment a declining share of total employment, it is not surprising the number of jobs in this sector fell sharply after 2000, even before the Great Recession.

In the Great Recession total private payrolls declined 7.6 percent and manufacturing jobs 16.6 percent, despite a decline in the ratio of net imports to manufacturing gross output. The manufacturing trade deficit got better but the employment situation got much worse, both figures driven by the cyclical decline.

In a post-financial crisis economy of chronic unemployment, the shrinkage of the manufacturing sector has become a much greater cause of concern, and the effort to do better on the trade front has become a key national objective. The National Export Initiative announced by the Obama Administration at the beginning of 2010 set a goal of doubling exports over a 5-year period. Manufacturing is an important sector and needs to be competitive in order for the US economy to return to full employment with a sustainable trade balance. Improving the US export position cannot be quickly achieved. It will take years to rebuild the domestic supply chain and

undo the incentives that have encouraged American firms to shift their production abroad. It is particularly difficult at a time of global recession when other countries are pursuing the same objective.

As shown in table 4, the United States has a large manufacturing trade imbalance with most regions of the world. It has declined since it peak in the mid-2000s, but the imbalance with Asia continues to increase. It is equal to the global total, offsetting surpluses in some other areas. The imbalance with China is particularly striking both in its size and its rate of increase in recent years. In general, analysts prefer a multinational perspective on trade as opposed to an emphasis on the bilateral relationships, but over the past decade the magnitude of the US-China bilateral imbalance has reached extreme levels, and it is hard to ignore the dominant role that China plays in the regional distribution of the U.S. external deficit.

However, it is instructive to divide China's trade regime into two distinct components—normal trade and processing trade—that have been evolving in different ways. About half of China's trade is accounted for by processing activities, which are based on the duty-free import of goods to be assembled and re-exported. The distinguishing features of processing trade are the low contribution of domestic value-added and its domination by foreign-invested enterprises (80%). As such, China's processing trade is an integral part of a larger regional production network as companies in Asia that had long exported to the United States moved their assembly work to China. Morrison (2012) shows that US imports from the Pacific Rim countries, including China, have been a nearly constant share of U.S. manufacturing imports since 1990, but that China's share of that trade rose from 8 percent in 1990 to 55 percent by 2011. The exports are widely diversified by recipient country, but the United States is the largest single destination.

The development of transnational production networks is but one of a series of profound organizational innovations that have given millions of poor unskilled workers—particularly in Asia—access to a global economy that was limited for decades to a few high-income countries. Capital and technology are now mobile in ways they never were before, and both can move about the globe in search of the optimal combinations of skilled and unskilled labor and preferred institutional arrangements. The result has been an unprecedented growth of a global middle class, people living well beyond the level of subsistence. But those innovations have also introduced a more competitive and rapidly changing set of circumstances for some in the older developed economies.

The distinction between the processing and normal trade components is important to evaluate the importance of trade as a driver in China's overall growth. The trade sector is certainly oversized by the standards of other large countries; but, as highlighted in a recent paper by Koopman, Wang, and Wei (2012), the domestic value-added content of processed exports is much lower than that of normal exports. They used a detailed input-output table to estimate the foreign and domestic content of exports, and found a sharp contrast in the 1990s when the domestic content of the processed exports was only about 20 percent compared to 90 percent for normal exports. The two components have become more similar over time: the domestic share of processed goods has steadily grown as the foreign firms have increased their reliance of local sources for the components, and the domestic producers of normal exports have increased their use of foreign inputs. However, the domestic content of processed exports is still less than half that of normal exports.

China's normal (non-processing) trade has also grown very rapidly, and processing trade is actually a shrinking share of the total, falling from about 55 percent of the total in 2004 to

about 44 percent in 2011 (Table 5). However, processing imports have slowed in line with processed exports, and processing trade now accounts for China's entire trade surplus. Meanwhile, the balance of normal trade has fluctuated over the years and it has been in substantial deficit since 2008.

China's processing trade and the growth of the Asian production network are of particular importance to an understanding of the evolution of the U.S. manufacturing sector. Many American firms have shifted away from the prior model of large integrated production units in order to focus on product design and marketing. Thus, they contract with firms that are part of the regional production network in Asia, and undertake little of their own production. The computer and electronics industry is very striking in this regard, where American firms are still global leaders in the industry, but have reduced the amount they manufacture in the United States and rely on overseas contractors. The trade deficit in this industry rose from 14 percent of gross industry output in 1998 to 56 percent in 2011. Apple Inc. is a leading example of such a company: it owns no large production facilities in the United States or elsewhere¹², preferring to contract with companies in Taiwan and Korea who assemble the products in China. But, by controlling key elements in the value chain, Apple extracts much of the profit. Similar networks have become common in the market for personal computers. In contrast, Mattel has also closed all of its production facilities in the United States, but continues to operate factories throughout Asia.

The sizable role of processing trade also complicates the analysis of the effects of exchange rate changes. Most studies find the expected negative relationship between the real exchange rate and China's normal trade, but the impact on processing trade is complicated by the

¹² Apple CEO Tim Cook has announced that it will spend \$100 million (not much!) on facilities to assemble some Macs in the United States. <http://business.time.com/2013/02/12/state-of-the-union-why-is-apple-ceo-tim-cook-sitting-next-to-michelle-obama/>

additional need to take account of exchange rate changes for the component suppliers elsewhere in Asia: a joint appreciation will have a much larger effect than that of China's alone (Ahmed (2009), Thornbecke (2011)). Finally, the rising domestic content of processing trade suggests the exchange-rate elasticity of China's exports is increasing over time.

Further evidence of China's changing external situation is provided by the rise in the exchange rate, particularly when contrasted with the falling US rate, as shown in figure 2. Since the end of 2005, the real trade-weighted value of the RMB has appreciated by 15 percent and the dollar has fallen by 7 percent. The influence of the RMB increase seems evident in the growing deficit in normal trade; but some of the effects on processing trade have been offset by large coincident declines in the exchange rates of Korea and Taiwan, two major component suppliers.

Interestingly, from China's perspective, the United States is an important but not dominant export market. Exports to the United States were 20 percent of the total in 2011, about the same as the US share of global GDP, but the proportion of China's trade going to the United States has fallen substantially since 2001 when it accounted for 29 percent. China has a large trade surplus with the United States, but many of the exports are in the processing sector where the value added benefits are limited. The observation can also be made from the U.S. perspective. Observers frequently point to China as America's most rapidly growing market, but a more relevant statistic would be the steady decline in the U.S. share of the Chinese import market from 11.4 percent in 2001 to 7.7 percent in 2011.

Looking at U.S. competitiveness more generally, data from the BLS on international measures of unit labor costs in manufacturing suggest that the United States has achieved a major improvement in its competitiveness relative to other large G-7 economies. Unit labor costs fell by 19 percent between 2001 and 2011, while they rose by an average of 12 percent in the G-

7 as a whole. However, nearly all of the gain was result of the fall in the value of the dollar. In national currencies, the G-7 average declined by about 13 percent; still a relative improvement for the United States, but small. Hourly compensation costs have risen more slowly in other countries, but the United States has recorded a faster rate of improvement in labor productivity. Still hourly labor costs are lower in the United States than all of the large G-7 countries except the U.K.

Emerging Technologies in Manufacturing

Some observers that see a crisis in the manufacturing sector argue that investing in technology is the key to generating future growth and jobs in the sector.¹³ In this section we describe some of the most important emerging technologies in manufacturing and conclude that they have the potential to increase US-based output in the sector, although the number of jobs likely to be created is more of an open question.

Industrial robotics and automation – The last few years have seen rapid strides in the design technology of industrial robots allowing them to perform tasks that can today only be performed by humans. Many of these tasks require dexterity that robots are only now acquiring, while others require minor adjustments and variances, which are difficult to program a machine to respond to. While industrial robots have been used in several industries for heavy lifting, dangerous operations and repetitive, precise movements – painting and welding in the auto industry, for example – they have been priced well out of range for more regular ‘human’ tasks.

That could change soon with the development of robots that have the capability to work safely alongside humans. For example, a robot priced at \$20,000 can now sense a human in the path of its arms and stop movement. It can be ‘reprogrammed’ for new tasks by a human

¹³ See for example Hart et al. (2012)

operator who physically manipulates its arms to move, bend, lift or drop in the desired way. Low cost robots like this have the potential to increase precision and raise productivity by reducing the number of workers required. Robotics is a two-edged sword for US employment. These advances could reduce the number of jobs for a given level of output, but at the same time the cost advantage currently held by Asian assembly and manufacturing companies will be reduced or eliminated, allowing production to be re-shored to the United States.

Additive manufacturing – this refers to a range of technologies, including 3-D printing, that build up objects from small particles. Thus far, 3D printing has been used primarily to create prototypes or objects that would be impossible to machine; but in the future companies will sell designs on the web, instead of selling products directly. Customers will be able to print out the desired product for themselves. As the technology improves further, this will allow products to be customized to match the specific demands of the individual customers. Additive manufacturing increases flexibility, cuts development costs and time, reduces material waste, eliminates tooling costs and simplifies production runs.

How fast this technology will be deployed is hard to predict. Compared to traditional casting, additive manufacturing is still expensive today and capital costs are high. Even now, however, additive manufacturing contributes to rapid prototyping and early production runs for small and complex components.

Advanced Design – Increases in computer power and advances in software are enhancing companies' ability to develop digital prototypes and carry out much more testing on the digital model before building a physical prototype. McKinsey & Company estimate there will be a 20 – 50 percent reduction in R&D and development costs as well as reduction in time to market.

Direct Interconnections among Machines – Described as the ‘Internet of Things’, this refers to the ability of machines to connect with each other, enabled through the use of low cost sensors. Connecting machines will allow improved monitoring of production processes remotely and allow operators to provide instructions to one set of equipment based on activity at other equipment. Process designers will be able to set up systems which automatically make adjustments based on sensor readings from all the equipment in a network and apply optimization algorithms to improve efficiency. One specific example of this is to reduce energy usage. Traditionally, motors operate at peak capacity irrespective of load. Smart motors are able to adjust power usage as output changes, usually through variable speed drives controlled by an intelligent motor controller. With low cost sensors allowing improved inter-machine and system communication over wireless networks, it will be possible to make manufacturing systems with thousands of motors smarter, enabling substantial improvements in energy efficiencies in manufacturing. Connecting machines within a given factory, or even across multiple factories, will allow particular machines or conveyor belts to be shut down when not in use, saving energy and wear.

New Materials – There have been breakthroughs in materials science and biotechnology that promise major advances ahead, although the timetable for adoption is unclear. Applying the technology to carbon nano-tubes and graphene has allowed the creation of high-performance transistors and ultra-strong and light composite materials. Fluorescent nano-particles are used in biological labeling and solar cells. In biotechnology, nano-enabled technologies allow more rapid diagnosis of illnesses, detect contaminants, provide glucose monitoring and many other applications. Bringing these advances into the economic mainstream will require long time horizons and continued investment, however.

Energy – although not a manufacturing innovation directly, the application of new technologies to allow the extraction of natural gas and light tight oil from shale deposits will have a substantial effect on manufacturing. US natural gas resources have nearly doubled since 2003, driven by the development of shale deposits nationwide. The US has the second largest recoverable shale gas reserves in the world at 24 tcm (trillion cubic meters), after China's reserves of 36 tcm. However, the US is substantially ahead of the rest of the world in having started to tap these reserves at increasing scale. By 2020, shale gas is expected to add 10-15 billion cubic feet per day over current levels and grow to over 25% of total gas production. This will also lead to a 60% drop in natural gas imports. Substituting energy imports and increasing energy exports could reduce US net energy imports to zero. Along with shale gas, light tight oil (LTO) production has also developed rapidly. Current LTO production estimates for 2020 are between 5 and 10 million incremental barrels per day, although even higher numbers are possible. There are environmental dangers involved in this new wave of energy production but with the right regulation, including coordination between federal and state regulators, it should be possible to develop the oil and gas fields responsibly. It is expected that natural gas will be priced in the United States at \$4-6 per million BTUs, well below the \$12 price range in Europe and \$16 in Asia. Oil prices are set globally, but it is likely that US domestic prices will carry a differential below imported oil and the greater security of domestic supply will be an attraction for users. Cheap natural gas will also keep electricity prices down. The cost of new capacity using natural gas turbines is estimated to be about 4c per kwh at today's prices, compared to 6c for new coal-fired capacity and over 10c for nuclear or solar power. In addition, some existing capacity will be shifted to natural gas.

What is the impact of the energy revolution on manufacturing? A study by Price Waterhouse Coopers suggested that it would result in about one million new jobs in manufacturing as energy intensive sectors such as chemicals and plastics re-shore activity back to the United States.¹⁴ And it is true that both US-based and global companies are already investing in new plants here to take advantage of the low price of energy and natural gas as a feedstock. The figure of one million jobs seems over-optimistic, though, for re-shoring, particularly as the most energy intensive industries tend also to be the most capital intensive and have low levels of employment. Additional manufacturing employment will come from the development of the new energy sources. McKinsey & Company estimates that exploiting the domestic oil and gas will require capital investment of \$1 trillion over the next 5 to 10 years. Another upside for the manufacturing sector from low energy prices is the potential for the US economy to shift part of its transportation system to natural gas and that would generate substantial manufacturing demand. Some companies are already shifting their short-haul trucks to liquefied natural gas because of low fuel cost and this could extend to long-haul trucks also if the refueling infrastructure is developed. Companies such as GM, Navistar and Cummins are developing natural gas powered trucks.¹⁵

However, there is a downside to US-based manufacturing from the increase in domestic energy productions—namely the Dutch Disease. An expansion of domestic energy supply by reducing net import requirements might raise the exchange rate and make domestic manufacturing less competitive. These offsetting effects of the energy revolution make it very difficult to make a numerical prediction of its overall effect on manufacturing. We judge the net impact on output will likely be positive, on employment not so clear.

¹⁴ http://www.pwc.com/en_US/us/industrial-products/publications/assets/pwc-us-manufacturing-resurgence.pdf

¹⁵ Rebecca Smith, “Will Truckers Ditch Diesel,” Wall Street Journal, Business Section, May 23, 2012.

The Future of Manufacturing

Suppose manufacturing follows its past trend in terms of share of total employment, as in Figure 1. In this case its share will fall 0.29 percentage points a year. The forecasting firm of Macroeconomic Advisers predicts civilian employment in 2021 will be 164.2 million and so the implied level of manufacturing employment will be 9.95 million, 2 million jobs below its level as of January 2013. Given the persistence of the downward employment share trend through war and peace, trade surpluses and deficits; and given the commonality of the trend across countries, a figure of around 10 million for manufacturing employment in 2021 is a reasonable baseline estimate.

Is manufacturing like agriculture? In some respects it is, particularly in that both sectors have achieved higher rates of labor and multifactor productivity than the rest of the economy. And the income and price elasticities of demand have not been large enough to keep the share of economic activity and the share of employment constant in either sector. Productivity growth has not slowed down in either sector in recent years. Both sectors are considered important for national security, including access to secure domestic food supply, in the case of agriculture, and access to domestic manufacturing capacity that might be needed for armaments production.

The sectors are different in that agriculture has sustained a stronger level of trade competitiveness even during periods when the dollar has been elevated by capital inflows, partly as a result of agricultural subsidies. Manufacturing, as we have seen, has run chronic trade deficits since 1980.

Importance of Manufacturing. We have documented an extensive decline in the relative size of the manufacturing sector in terms of both jobs and aggregate incomes. An important question is the extent to which that is a problem. Certainly parts of that decline were inevitable and desirable as low-wage low-skill jobs in apparel, leather goods, and simple assembly work moved elsewhere and American workers shifted into higher- wage occupations, frequently in services. To some extent, the U.S. manufacturing sector has transformed itself into a smaller more efficient set of industries. However, it is also important to remember that Americans live and work in a global economy in which they must exchange products that they produce for those that they consume without a continuous decline in their terms of trade. Manufactures account for a very large proportion of tradables, particularly those in which the United States could have a comparative advantage. While, It does enjoy advantages in many services industries, the tradables component of services is not substantial enough to offset continued large deficits in goods trade.

In addition, the bubble has burst on an unusually confluence of factors that encouraged Americans to consume beyond their means financed by the steady sale of assets to foreigners in return for a large net inflow of imports. Going forward, consumption expenditures and investments in residential housing will constitute a smaller share of GDP, and it is hard to visualize a return to full employment, without elimination of a large portion of the external trade deficit.¹⁶ Thus, the United States must become a better exporter, and realistically that means more export of manufactured products. While the country does not need a policy that favors or subsidizes manufacturing, but it is important to ensure that existing policies do not discriminate against it. Another way in which manufacturing is important and different from agriculture is by

¹⁶ At present, the United States is making little progress in filling an ongoing production gap of about 5 percent of potential GDP. Yet, consumption remains at an elevated share of GDP financed by large but ultimately unsustainable fiscal transfers.

providing good jobs for production workers. Agricultural laborers are low-paid and the jobs are not attractive to most Americans. Historically, workers have migrated away from agricultural jobs towards better paid jobs in manufacturing or services. The loss of jobs in manufacturing, concentrated among blue-collar positions, has been a painful adjustment for workers and has reduced the job options for young people without higher education (see for example Goldin and Katz (2008))

Can Policy Bend the Downward Trend? Given the importance of the sector, there are policies that will give manufacturing employment and growth the best chance in the future.

1. Historically, the external deficits have been sustained by an equal shortfall of domestic saving less investment. There are few if any tools by which government can influence private saving; thus, the increment to national saving will be achieved most effectively by reducing or eliminating the federal budget deficit. There are always complications of synchronizing the domestic and external adjustments, but it is clear from the past that insufficient levels of national saving drove up the exchange rate and priced U.S. exporters out of foreign markets. It is hard to see how the United States can achieve external balance in the future without tackling the budget deficit.

2. Balance in the external trade accounts needs to be a more focused objective of U.S. foreign policy. In the past negotiations, the United States traded access to U.S. markets for foreign political support or access of U.S. financial firms to foreign markets, to the detriment of admittance for U.S. exports. There is also a need to develop greater international consensus on appropriate guidance for exchange rates.¹⁷

¹⁷ A greater reliance on market-determined exchange rates would be preferable in most cases, but countries differ widely in the stage of development and ability to rely on such mechanisms.

3. The mobility of capital, technology, and production facilities makes the national taxation of production as opposed consumption increasing impractical. The marginal rate of corporate taxation in the United States is too high, particularly in relationship to the tax rates of other countries, inducing firms to locate overseas. The United States needs to follow the lead of other countries in shifting toward greater reliance on consumption-based taxation.¹⁸

4. Both American companies and foreign companies investing in the United States say that the skills of the US workforce are comparatively weak. It lags behind many other countries in developing effective vocational education and job training programs, and the educational attainment of young workers is falling behind that of countries like Canada, Japan and Korea. Furthermore, U.S. 15-year-olds rank 25th in math and 17th in science in PISA scores among OECD nations. Germany is an example of a country that has used a high-quality vocation education system to improve the skills of its workforce. While there is no space here to elaborate on what changes should be made, Greater attention needs to be paid to reversing the deterioration in workforce skills.

5. Similarly, the country suffers from a deteriorating physical infrastructure that raises the costs of production and limits the location of export activities. The extraordinarily low level of current interest rates suggests that now is an ideal time to borrow funds to finance the repair and modernization of those systems. The adoption of such a program is constrained by a concern that it is simply an excuse for added deficit spending. That issue can be addressed within a capital budget framework in which each investment is financed with amortized debt for which a portion comes due in each year and is repaid with an explicit tax or dedicated revenue

¹⁸ The United States also attempts to tax the foreign income of U.S. companies, albeit with a deferral. Most other countries use a territorial-based system in which income is taxed only in the country in which it is earned.

source over the duration of the bond issue. Such financing, if matched by a credible dedicated revenue source, would not add to concerns about an unmanageable level of general fund debt.

6. Supporters of manufacturing often stress the need for government support of technology (see Atkinson et al. 2012). We are supporters of continued and even expanded government support of basic science and engineering but, as described earlier, we judge that US companies remain strong in technology development. The key to expanding US exports and reaching manufacturing's employment potential is that companies, domestic and foreign, judge it is profitable to manufacture here.

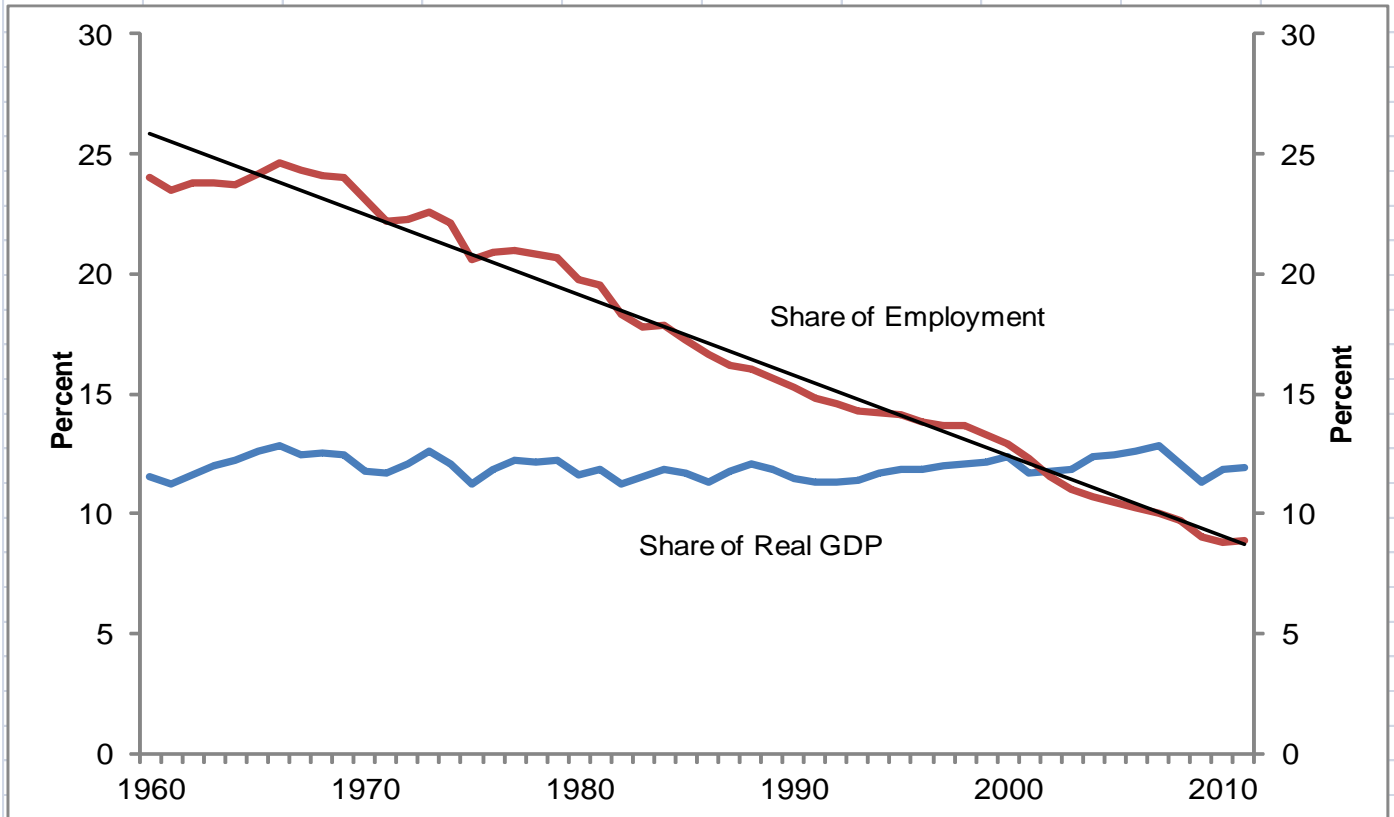
References

- Ahmed, Shaghil. 2009. "Are Chinese Exports Sensitive to Changes in the Exchange Rate?" International Finance Discussion Paper No. 987, Board of Governors of the Federal Reserve System.
- Atkinson, Robert D., Luke A. Stewart, Scott M. Andes, and Stephen J. Ezell. 2012. *Worse Than the Great Depression: What Experts Are Missing about American Manufacturing Decline*. Washington, DC: Information Technology and Innovation Foundation.
- Autor, David H., David Dorn, and Gordon H. Hanson. 2012. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." NBER Working Paper No. 18054.
- Bureau of Labor Statistics, U.S. Department of Labor. 2012. "International Comparisons of Manufacturing Productivity and Unit Labor Cost Trends, 2011." News Release, December 6.
- Diewert, W. Erwin, and Alice Nakamura. 2009. "Bias in the Import Price Index Due to Outsourcing: Can it be Measured?" Paper prepared for the conference on Measurement Issues Arising from the Growth of Globalization, Washington, DC, November 6–7.
- Edwards, Lawrence and Robert Z. Lawrence. Forthcoming 2013. *Rising Tide: Is Growth in Emerging Economies Good for the United States?* Washington, DC: Peterson Institute for International Economics.
- Feenstra, Robert C., Benjamin R. Mandel, Marshall B. Reinsdorf, and Matthew J. Slaughter. 2013. "Effects of Terms of Trade Gains and Tariff Changes on the Measurement of US Productivity Growth." *American Economic Journal: Economic Policy*, 5(1): 59–93.
- Goldin, Claudia, and Lawrence F. Katz. 2008. *The Race Between Education and Technology*, Belknap Press.
- Hart, David M., Stephen J. Ezell, and Robert D. Atkinson. 2012. "Why America Needs a National Network for Manufacturing Innovation." Information Technology and Innovation Foundation. <http://www2.itif.org/2012-national-network-manufacturing-innovation.pdf>.
- Houseman, Susan, Christopher Kurz, Paul Lengermann, and Benjamin Mandel. 2011. "Off Shoring Bias in U.S. Manufacturing." *Journal of Economic Perspectives*, 25 (2): 61–80.
- Koopman, Robert, Zhi Wang, and Shang-Jin Wei. 2012. "Estimating Domestic Content In Exports When Processing Trade Is Pervasive." *Journal of Development Economics*, 99: 178–189.
- Manyika, James, Jeff Sinclair, Richard Dobbs, Gernot Strube, Louis Rasse, Jan Mischke, Jaana Remes, Charles Roxburgh, Katy George, David O'Halloran, and Sreenivas Ramaswamy. 2012. "Manufacturing the future: The next era of global growth and innovation." McKinsey Global Institute. http://www.mckinsey.com/insights/mgi/research/productivity_competitiveness_and_growth/the_future_of_manufacturing

- Morrison, Wayne. 2012. "China-U.S. Trade Issues." U.S. Congressional Research Service, RL33536.
- Nakamura, Emi, and Jon Steinson. 2012. "Lost in Transit: Product Replacement Bias and Pricing to Market." *American Economic Review*, 102 (7): 3277–3316.
- PricewaterhouseCoopers LLP. 2012. "A homecoming for US manufacturing? Why a resurgence in US manufacturing may be the next big bet." http://www.pwc.com/en_US/us/industrial-products/publications/assets/pwc-us-manufacturing-resurgence.pdf.
- Roxburgh, Charles, James Manyika, Richard Dobbs, and Jan Mischke. 2012. "Trading Myths: Addressing Misconceptions about Trade, Jobs, and Competitiveness." McKinsey Global Institute. http://www.mckinsey.com/insights/mgi/research/productivity_competitiveness_and_growth/six_myths_about_trade.
- Schott, Peter K. 2010. "U.S. Manufacturing Exports and Imports by SIC or NAICS Category and Partner Country, 1972 to 2005." http://faculty.som.yale.edu/peterschott/files/research/data/sic_naics_trade_20100504.pdf.
- Smith, Rebecca. 2012. "Will Truckers Ditch Diesel." *Wall Street Journal*, May 23.
- Thorbecke, Willem. 2011. "Investigating the Effect of Exchange Rate Changes on China's Processed Exports." *Journal of the Japanese and International Economies*, 25: 2, 33–46.

Figure 1. Manufacturing Value Added and Employment as a Share of GDP, 1960-2011

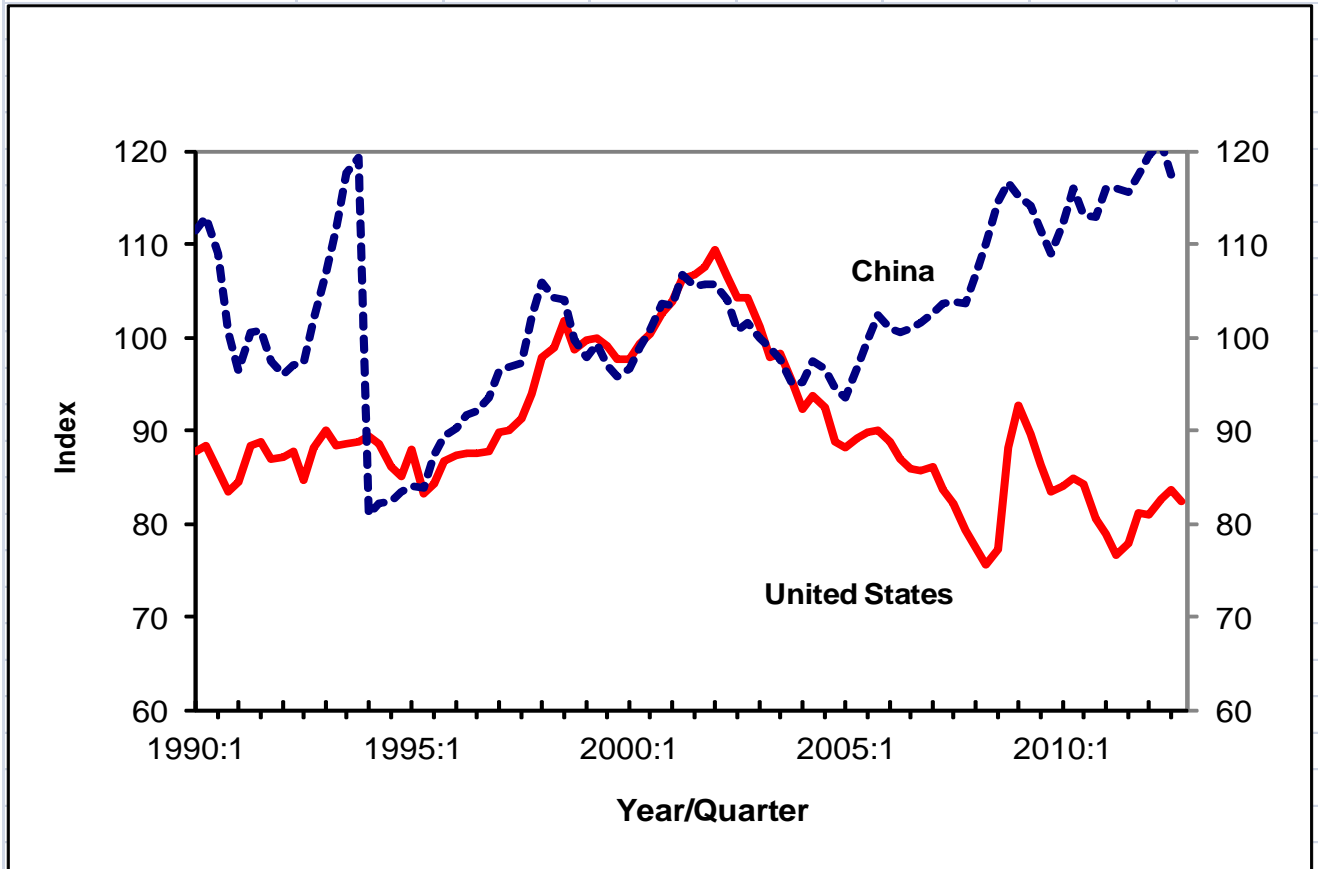
2005 prices



Source: Bureau of Economic Analysis, Industry Accounts.

Figure 2. Trade-Weighted Real Exchange Rate, 1990-2012

2000 = 100



Source: JPMorgan.

Table 1. Annual Rates of Growth in Value added of the Manufacturing Sector, 1987-2011.

percent			
	1987-2011	1987-2000	2000-2011
Gross Domestic Product	2.5	3.4	1.6
Manufacturing	2.5	3.4	1.6
Manufacturing less computers	0.6	1.5	-0.4
Durable Goods	4.0	5.4	2.5
Durable Goods less computers	0.6	1.5	-0.5
Computers and electronic products	19.5	23.5	15.0
Nondurable Goods	0.7	1.4	-0.3
Source: Industry Accounts of the Bureau of Economic Analysis and authors' calculations.			

Table 2. Output Trends for the Computer and Electronic Products Industry, 1987-2011.

	Billions of dollars		
	1987	2000	2011
Value added	85.1	172.1	227.0
Gross output	216.4	503.6	350.1
Intermediate inputs	131.4	331.5	123.1
	Annual percentage rates of change		
	1987-2011	1987-2000	2000-2011
Nominal values			
Value added	4.2	5.6	2.6
Gross output	2.0	6.7	-3.3
Intermediate inputs	-0.3	7.4	-8.6
Real values			
Value added	19.5	23.5	15.0
Gross output	9.0	15.4	1.8
Intermediate inputs	1.7	11.1	-8.5
Price indexes			
Value added	-12.8	-14.5	-10.8
Gross output	-6.4	-7.6	-5.0
Intermediate inputs	-1.9	-3.3	-0.2

Source: Bureau of Economic Analysis, Industry Accounts and Authors' calculations.

Table 3. Manufacturing Output and Productivity Growth by Industry, 1987-2010

Percent

Sector or Industry	Output Share	Annual growth rate (percent)			
		Output	Labor Hours	Labor Productivity	Multifactor Productivity
Manufacturing Sector	100.0	1.7	-1.7	3.4	1.5
Manufacturing less computers	91.5	0.7	-1.6	2.4	0.4
Durable Manufacturing Sector	47.8	2.2	-1.7	4.0	2.3
Wood Products	1.9	-0.9	-2.4	1.5	0.5
Nonmetallic Mineral Products	2.3	-0.4	-1.3	0.9	0.0
Primary Metals	4.6	-0.2	-2.5	2.4	0.3
Fabricated Metal Products	7.8	0.5	-0.7	1.2	0.4
Machinery	8.3	1.1	-1.5	2.6	0.3
Computer and Elec Prod	8.5	8.3	-2.5	11.0	10.4
Electric Equip and Comp	3.1	-0.4	-2.6	2.3	-1.2
Transportation Equipment	14.6	1.1	-1.9	3.1	0.2
Furniture and Related Prod	1.5	-0.9	-1.6	0.8	0.4
Miscellaneous Manufacturing	4.0	2.5	-0.8	3.3	2.0
Non-Durable Manufacturing Sector	57.8	0.8	-1.7	2.5	0.4
Food, Bev and Tobacco Prod	18.9	0.9	0.1	0.9	-0.2
Textile Mills	1.3	-2.4	-4.7	2.4	0.9
Apparel, Leather App Prod	0.4	-7.3	-6.9	-0.5	2.4
Paper Products	4.6	-0.2	-2.0	1.9	0.1
Printing and Related Activities	2.3	-0.6	-1.9	1.2	0.4
Petroleum and Coal Products	17.5	1.2	-1.5	2.7	0.9
Chemical Products	15.9	0.7	-0.9	1.6	0.1
Plastics and Rubber Products	5.0	1.1	-1.0	2.1	0.8

Source: Bureau of Labor Statistics, Multifactor Productivity Trends, and authors' calculations.

Table 4. U.S. Trade Balance in Manufactured Goods by Area, 2000-2011

Billions of dollars

Item	2000	2005	2011	Change 2011-2005
Total	-316	-542	-440	102
Asia	-240	-372	-437	-65
China	-84	-206	-319	-114
Hong Kong	3	7	30	23
Other Asia	-160	-173	-148	26
Canada	-15	-16	44	59
Latin America	-3	-28	41	69
Europe	-58	-131	-117	15
Middle East & Africa	1	4	28	24

Source: U.S. Census Bureau, Foreign Trade, Country and Product Trade Data, and authors' calculations

Table 5. Components of China's Merchandise Trade, 1993-20011.

percent of GDP							
Year	Processing Exports	Processing Imports	Balance		Normal Exports	Normal Imports	Balance
1993	10.0	8.3	1.8		10.8	15.3	-4.5
1994	10.2	8.5	1.7		11.4	12.2	-0.8
1995	10.1	8.0	2.1		10.3	10.1	0.2
1996	9.9	7.3	2.6		7.8	9.0	-1.1
1997	10.5	7.4	3.1		8.7	7.5	1.2
1998	10.2	6.7	3.5		7.8	7.0	0.7
1999	10.2	6.8	3.4		7.8	8.5	-0.7
2000	11.5	7.7	3.8		9.3	11.1	-1.8
2001	11.1	7.1	4.0		9.0	11.3	-2.3
2002	12.4	8.4	4.0		10.0	11.9	-1.9
2003	14.7	9.9	4.8		12.0	15.2	-3.2
2004	17.0	11.5	5.5		13.7	17.6	-3.8
2005	18.5	12.1	6.3		15.3	17.1	-1.8
2006	18.8	11.9	7.0		16.9	17.3	-0.4
2007	17.7	10.6	7.1		17.2	16.8	0.4
2008	14.9	8.4	6.6		16.7	16.7	0.0
2009	11.8	6.5	5.3		12.3	13.7	-1.3
2010	12.5	7.0	5.4		14.2	16.5	-2.3
2011	11.4	6.4	5.0		14.6	17.4	-2.8
Source: China Customs							

FEBRUARY 10, 2012, 6:00 AM

Why Manufacturing Still Matters

By **LAURA D'ANDREA TYSON**

Laura D'Andrea Tyson is a professor at the Haas School of Business at the University of California, Berkeley, and served as chairwoman of the Council of Economic Advisers under President Clinton.

As one of a rare group of economists who believe that “**manufacturing matters**” for the health of the American economy, I was heartened to hear President Obama emphasize manufacturing in his State of the Union address. During the last two years, the manufacturing sector has led the economic recovery, expanding by about 10 percent and adding more than 300,000 jobs.

Admittedly, this is a small number compared with overall private-sector job gains of 3.7 million during the same period, but it reverses the trend of declining manufacturing employment since the late 1990s.

And promising signs are emerging that American companies are shifting some manufacturing production and employment back to the United States. Policies to strengthen the competitiveness of the United States as a location for manufacturing can strengthen these nascent developments.

Though there are economists **who do not share** my heretical view, I believe that a strong manufacturing sector matters — and deserves the attention of policy makers — for several reasons.

First, economists agree that the United States must rebalance growth away from consumption and imports financed by foreign borrowing toward exports.

Manufactured goods account for about 86 percent of merchandise exports from the United States and about 60 percent of exports of goods and services combined. Exports support more than one-quarter of manufacturing jobs in the United States.

Even though service exports are becoming more important, the only way the United States can rebalance growth and make a significant dent in its trade deficit for the foreseeable future is by increasing exports of manufactured goods.

American manufacturing exports are becoming more attractive as a result of rising wages abroad, the decline in the dollar's value, increasing supply-chain coordination and transportation costs, and strong productivity growth in American manufacturing.

Germany and Japan, two high-wage countries, have maintained substantial shares of manufacturing in their economies, and are major exporters of manufactured goods to emerging market economies. Like manufacturing in these countries, manufacturing in the United States can win larger shares of global export markets with the right policies in place.

Second, on average manufacturing jobs are **high-productivity, high value-added jobs** with good pay and benefits. Even though the premium on manufacturing wages has been declining over time, it remains significant. Between 2005 and 2010, average weekly earnings in manufacturing were about 21 percent higher than average weekly private non-agricultural earnings. In 2009, the average manufacturing worker earned \$74,447 in annual pay and benefits compared with \$63,122 for the average non-manufacturing worker. In that year, only about 9 percent of the work force was employed in manufacturing, down from about 13 percent in 2000.

The fall in manufacturing employment during the 2000s was a major factor behind growing wage inequality and the polarization of job opportunities between the top and bottom of the wage and skill distribution, with **a hollowing out of middle-income jobs**.

Even with continuing labor-saving automation, stronger growth in American manufacturing would mean **more middle-income job opportunities** for workers both in manufacturing itself and in the many domestic business services that support it.

Third, manufacturing matters because of its substantial and disproportionate role in innovation. Few economists dispute the importance of innovation to the growth of living standards, but few acknowledge the strong links between innovation and manufacturing.

A strong manufacturing sector supports the key building blocks of the nation's innovation ecosystem — its skilled scientific, engineering and technical work force, its research and development, its ability to identify technical challenges and provide creative solutions.

Although manufacturing is only about 11 percent of gross domestic product, it employs the majority of the nation's scientists and engineers, and it accounts for 68 percent of business R.&D. spending, which in turn accounts for about 70 percent of total R.&D. spending.

American leadership in science and technology remains highly dependent on R.&D. investment by manufacturing companies, and the social returns to such investment are substantial, far exceeding the returns to the companies that fund it.

Despite the offshoring of parts of the manufacturing supply chain, manufacturing companies in the United States continue to situate most of their R.&D. investment and research work force in the United States.

American multinational companies that account for about 84 percent of all private-sector (non-bank) business R.&D. in the United States still place about 84 percent of their R.&D. activities in the United States, often in clusters around research universities, as Matthew Slaughter of Dartmouth calculated for our article, "Warning Sign From Global Companies," which will be published in The Harvard Business Review next month.

But this share is gradually declining as American companies shift some of their R.&D. to Asia in response to rapidly growing markets, ample supplies of technical workers and engineers and generous subsidies. The number of foreign research workers employed by American multinational companies has more than doubled in the last decade.

China and other emerging economies are actively building their R.&D. capabilities and aggressively competing for the R.&D. of American manufacturing companies. Meanwhile the attractiveness of the United States as a location for such activities is slipping because of shortages in the skilled scientific, engineering and technical labor force and restrictions on the number of immigrants with these skills.

Congress's failure to extend and broaden the R.&D. tax credit, as President Obama has urged, is also encouraging companies in the United States to look to other countries offering far more generous R.&D. tax incentives.

In his State of the Union speech, President Obama proposed several additional changes in business taxes to discourage the outsourcing of manufacturing jobs and to encourage their creation in the United States.

A significant reduction in the corporate tax rate in the United States, which is the second highest among the developed countries, would be a much more powerful incentive to encourage American manufacturing production than these changes. Nor is it likely that they would have much effect on American manufacturing employment, because outsourcing has not been the major cause of manufacturing job losses.

Between 2000 and 2011, American manufacturing employment declined by about 5.6 million while American manufacturing output, after contracting during the 2001-2 and 2008-9 recessions, expanded by about 1 percent.

The contraction in employment occurred throughout the manufacturing sector not just in multinational companies that are often criticized for outsourcing jobs in pursuit of lower labor costs and taxes. The remarkable divergence between manufacturing output and employment reflects strong labor productivity growth, driven by labor-saving technological progress. This trend is likely to persist independent of changes in corporate taxation.

The other policies President Obama is promoting to support manufacturing — measures to increase high-school graduation rates; work-force training programs at community colleges; more support for basic research, infrastructure investment, and scientific, engineering and technical education; and immigration reform — would benefit not just manufacturing but the entire economy.

There is widespread support for such policies among economists, whatever their view of the role of manufacturing.

THE WHITE HOUSE
Office of the Press Secretary

EMBARGOED UNTIL DELIVERY OF THE PRESIDENT'S REMARKS IN CEDAR
RAPIDS, IA

January 25, 2012

**FACT SHEET: President Obama's Blueprint to Support U.S. Manufacturing Jobs,
Discourage Outsourcing, and Encourage Insourcing**

In his State of the Union address, President Obama laid out a [Blueprint for an America Built to Last](#), encouraging companies to create manufacturing jobs in the United States while removing deductions for shipping jobs overseas and encouraging insourcing. During the past two years, we have begun to see positive signs in American manufacturing – with the manufacturing sector adding more than 300,000 jobs since December 2009, with companies engaging in the emerging trend of “insourcing” by bringing jobs back and making additional investments in the United States. Manufacturing jobs are growing for the first time since the late 1990s.

The proposals the President is describing today are designed to build on this progress. They include six proposals that Congress should act on immediately to encourage job growth in the United States and that are fully paid for by closing tax loopholes that encourage the shifting of jobs and shielding of profits overseas. The President is also calling for Congress to extend current temporary tax incentives this year to bring more certainty to the near-term economy and for fundamental tax reform that would encourage more investment in America with a new international minimum tax, a lower rate for American manufacturing, and a simpler, broader tax code.

The President is proposing the following revenue-neutral reform package to support manufacturing, discourage outsourcing, and encourage insourcing that Congress should act on immediately:

- 1. Removing tax deductions for shipping jobs overseas and providing new incentives for bringing them back home (revenue neutral):** The tax code currently allows companies moving operations overseas to deduct their moving expenses – and reduce their taxes in the United States as a result. The President is proposing to change that. These deductions will be denied, and companies will no longer be provided deductions for moving their operations abroad. At the same time, the President is proposing to give a 20 percent income tax credit for the expenses of moving operations back into the United States to help companies bring jobs home.

- For example: If a company was closing a plant to move that plant overseas and incurred \$1 million in expenses – ranging from the cost of scrapping equipment to shipping physical capital to clean up costs – it could right now deduct those expenses, and get a tax reduction of \$350,000 (assuming the firm faces the 35 percent statutory tax rate). The President proposes to eliminate this tax deduction. And, if a corporation moving jobs to the U.S. incurred similar expenses, the President proposes to provide that company with a tax credit of \$200,000 to help offset these costs and encourage investment here at home.

2. Targeting the domestic production incentive on manufacturers who create jobs here at home and doubling the deduction for advanced manufacturing (*revenue neutral*): In conjunction with the President’s broader commitment to corporate tax reform, the Administration is proposing measures to provide incentives for manufacturing in the United States. The Administration is proposing to reform the current deduction for domestic production by more narrowly focusing it on manufacturing activities – for example, it would no longer cover oil production. These savings would be invested in expanding the deduction for manufacturers and *doubling* for advanced manufacturing technologies from its current level of 9 percent to 18 percent.

3. Introducing a new Manufacturing Communities Tax Credit to encourage investments in communities affected by job loss (*\$6 billion in credits*): The President is proposing a new credit for qualified investments that help finance projects in communities that have suffered a major job loss event. This credit will provide \$2 billion per year in incentives for three years. For this purpose, a major job loss event occurs when a military base closes or a major employer closes or substantially reduces a facility or operating unit, resulting in permanent mass layoffs. The tax credit would support qualified investments in this affected community – made in conjunction with State Economic Development Agencies and other local entities – that improve local economic growth.

4. Providing temporary tax credits to drive nearly \$20 billion in domestic clean energy manufacturing (*\$5 billion in credits*): The President is proposing to extend tax credits to drive nearly \$20 billion of investment in domestic clean energy manufacturing, ensuring new windmills and solar panels will incorporate parts that are produced and assembled by American workers. This Advanced Energy Manufacturing Tax Credit – which was oversubscribed more than three times over – goes to investments in clean energy manufacturing in the United States. The additional \$5

billion in tax credits the President is proposing will leverage nearly \$20 billion in total investment in the United States.

5. Reauthorizing 100% expensing of investment in plants and equipment (\$4 billion): The President is proposing to extend for all of 2012 a provision that allows businesses to expense the full cost of their investments in equipment, spurring investment in the United States. Over the next two years, this would provide businesses large and small with \$50 billion in tax relief, with much of that recovered by the Treasury in subsequent years.

6. Closing a loophole that allows companies to shift profits overseas (raises \$23 billion): Corporations right now can abuse the tax system by inappropriately shifting profits overseas from intangible property created in the United States. The President is proposing to close this loophole.

At the same time as the President is calling for immediate enactment of this plan, he is also pushing forward on a framework for corporate tax reform that would encourage even greater investment in the United States, while eliminating tax advantages for outsourcing. This framework will include:

- **Making companies pay a minimum tax for profits and jobs overseas and investing the savings in cutting taxes here at home, especially for manufacturing:** The President is proposing to eliminate tax incentives to ship jobs offshore by ensuring that all American companies pay a minimum tax on their overseas profits, preventing other countries from attracting American business through unusually low tax rates. The savings would be invested in cutting taxes here at home, especially for manufacturing.
- **Making permanent an expanded Research and Experimentation Tax Credit:** The President has proposed to make permanent the Research and Experimentation Tax Credit, while enhancing and simplifying the credit. About 70 percent of the benefit directly supports jobs in the United States, and every dollar spent encourages U.S.-based investment, as only research and experimentation performed in the United States is eligible.
- **Simplify the tax code and close loopholes:** Over the nearly three decades since the last comprehensive reform effort, the tax system has been loaded up with special deductions, credits, and other tax expenditures that help well-connected special interests, but do little for our Nation's economic growth. The President's framework

will close these loopholes and simplify the tax code so businesses can focus on investing and creating jobs rather than filling out tax forms.

Building on Progress

- **Providing tax incentives to help businesses grow and invest:** Building off earlier measures, the President signed into law a provision that allowed businesses, both large and small, to immediately write off 100% of the costs of new investment in equipment in the United States. This is among the 17 tax cuts the President has signed into law for small businesses, including measures that temporarily eliminated capital gains taxes on key small business investments and raised expensing limits for small firms.
- **Providing tax incentives to support domestic investment in clean energy technology manufacturing:** The Recovery Act's Advanced Energy Manufacturing Tax Credit provided \$2.3 billion in incentives that catalyzed an additional \$5.4 billion in private sector investment in projects to manufacture the next generation of solar, wind, geothermal, vehicle, energy efficiency, and other clean energy technologies.
- **Temporary tax cuts to increase investment and jobs:** The President has signed into law \$200 billion in tax relief and incentives for America's businesses to encourage them to make new investments and create new jobs – relief that was paid out over the last three years. This includes provisions that directly benefit those businesses that did the most to boost investment and hiring.
- **Cracking down on overseas tax avoidance and loopholes:** The President has taken strong steps to crack down on overseas tax evasion and loopholes – measures that will save billions of dollars over the next decade and make sure that everyone plays by the same rules. This includes signing into law the Foreign Account Tax Compliance Act, which targets tax evasion by U.S. citizens holding investments in foreign accounts, as well as measures to crack down on abuse of foreign tax credits through games that allowed multinational companies to inappropriately reduce the amount of taxes they paid here at home.

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Robert D. Atkinson



Dr. Robert D. Atkinson is one of the country's foremost thinkers on innovation economics. With an extensive background in technology policy, he has conducted ground-breaking research projects on technology and innovation, is a valued adviser to state and national policy makers, and a popular speaker on innovation policy nationally and internationally. He is the author of *Innovation Economics: The Race for Global Advantage* (Yale, 2012) and *The Past and Future of America's Economy: Long Waves of Innovation That Power Cycles of Growth* (Edward Elgar, 2005). Before coming to ITIF, Atkinson was Vice President of the Progressive Policy Institute and Director of PPI's Technology & New Economy Project. *Ars Technica* listed Atkinson as one of 2009's Tech Policy People to Watch. He has testified before a number of committees in Congress and has appeared in various media outlets including CNN, Fox News, MSNBC, NPR, and NBC Nightly News. He received his Ph.D. in City and Regional Planning from the University of North Carolina at Chapel Hill in 1989.

BROOKINGS

QUALITY. INDEPENDENCE. IMPACT.

Martin Neil Baily

Martin Baily is a senior fellow in the Economic Studies Program and holds the Bernard L. Schwartz Chair in Economic Policy Development. He is the Director of the Initiative on Business and Public Policy and co-leads the All-Brookings Priority on “Growth through Innovation.” Baily’s research focuses on issues of globalization, productivity and competitiveness, Social Security reform, and U.S. economic policy.



Martin Baily re-joined Brookings in September 2007 to develop a program of research on business and the economy. He is studying growth, innovation and how to speed the recovery. He is a member of the Squam Lake Group of financial economists and was the co-chair of the Taskforce on Financial Reform convened by the Pew Charitable Trusts. Dr. Baily is a director of The Phoenix Companies of Hartford, CT.

In August 1999 Dr. Baily was appointed as chairman of the Council of Economic Advisers. As chairman, Dr. Baily served as economic adviser to the President, was a member of the President’s Cabinet and directed the staff of this White House agency. He completed his term as chairman on January 19, 2001. Dr. Baily previously served as one of the three members of the President’s Council of Economic Advisers from October 1994 until August 1996.

Baily has served as a senior advisor to the McKinsey Global Institute for many years and was an adviser to the Congressional Budget Office from 2006-09. Dr. Baily was a principal at McKinsey & Company at the Global Institute in Washington, D. C. from September 1996 to July 1999 and from 2001 to 2007 he was a senior fellow at the Peterson Institute where he published books on the European economy and on pension reform.

Dr. Baily earned his Ph.D. in economics in 1972 at the Massachusetts Institute of Technology. After teaching at MIT and Yale, he became a senior fellow at the Brookings Institution in 1979 and a professor of economics at the University of Maryland in 1989. He is the author of many professional articles and books, testifies regularly to House and Senate committees and is often quoted in the press.

[March 2012]

Mihir A. Desai

Mihir A. Desai is the Mizuho Financial Group Professor of Finance and the Chair of Doctoral Programs at Harvard Business School. He received his Ph.D. in political economy from Harvard University; his MBA as a Baker Scholar from Harvard Business School; and a bachelors degree in history and economics from Brown University. In 1994, he was a Fulbright Scholar to India.

Professor Desai's areas of expertise include tax policy, international finance and corporate finance. His academic publications have appeared in the leading economics, finance and public economics journals. His work has emphasized the appropriate design of tax policy in a globalized setting, the links between corporate governance and taxation, and the internal capital markets of multinational firms. His research has been cited in *The Economist*, *BusinessWeek*, *The New York Times*, and several other publications. He is also the author of *International Finance: A Casebook* (New York: John Wiley & Sons, 2006) which features his many case studies on international corporate finance.

He is a Research Associate in the National Bureau of Economic Research's Public Economics and Corporate Finance Programs, is the co-director of the NBER's India program. He is also on the Advisory Board of the International Tax Policy Forum.

Professor Desai teaches a second-year elective on International Financial Management and he co-teaches Public Economics (EC 1410) at Harvard College. He received the Student Association Award for teaching excellence from the HBS Class of 2001. His professional experiences include working at CS First Boston, McKinsey & Co., and advising a number of firms and governmental organizations. For Professor Desai's home page, go to www.people.hbs.edu/mdesai.

C. Fritz Foley

André R. Jakurski Professor of Business Administration

Fritz Foley is a Professor in the Finance area at Harvard Business School. He is also a Faculty Research Fellow in the National Bureau of Economic Research's Corporate Finance and International Trade and Investment Programs and an Associate Editor of the *Journal of International Economics*. Professor Foley teaches the first-year course Field Immersion Experiences for Leadership Development and in various HBS [Executive Education](#) programs.

Professor Foley's research focuses on international corporate finance with a particular emphasis on the activities of multinational firms. He has investigated the use of international joint ventures, the determinants of multinational affiliate capital structure and dividend repatriations, the advantages associated with internal capital and labor markets, the impact of capital controls on multinationals, and the effects of stock market valuations on foreign direct investment. His work on how intellectual property rights influence international technological transfers has been funded by grants from the National Science Foundation, the World Bank, and the Asian Development Bank. His academic articles have appeared in several journals including *The Journal of Finance*, the *Journal of Financial Economics*, the *Journal of Public Economics*, the *National Tax Journal*, the *Review of Financial Studies*, and the *Quarterly Journal of Economics*.

Prior to joining HBS, Professor Foley taught at the University of Michigan Business School. He received a Ph. D. in Business Economics from Harvard University and a B.A. in Ethics, Politics, and Economics from Yale University. Professor Foley has also worked as a strategy consultant at Monitor Company and conducted research on multinational firms in the apparel export sector as a Fulbright Scholar in Sri Lanka.

William G. Gale

William Gale is the Arjay and Frances Miller Chair in Federal Economic Policy in the Economic Studies Program at the Brookings Institution. His research focuses on tax policy, fiscal policy, pensions and saving behavior. He is co-director of the Tax Policy Center, a joint venture of the Brookings Institution and the Urban Institute. He is also director of the Retirement Security Project. From 2006 to 2009, he served as Vice President of Brookings and Director of the Economic Studies Program.

Prior to joining Brookings in 1992, he was an assistant professor in the Department of Economics at the University of California, Los Angeles, and a senior economist for the Council of Economic Advisers under President George H.W. Bush.

He is the co-editor of several books, including *Automatic: Changing the Way America Saves* (Brookings 2009); *Aging Gracefully: Ideas to Improve Retirement Security in America* (Century Foundation, 2006); *The Evolving Pension System: Trends, Effects, and Proposals for Reform* (Brookings, 2005); *Private Pensions and Public Policy* (Brookings, 2004); *Rethinking Estate and Gift Taxation* (Brookings, 2001), and *Economic Effects of Fundamental Tax Reform* (Brookings, 1996).

His research has been published in several scholarly journals, including the *American Economic Review*, *Journal of Political Economy*, and *Quarterly Journal of Economics*. In 2007, a paper he co-authored was awarded the TIAA-CREF Paul A. Samuelson Award Certificate of Excellence.

He has also written extensively in policy-related publications and newspapers, including op-eds in CNN, the Financial Times, Los Angeles Times, New York Times, Wall Street Journal, and Washington Post.

Gale serves on the editorial board of several academic journals, and has served on advisory boards for the Government Accountability Office, the Internal Revenue Service, and the Joint Committee on Taxation, and on the Board of the Center on Federal Financial Institutions.

Gale attended Duke University and the London School of Economics and received his Ph.D. from Stanford University in 1987. He lives in Washington, DC, is an avid tennis player, and is a person who stutters. He is the father of two children, a son who resides in Denver, and a daughter attending school in New Orleans.

James R. Hines Jr.

Jim Hines teaches at the University of Michigan, where he is the L. Hart Wright Collegiate Professor of Law in the law school and the Richard A. Musgrave Collegiate Professor of Economics in the Department of Economics. He also serves as the research director of the Office of Tax Policy Research in the Stephen M. Ross School of Business. His research is focused on various aspects of taxation. He holds a BA and MA from Yale University and a PhD from Harvard, all in economics. He taught at Princeton and Harvard universities prior to joining the Michigan faculty in 1997, and has held visiting appointments at Columbia University, the London School of Economics, the University of California, Berkeley, and Harvard Law School. He is a research associate of the National Bureau of Economic Research, co-editor of the *Journal of Public Economics*, and once, long ago, was an economist in the U.S. Department of Commerce.

Donald Marron

Donald Marron is an expert on U.S. economic policy and federal budgeting. Since joining the Urban Institute as director of the Urban-Brookings Tax Policy Center, his work has focused on tax reform and America's long-run fiscal challenges. From 2002 through early 2009, he served in senior government positions, including as a member of the President's Council of Economic Advisers, acting director of the Congressional Budget Office, and executive director of Congress's Joint Economic Committee. He has also taught at the Georgetown Public Policy Institute and the University of Chicago Graduate School of Business, consulted on major antitrust cases, and served as chief financial officer of a health care software start-up.

Marron appears frequently at conferences and on TV and radio to discuss economic policy. He also works to popularize economics through his blog (www.dmarron.com) and writings for publications such as CNN Money, the Christian Science Monitor, and the Washington Post. He is the editor of *30-Second Economics*, a short book that introduces readers to 50 of the most important theories in economics. He is also an adviser to several start-up companies.

Pamela F. Olson
Deputy Tax Leader and Washington National Tax Services Practice Leader

Ms. Olson is the Deputy Tax Leader and Washington National Tax Services Practice Leader of PwC. In her role as WNTS leader, Ms. Olson leads a team that includes many former senior government officials and policy advisers.

Prior to joining PwC, Ms. Olson retired as the leader of a major law firm's Washington office Tax Group, and formerly was an assistant secretary for tax policy at the US Department of the Treasury.

Ms. Olson has represented clients in a broad range of matters, including IRS audits, appeals and litigation; congressional investigations; private letter ruling requests and other administrative guidance; and in the submission of comments on proposed regulations. She also has advised clients on tax and social security reform, legislative matters and the structuring of transactions. She is a frequent speaker on tax, economic and federal budget matters and has testified before several congressional committees.

As assistant secretary for tax policy, Ms. Olson had supervisory responsibility for providing the secretary of the treasury with policy analysis and recommendations for all domestic and international issues of federal taxation, including legislative proposals, regulatory guidance, and tax treaties, and for providing the official estimates of all government receipts for the president's budget and treasury cash management decisions. Ms. Olson also held positions with the chief counsel's office of the Internal Revenue Service as special assistant to the chief counsel, attorney-adviser in the legislation and regulations division and trial attorney in San Diego district counsel.

In 2000 and 2001, Ms. Olson was the first woman to serve as chair of the American Bar Association Section of Taxation. She served as a senior economic adviser to the Bush-Cheney campaign and as federal tax adviser to the National Commission on Economic Growth and Tax Reform. She has been included repeatedly in Chambers USA: America's Leading Lawyers for Business and The Best Lawyers in America for tax law. Ms. Olson served as Vice President of the American College of Tax Counsel and on the board of several tax exempt organizations. She received distinguished service awards from the Federal Bar Association and from Tax Executives Institute.

Ms. Olson received her M.B.A. and her J.D. from the University of Minnesota. She graduated magna cum laude with a B.A. from the University of Minnesota.

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Mr. Oosterhuis is an international tax partner in the Washington, D.C. office of Skadden, Arps, Slate, Meagher & Flom LLP and is the firm-wide leader of its various regulatory practice groups. Mr. Oosterhuis has had extensive experience in cross-border acquisition and disposition transactions, financing arrangements and tax planning for U.S. and foreign-based multinational corporations. He also frequently represents clients on international tax controversy matters, as well as regulations and rulings proceedings, with the Internal Revenue Service. In particular, he frequently represents clients in intercompany pricing matters, including in Advance Pricing Agreement and Competent Authority negotiations.

He received his B.A. from Brown University and his J.D. Degree from Harvard Law School. In 1973 he became a Legislation Attorney for the Joint Committee on Taxation, U.S. Congress, and in 1977 and 1978 served as the Committee's Legislation Counsel. He entered private practice in 1979. He has also served as an Adjunct Professor at Georgetown University Law Center, where he taught International Taxation in the Master of Taxation graduate law program.

He is a member of the bar of the District of Columbia and is admitted to practice in the U.S. Tax Court.

John M. Samuels

John Samuels is GE's Vice President and Senior Counsel for Tax Policy and Planning. He is responsible for GE's worldwide Tax Organization and for the Company's global tax planning and tax compliance operations. He is a member of GE's Corporate Executive Council, the GE Capital Corporation Board of Directors, the GE Finance Council and the GE Pension Board.

Prior to joining GE in 1988, he was a partner in the law firm of Dewey, Ballantine in Washington, D.C. and New York City. From 1976 to 1981 Mr. Samuels served as the Deputy Tax Legislative Counsel and Tax Legislative Counsel of the U.S. Department of Treasury in Washington, D.C.

Mr. Samuels is the Chairman of the International Tax Policy Forum, a Fellow of the American College of Tax Counsel, and a member of the University of Chicago Law School Visiting Committee. Mr. Samuels was an adjunct professor of taxation of NYU Law School (1975 to 1986), and currently is the Jacquín D. Bierman Visiting Lecturer at Yale Law School where he teaches courses in international taxation.

Mr. Samuels is a graduate of Vanderbilt University (1966) and the University of Chicago Law School (1969), and received an LLM in taxation (1976) from NYU Law School.

Damon A. Silvers

Damon A. Silvers is the Director of Policy and Special Counsel for the AFL-CIO. He joined the AFL-CIO as Associate General Counsel in 1997.

Mr. Silvers serves on a pro bono basis as a Special Assistant Attorney General for the state of New York. Mr. Silvers is also a member of the Investor Advisory Committee of the Securities and Exchange Commission, the Treasury Department's Financial Research Advisory Committee, the Public Company Accounting Oversight Board's Standing Advisory Group and its Investor Advisory Group.

Mr. Silvers served as the Deputy Chair of the Congressional Oversight Panel for TARP from 2008 to 2011. Between 2006 and 2008, Mr. Silvers served as the Chair of the Competition Subcommittee of the United States Treasury Department Advisory Committee on the Auditing Profession and as a member of the United States Treasury Department Investor's Practice Committee of the President's Working Group on Financial Markets.

Prior to working for the AFL-CIO, Mr. Silvers worked for the Harvard Union of Clerical and Technical Workers, the Amalgamated Clothing and Textile Workers, and as a law clerk at the Delaware Court of Chancery for Chancellor William T. Allen and Vice-Chancellor Bernard Balick.

Mr. Silvers led the successful efforts to restore pensions to the retirees of Cannon Mills lost in the Executive Life collapse and the severance owed to laid off Enron and WorldCom workers following the collapse of those companies. Mr. Silvers served from 2003 to 2006 as pro bono Counsel to the Chairman of ULLICO, Inc. and in that capacity led the successful effort to recover over \$50 million related to improperly paid executive compensation.

Mr. Silvers received his J.D. with honors from Harvard Law School. He received his M.B.A. with high honors from Harvard Business School and is a Baker Scholar. Mr. Silvers is a graduate of Harvard College, summa cum laude, and has studied history at Kings College, Cambridge University.

Mr. Silvers' publications include: "A Response to Vice-Chancellor Leo Strine Jr.'s, Toward Common Sense and Common Ground? Reflections on the Shared Interests of Managers and Labor in a More Rational System of Corporate Governance," published in *The Journal of Corporation Law* (2007); "The Current State of Auditing as a Profession: A View from Worker-Owners," published in *Accounting Horizons* (2007); "How We Got Into This Mess," published in *The American Prospect* (2008); "Securities and Exchange Commission: Restoring the Capital Markets Regulator and Responding to Crisis," published in *Change for America: A Progressive Blueprint for the 44th President* (2008); "The Legacy of Deregulation and the Financial Crisis—Linkages Between Deregulation in Labor Markets, Housing Finance Markets, and the Broader Financial Markets," published in *The Journal of Business & Technology Law* (2009);

“Rebuilding Workers’ Retirement Security: A Labor Perspective on Private Pension Reform,” published in *Restructuring Retirement Risk Management in a Defined Contribution World* (2010); “Obligations Without the Power to Fund Them—The Origins, Consequences and Possible Solutions to the Fiscal Crisis of the States,” published in *When States Go Broke: The Origins, Context, and Solutions for the American States in Fiscal Crisis* (Cambridge University Press 2012); and “Deregulation and the New Financial Architecture,” published in *The Handbook of The Political Economy of Financial Crises* (Oxford University Press 2013).

Laura D'Andrea Tyson

Laura D'Andrea Tyson is the S.K. and Angela Chan Professor of Global Management at the Haas School of Business, at the University of California Berkeley. She served as Dean of London Business School from 2002-2006, and as Dean of the Berkeley Haas School of Business from 1998-2001.

Tyson is a member of the US Department of State Foreign Affairs Policy Board. From 2011-2013, Tyson served as a member of President Barack Obama's Council of Jobs and Competitiveness and from 2009 – 2011, she was member of the President's Economic Recovery Advisory Board. She served in the Clinton Administration and was the Chair of the Council of Economic Advisers (1993-1995) and the President's National Economic Adviser (1995 – 1996).

Tyson is currently a Senior Advisor at the McKinsey Global Institute, Credit Suisse Research Institute, and The Rock Creek Group. She is a Senior Fellow at the Center for American Progress and is on the Advisory Council of the Brookings Institution Hamilton Project. She is an advisory board member of Pave, Inc., Newman's Own, Generation Investment Management, H&Q Asia Pacific, and Tykoon. Tyson is the chair of the Board of Trustees for the Blum Center for Development Economies, Jacobs Foundation, and the Bay Area Council Economic Institute. She is an Advisor to Samsung SDS and a Special Advisor at the Berkeley Research Group. Tyson is a Commissioner at the Committee for Responsible Federal Budget and is a member of the Committee on Capital Markets Regulation, and the Henry Jackson Initiative Task Force for Inclusive Capitalism. She serves on the National Academies' Board on Science, Technology and Economic Policy and is a member of Nicolas Berggruen's Think Long Committee for California and 21st Century Council. Tyson is the co-chair of the World Economic Forum Global Agenda Council on Women's Empowerment and is a member of The MIT Corporation. Tyson serves on the Boards of Directors of Morgan Stanley, AT&T, CBRE Group Inc., and Silver Spring Networks.

Tyson has written books and articles on industrial competitiveness and trade. She has also written opinion columns for many publications including *BusinessWeek*, *The New York Times* and the *Financial Times* and she has made numerous television appearances on economic issues. She is an Economics Editor of Current TV and is on the editorial board of the *International Economy*. She contributes to the *New York Times* Economix blog, *Project Syndicate* and the *Financial Times* A-list.