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*Deindustrialization of the U.S. Economy: The Roles of
Trade, Productivity, and Recession*

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April 15, 2004

Abstract. Manufacturing seems to be a steadily diminishing presence in the American economy, producing a falling share of Gross National Product and employing a smaller share of the labor force. Many see this as a loss of something vital to providing "good" jobs and advancing economic well being. On the other hand, deindustrialization has occurred in varying degrees in most industrial economies and can be seen as a natural outcome of economic progress and a rising living standard. When examined from the standpoint of real output and level of employment, the U.S. manufacturing sector has shown considerable stability over the last 20 years. Because the apparent deindustrialization has been coincident with a rising level of international trade, particularly recent increases in trade with many low-wage, developing economies, there is an inclination to see causality running from rising trade to a faltering manufacturing sector. Yet economic analysis indicates that while a rising level of trade can have adverse consequences for particular industries, it is unlikely to adversely affect the whole manufacturing sector. Increased imports may hurt some industries, but the increased exports needed to pay for those imports helps other industries. Therefore, across all tradeable goods producing industries there is no net loss of jobs. Moreover, exporting industries tend to pay higher wages than import competing industries.

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April 15, 2004

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Deindustrialization of the U.S. Economy: The Roles of Trade, Productivity, and Recession

Summary

Manufacturing seems to be a steadily diminishing presence in the American economy, producing a falling share of Gross National Product and employing a smaller share of the labor force. Many see this as a loss of something vital to providing “good” jobs and advancing economic well being. On the other hand, deindustrialization has occurred in varying degrees in most industrial economies and can be seen as a natural outcome of economic progress and a rising living standard. When examined from the standpoint of real output and level of employment, the U.S. manufacturing sector has shown considerable stability over the last 20 years. Because the apparent deindustrialization has been coincident with a rising level of international trade, particularly recent increases in trade with many low-wage, developing economies, there is an inclination to see causality running from rising trade to a faltering manufacturing sector. Yet economic analysis indicates that while a rising level of trade can have adverse consequences for particular industries, it is unlikely to adversely affect the whole manufacturing sector. Increased imports may hurt some industries, but the increased exports needed to pay for those imports helps other industries. Therefore, across all tradeable goods producing industries there is no net loss of jobs. Moreover, exporting industries tend to pay higher wages than import competing industries.

Rising trade deficits are a somewhat different matter. Trade deficits are not a function of a rising level of trade. They are largely rooted in domestic macroeconomic forces that affect domestic saving and investment decisions, including the government budget. Trade deficits do not lead to any net loss of output or jobs for the economy, but they will likely change the composition of output and employment between tradeable and non-tradeable goods. It is very likely that the manufacturing sector, which produces tradeable goods, will be adversely affected by large and growing trade deficits, although that effect is probably not as large as commonly believed.

An economic force that has clearly had a strong impact on manufacturing is a steady and often rapid rise in sector productivity. The impact of productivity on sector employment is far larger than the effect of trade deficits. In the past, productivity rise has allowed the manufacturing sector to expand output with a fairly steady level of employment. Recent acceleration of the pace of productivity advance raises the possibility that in the future, efficiency gains may outpace output growth and lead to significantly slower growth of sector employment.

A policy response that would have a direct positive economic effect on the manufacturing sector is action toward reducing the trade deficit. An indirect policy response would be, to raise the pace of development of new technology and new products through added support for areas of idea creation that the private market will insufficiently support. There will still be need to ameliorate the destructive aspect of economic progress. If workers now must face an increasingly volatile labor market, more support may be needed for programs to ease the disruption workers face and facilitate their adjustment to new jobs. This report will not be updated.

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Deindustrialization of the U.S. Economy: The Roles of Trade, Productivity, and Recession

Introduction

In recent years there has been a regularly recurring concern about the apparent “deindustrialization” of the U.S. economy. Manufacturing seems to be a steadily diminishing presence in the American economy, accounting for a smaller and smaller share of Gross domestic Product (GDP) and employing a smaller and smaller share of the labor force. The typical concern is that a withering away of manufacturing is the loss of an activity vital to the continued economic well-being of American workers. For many this sector of the economy is seen as the source of economic vigor and the provider of millions of “good” jobs. If manufacturing fades away, in this view, so will the high standard of living of many citizens.

Deindustrialization is hardly a phenomenon that is unique to the United States. It is also evident in varying degree in most other industrial economies, both in mature economies such as the United States and in newly emergent economies such as China, Hong Kong, Korea, and Singapore. Nor is it a recent occurrence, as aspects of decline have been underway at a varying pace in the United States, Japan and Europe for nearly 30 years. Looking at this process, a 1997 IMF study concluded: “...de-industrialization is simply the natural outcome of successful economic development and is generally associated with rising living standards.”¹

Of late, concern about deindustrialization in the United States has been heightened by a particularly protracted decline in manufacturing output and employment since the 2001 recession, with no sign of significant improvement in the recovery, so far. Always highly sensitive to the path of the business cycle, the impact of the recession of 2001 and its aftermath may be particularly sharp for manufacturing because much of the slack demand is the consequence of a pronounced and protracted weakening of investment spending and export sales. Both are important sources of demand for manufactured goods.

Although the recession was generally mild, it coincided with a major stock market crash, and weak equity prices have likely reduced the ability of consumers and business to finance new spending. Also, during the recession, the September 11 terrorist attacks occurred and since the recession there was a major corporate governance scandal and the start of the war with Iraq. This succession of unusual

¹Robert Rowthorn and Ramana Ramaswamy. *Deindustrialization – Its Causes and Implications* (International Monetary Fund, Washington DC, 1997).

events has probably raised uncertainty and reduced confidence in the marketplace. An ebbing of confidence will have a particularly negative impact on forward looking activities such as business investment in new plant and equipment. In addition, a high dollar exchange rate and slow growth abroad during this time period took its toll on export sales. Activity in the manufacturing is strongly linked to these two components of final demand and protracted weakness in these areas transmits a sharp negative impulse to the sector.

But these are likely to be temporary problems. In 2003 the pace of economic growth in the United States quickened and most analysts expect the economic expansion to maintain this revived momentum. Also, the dollar has weakened substantially since early 2002 with further depreciation probable, and the pace of economic growth among major trading partners is likely to accelerate.²

For some, however, the worry is that more than the temporary negative effect of recession and its aftermath is hurting the manufacturing sector. More enduring forces of decline are suspected to be at work that make it likely that economic recovery for the overall economy will not bring the U.S. manufacturing sector back to where it was in 2000. Because the apparent deindustrialization has been concurrent with a rising level of international trade, particularly trade with many low-wage developing economies, some observers see causality running from rising trade to a faltering manufacturing sector. The basic vision, in this regard, is one where a rising tide of imports from low-wage countries supplants American producers and eliminates American manufacturing jobs. A rising level of trade can surely have adverse consequences for particular industries, but it is unlikely to have a net negative effect on the whole sector because a rising level of imports requires a rising level of exports to pay for them.³ Some import competing industries lose, but some export producing industries gain.

In contrast, a rising trade deficit, which is not a necessary consequence of a rising level of trade, reflects macroeconomic conditions that generate a bias against domestic produced tradeable goods and will likely have a net negative impact on the manufacturing sector. Nevertheless, the trade deficit's negative repercussions on the manufacturing sector are probably smaller than commonly believed and it is unlikely that this effect can be the principal cause of manufacturing's difficulties.

Another powerful economic force affecting the manufacturing sector is rising productivity. Historically, rapid productivity growth in manufacturing has steadily reduced the number of employees needed to produce any given level of output. Since the 1970s, productivity has risen, more or less in step with the rising demand for

²See: OECD Economic Outlook, No. 74(Paris, 2004).

³More imports must be paid for with a foreign currency. To earn foreign currency the United States must sell an equal value of exports to the foreign economy. Those exports can be the sale of either goods (e.g. computer, airplane, wheat) or assets (e.g. stock, bonds, real property). The export of more goods has a direct positive effect on domestic output and employment. The export of more assets has an indirect positive effect on domestic output and employment through the stimulative effect of lower interest rates caused by that sale increasing the capital inflow to domestic credit markets.

manufacturing output, allowing for a fairly steady level of employment. Since the mid-1990s, however, the rate of productivity growth has accelerated. At that time demand also accelerated and the level of employment rose. Productivity advance continued through the recession and, in this environment of shrinking demand, its impact on employment was necessarily negative. If as the current economic expansion proceeds, high rates of productivity growth persist and demand does not keep pace, then the level of employment in manufacturing will not regain its pre-recession levels.

Finally, we can not rule out that, as in the late 1970s, the long-term structure of demand in the U.S. economy has again shifted away from manufactured goods, with consumers allotting a smaller share of their total spending to this type of output regardless of the stage of the business cycle or the national origin of the manufactured product.

We can expect that these several forces acting in conjunction would have a very strong negative effect on the manufacturing sector. This report attempts to sort through these forces, trying to assess what role each might have played in the recent travails of the U.S. manufacturing sector, as well as their possible impact on the future path of that sector. Possible policy responses to these events – such as industrial policy, trade policy, worker retraining and adjustment, technology policy, and trade deficit reduction will also be evaluated.

Manufacturing in the U.S. Economy

1950 to 2000

Evidence of Decline. As a share of current dollar GDP, manufacturing output has been in near continuous decline in the post World-War II era, falling from nearly 30% in 1950 to less than 16% in 2000. Employment in manufacturing as a share of total employment has also declined over this period, from about 30% in 1950 to around 14% in 2000. The corollary to these trends is an equally steady rise in the output and employment share of the service sector. That sector's share of GDP has increased from about 35% of GDP to about 55% over this time period, while its share of employment increased from 55% to 80%. Declining shares of current dollar GDP and total employment are not unique to the American manufacturing sector, having also occurred in most other industrial economies in this time period. This pattern of change would seem to suggest that there has been a substantial shift in the structure of expenditures away from manufacturing and toward services. Such a shift could be part of the normal evolution of demand in high income economies, but may also be seen as the adverse impact of a rising level of trade with low-wage developing economies on the manufacturing sector.

Evidence of Growth and Stability. A significantly different picture, one of relative stability and growth rather than decline, emerges if the U.S. manufacturing sector is viewed from the perspective of the sector's contribution to real GDP and its absolute level of output and employment.

A Steady Share of Real GDP. The value of current dollar GDP can change due to either changes in the price of output or to changes in the volume of output. Real GDP is a dollar measure of the volume of output – the number of things actually produced. A decline in the current dollar share of GDP can therefore be the result of a fall in the price of sector output or a fall in the volume of sector output, or both. The economic significance of a decline in current dollar GDP share will be different depending on whether price or volume is the primary force behind the change. If falling price is the primary cause, it indicates that the sector's claim on the economy's productive resources is declining, but that the real demand for its output – the volume of goods produced and purchased– is not declining. Real output and the real output share could be steady or rising, indicating a steady or rising importance of manufactured goods in the economy's overall demand for goods and services. This would also mean that there has been no decline in the principal demand-side determinant of the sector's level of employment. Other factors unchanged, the same real output requires the same level of employment to produce it and rising real output requires a higher level of employment. Of course, real output and a real output share can stay the same or rise even if current dollar output or current dollar share is declining.

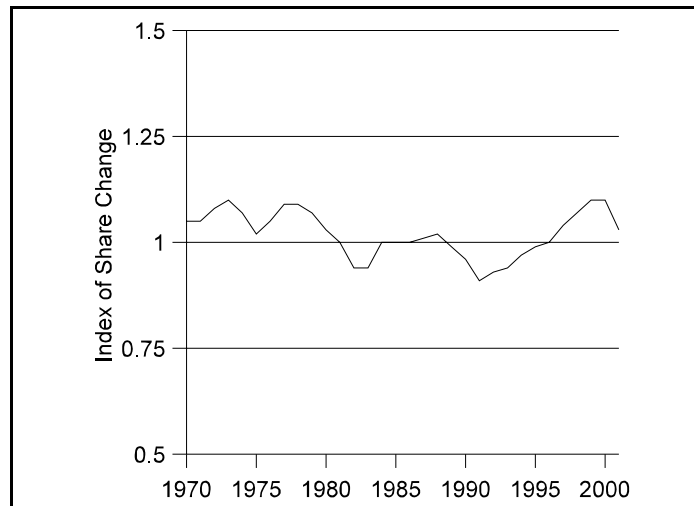
On the other hand, if a falling current dollar GDP share is the result of a fall in the sector's volume of output or relatively slower growth of real output, it indicates that the economy's demand for the goods the sector produces has fallen absolutely or as a share of total expenditures. In addition, if the sector's real output falls, other factors constant, so would the level of employment in the sector. If manufacturing's falling share is the result of sector real output rising slower than the overall economy, employment would still increase, but not as rapidly as in the steady or rising share case.

The two alternative reasons for a falling current dollar share tell very different stories about the process of deindustrialization in the 1950 to 2000 period. If that decline reflects a falling price for the manufacturing sector's output, it is a favorable outcome for the overall economy, as it is getting the manufactured goods it wants for a steadily lower price. And such a decline is not bad news for the manufacturing sector, for it maintains its share of the economy's real demand for goods and services and a steady volume of output will not cause any fall in the level of industry employment. If the decline in current dollar GDP share is the result of falling real output, it can also be seen as a process that is good for the wider economy, as consumers are shifting their real spending towards the things that they prefer. But, a reduction of real output would seem to be clearly bad news for the manufacturing sector, as it is producing less and less of what the economy wants and fewer and fewer workers will be needed to produce that shrinking output. It is this circumstance, where domestic manufactured goods are a smaller and smaller part of real economy-wide demand and are a truly fading economic presence, that seems most consistent with the notion of deindustrialization.⁴

⁴Falling demand for domestic manufactured goods could reflect a reduced demand for
(continued...)

In 1991, at the beginning of the previous economic expansion, manufacturing's share of real GDP was 15.8%, and by the expansion's peak in 2000 that real share had increased to 17.2%. Therefore, there was no absolute or relative decline in manufacturing's production of goods over this period. A longer term view of the behavior of manufacturing's share of real GDP would afford a more telling view of manufacturing's evolving standing in the U.S. economy. Unfortunately, due to their method of estimation, real GDP shares may give an inaccurate measure of real share for more distant years. We can get around this problem, however, by comparing the movement of an index of manufacturing output relative to an index of real GDP. This measure cannot tell us what the share is, but it can tell us whether that share has likely risen or fallen. Looking at a plot of this measure since 1970 in **Figure 1** shows a rather trendless path. Looking beyond the periodic ups and downs caused by the business cycle, manufacturing's real share declined moderately from the late 1970s through the 1980s but then increased moderately through the 1990s. All in all, the U.S. manufacturing's sector's relative position in real demand and output has been stable, not in decline.

Figure 1 Change in Manufacturing's Real GDP Share



Source: U.S. Department of Commerce, Bureau of Economic Analysis and U.S. Department of Labor, Bureau of Labor Statistics

A Rising Level of Output. A steady share of real GDP in a growing economy does not mean that the level of manufacturing real output has been steady;

⁴(...continued)

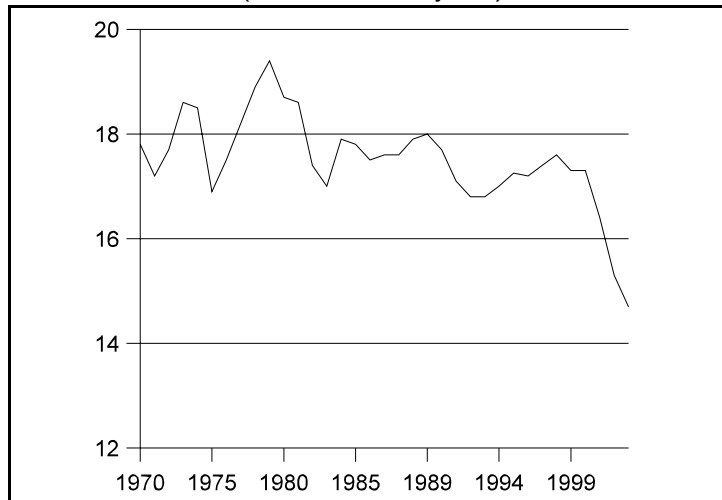
domestic manufactured goods or a reduced demand for manufactured goods generally, regardless of the national origin of the goods.

rather it has steadily risen. From 1970 to 2000 the cumulative increase in manufacturing real output was 144%. That translates to an annual average rate of growth of 3.0%, only slightly slower than the 3.1% pace of the overall economy. This is not the picture of a sector that was in significant economic decline. Moreover, it shows that for nearly three decades there has been no shift in the structure of demand away from manufactured goods and toward services. What has occurred is a significant change in the relative prices of the output of these two sectors. The average price of manufactured goods has steadily fallen while that of services has steadily risen. What has largely been in decline in manufacturing for the last 40 years is what consumers need to spend to purchase those goods.⁵

A Steady Level of Employment. The other element of relative stability in the manufacturing sector, through to the business cycle peak in 2000, has been the level of employment. (The sharp fall in employment after 2000 is examined in a subsequent section of the report). Manufacturing employment as a share of total employment has certainly fallen, down from about 25% in 1970 to about 14% in 2000. But the actual number of people employed in manufacturing has not seen such dramatic change, particularly over the last 20 years. Figure 2 plots the level of manufacturing employment from 1970 to 2003. We can see there that despite considerable economic turbulence, employment did on occasion rise above 18 million, and reached a post war peak of 19.0 million in 1979. Consistent with a moderate fall in manufacturing's share of real GDP after this period, sector employment levels in the 1980s also notched down, tending to fluctuate between 17 and 18 million employees. At the peak of the 1980s expansion employment pushed to near 18 million. This is also the approximate range for the level of employment during the long economic expansion of the 1990s, reaching a peak of about 17.6 million employees in 1998 and standing at about 17.3 million employees at the expansion's peak in 2000. Over the 30-year period from 1970 to 2000 there was some slippage of peak employment, down from 19 million workers in the 1970s to about 17.6 million in 1998, but the fall off is certainly not precipitous and as discussed in the next section could be more apparent than real.

⁵One might expect that the fall in the relative price of manufactured goods could lead to an increase in the quantity of those goods purchased. The relatively steady share of real GDP indicates that this has not occurred and that the demand for manufactures is not price elastic.

Figure 2. Manufacturing Employment
(in millions of jobs)



Source: Bureau of Labor Statistics

The Effect of Domestic Outsourcing. Some of the slippage in peak employment noted above is likely a matter of statistical definition. Particularly in recent years, there has been a significant amount of *domestic* outsourcing. Companies are now contracting out for many activities once done internally and many of these jobs are now counted as employment in another sector of the economy. Therefore, the measured employment in manufacturing is lower, but the measured employment in the service sector in which these workers are now classified is higher, and there likely has been no net loss of jobs to the economy from this re-definition. It has been judged by some that this phenomenon is sizable, and could account for a large portion of the measured manufacturing job loss between 1990 and 2000.⁶

The Effect of Rising Productivity. Another important factor that has certainly had an effect on employment in this sector is rapid, and in recent years, accelerating increases in productivity. As noted above manufacturing's steady share of GDP in a growing economy has meant that its level of output has grown apace with the economy. This rising output level, we have just seen, was produced using a fairly steady number of workers. Therefore, another steady feature of the U.S. manufacturing sector has been relatively high rates of productivity growth.

From 1970 through 2000, manufacturing productivity advanced at a 3.1% average annual rate.⁷ This average, however, masks the significant acceleration in the pace of productivity increase over this period. During the 1980s manufacturing

⁶See: The White House, *Economic Report of the President*, (Washington, DC: February 2004) p. 71; and Raymond J. Mataloni, Jr. "U.S. Multinational Companies: Operations in 2001, *Survey of Current Business*, (Washington, November 2003) Pp. 92.

⁷Productivity data obtained from U.S. Department of Labor, Bureau of Labor Statistics.

productivity advanced at a 2.9% average annual rate. From 1990 to 2000 this accelerated to an annual average of about 3.9%, and over the last four years of that interval the pace quickened further to 4.6%. Also, the pace of productivity growth was increasing relative to the pace of output growth in the manufacturing sector. Over the 1970 to 2000 period output increased at a slightly slower average pace of about 3.0%. During the 1970s output in manufacturing grew faster than productivity. For the 1980s and 1990s, however, manufacturing output grew slower than productivity, averaging about 2.9% while productivity over the same period advanced at about 3.2%. This recent acceleration of productivity growth would explain why, despite achieving similar output shares, the level of employment in manufacturing during the 1990s expansion fell slightly short of reaching the peak level of employment reached in the 1980s expansion as well as help explain the fall from the postwar era's peak employment in 1979.

An Estimate of the Employment Effect of Higher Productivity. A sense of the force productivity can have on employment can be judged by calculating the number of workers that would have been needed to produce the manufacturing sector's real output in 2000 at the productivity rate of 1990. In 1990 the average real GDP per employed person in manufacturing was about \$62,000. If that rate persisted for the next 10 years, that is, if there was no productivity advance, production of 2000's real output would have required 25.6 million workers. That is 8.6 million more than were actually employed in 2000, or an increase of nearly 50%, and would have boosted manufacturing's share of total employment from about 17% to over 19%, rather than falling to 13% as it actually did.

Of course, the substantive economic outcome of a rising productivity trend is that society has been able to gain the rising output of the manufactured goods it wants without a rising commitment of labor resources to this sector. As a result it would have been possible for those resources to be used to expand the production of services and increase the total quantity of goods and services available to consumers. This productivity-driven gain has manifested to consumers as the steady fall in the relative price of manufactured goods and a steady rise in the purchasing power of consumer's income. The efficiency gains afforded by productivity growth are what propels a rising living standard and the manufacturing sector has been, now and in the past, the leading source of higher productivity for the U.S. economy.

The Effect of Rising International Trade. Popular discussion of the state of the U.S. manufacturing sector will typically quickly focus on the impact of international trade on output and employment in this sector. While the spending of the domestic economy is strongly weighted toward services, trade flows tend to be largely of goods, particularly manufactured goods. Therefore, activity in the manufacturing sector is likely to be more sensitive than the wider economy to changes in the level, composition, and balance of trade. However, the economic impact of these trade effects on manufacturing is different in form and magnitude than commonly thought.

For the United States the total level of trade (exports plus imports) has grown steadily and substantially over the post World War II era. Total trade as a share of

GDP grew from 9% in 1960 to 22% in 2000.⁸ Economic analysis tells us that a rising level of trade (with imports and exports rising in balance) is a means for enrichment for the economy as a whole. Trade will change the composition of output, favoring domestic industries that are relatively efficient and have adverse effects on industries whose relative inefficiency dictates using a foreign production source. There is, however, no strong economic reason to expect a rising level of trade, per se, to have any net negative effect on the manufacturing sector. Rising imports hurt some industries, but an equal-sized increase in exports helps others.⁹

The composition of U.S. trade has also changed. For example, in 1960 agricultural goods were 22% of exports, but by 2000 had fallen to only 6%. Conversely, capital goods over the same period have gone from 30% to 46% of total exports. On the import side, automobiles moved from less than 4% to about 16% of total imports; and apparel has increased from 10% to 25% of total imports. However the greatest change on the import side is the increased imports of capital goods, rising from 4% of all imports in 1960 to 45% in 2000. More generally, the composition of both imports and exports has shifted towards manufactured goods and the majority of trade in manufactured goods is now trade in intermediate goods— goods used as inputs to the process of production, not goods ready for final sale to households.¹⁰

Such compositional changes are indicative of changing consumer demand here and abroad, shifting comparative advantage, and increasing fragmentation of the production process across many economies. Again, these compositional changes caused by trade are part of an enriching process that is good for the overall economy, but in the process helps some industries and hurts others.

The Effect of Growing Trade Deficits. Since the 1980s a recurring aspect of U.S. international trade has been the running of large trade deficits. Over the

⁸This *globalization* of the American economy has also occurred in the trade of financial assets (i.e. stocks, bonds, bank accounts, and real property). In fact, such *capital flows* have grown even more spectacularly than has trade in goods and services. Because asset transactions occur at greater speed and volume than goods transactions they have a stronger effect on exchange rates. Therefore, asset market flows most often become the determining force behind changes in the balance of trade in goods and services. Asset flows will be animated by the relative rate of return on domestic versus foreign assets. A relatively high rate of return on domestic assets will make them attractive to foreign buyers and induce a net outflow of assets. A net outflow of assets tends to appreciate the exchange rate because the demand for the domestic currency needed to buy the domestic assets also rises. The appreciating exchange rate will induce a net inflow of goods and services— a trade deficit. Conversely, a relatively low rate of return on domestic assets will make foreign assets more attractive to domestic buyers and induce a net inflow of assets. A net inflow of assets tends to depreciate the exchange rate because the demand for the foreign currency needed to buy the foreign assets also rises. A depreciating exchange rate will induce a net outflow of goods and services— a trade surplus.

⁹Remember that with a balanced rise in the level of trade, increased imports must be paid for with an equal valued increase in the export of goods or assets.

¹⁰For a discussion of these trends see: Douglas A. Irwin, *Free Trade Under Fire*, (Princeton, Princeton University Press, 2002) Pp.3-15.

economic expansion of the 1990s, the trade deficit increased from \$48 billion in 1992 to \$444 billion in 2000, or from 0.7% to 4.4% of GDP. Large trade deficits are not a necessary counterpart to a rising level of trade or a shifting composition of trade. Those deficits are the result of the U.S. economy's pronounced tendency to spend beyond what the domestic economy can produce, borrowing from the rest of the world to purchase a net inflow of foreign output (a trade deficit) to help meet the economy's total demand for goods and services (foreign and domestic).

Standard economic analysis indicates that trade deficits do not lead to any net loss of output or employment for the whole economy. But trade deficits will likely alter the composition of output and employment, as the forces behind those deficits generate a rising exchange rate and thereby, a rising incentive to allocate resources away from production of domestic tradable goods (which are largely manufactures), towards the import of foreign tradeable goods, and towards the production of non-tradable products (which are largely services).¹¹ In most cases this market churning induced by trade deficits is expected to have a negative effect on the output and employment of the United States' principal tradable goods sector — manufacturing.

However, the negative effect of trade deficits on manufacturing is probably not as substantial as commonly believed. Focusing on the 1992–2000 period, the \$300 billion rise in the trade deficit in manufactures in this period was unlikely to have caused a like-sized reduction in the production of domestic manufactured goods, nor caused a proportionate loss of manufacturing employment. This is because most often trade deficits are a means of augmenting the goods available to domestic purchasers, allowing the nation to spend beyond current domestic output through the availability of both domestic and foreign output. There are several reasons why imports and domestic output will rise together. First, with such strong demand in an economy operating near or at its productive capacity, and unable to generate substantial near-term expansion of its productive capacity, it is possible for many domestic industries to be working at full capacity, even as there are also large inflows of similar or related foreign products. Both domestic and foreign output of a particular product is needed to meet current demand. Second, because a very large share U.S. trade is *intraindustry* trade in intermediate products— trade within the same industry due to an internationally fragmented production process— a final product will often be composed of several components, some of domestic origin and some of foreign origin.¹² With this structure of production, an increase in the demand

¹¹The compositional effect is different than that induced by a rising level of trade. In that case the change was among tradeable goods producing industries. In the case of trade deficits, however the change is between tradeable and non-tradeable goods producing industries.

¹²The significance of intraindustry trade varies by industry. For industries that make sophisticated manufactured goods it tends to be very high with over 90% of trade of this form. In labor intensive industries, that manufacture less sophisticated products, very little trade is intraindustry. Intra industry trade is to a great degree a manifestation of a wide spread move towards more fragmented production processes, or what is called *vertical specialization*. It is estimated that about 1/3 of the growth of world trade since 1970 is the
(continued...)

for the final product will increase both domestic output and imported foreign output regardless the level of capacity utilization. Finally, there may simply be no domestic counterpart for some goods because product differentiation has led to specialization across countries in the production of particular goods. (The economic gain from such specialization arises from economies of scale, not comparative advantage and is common among high income economies with very similar resource endowments). For these reasons, to a substantial degree the size of the trade deficit during an economic expansion, as during the 1990s, cannot be taken as a one-for-one measure of reduced domestic output and the loss of the associated jobs.

During the 1992–2000 economic expansion the U.S. economy was in such a circumstance. A strong acceleration of investment spending pushed economy-wide spending well beyond current domestic production, with the difference made up by a net inflow of foreign output – a trade deficit. (Without this net inflow from abroad some investment would not have occurred or domestic consumption would have had to be reduced.) Yet, as the trade deficit increased the economy grew at record breaking speed, and the unemployment rate was pushed to record breaking lows. Investment spending is largely spending on manufactured goods; and as observed above, domestic manufacturing output grew even faster than the overall economy, the sector quickly reached a high level of capacity utilization, and sector employment rose to levels near the employment peaks of the 1980s. Among U.S. multinationals in manufacturing, which account for a large share of sector employment and trade, there was no evidence of U.S. firms during this period diverting activity from the domestic parent to their foreign affiliates. The output and employment of these firms rose in both domestic and foreign operations.¹³ This all strongly suggests that to a large degree the trade deficit in this period was a means to augment the manufactured goods available to the economy, rather than substitute for domestic manufacturing output.

Nevertheless, the inflow of goods that a trade deficit affords is unlikely to perfectly mesh with the economy's expanding spectrum of demands for goods in such a period. Remember that more than half of economy-wide spending is on services (services represented 53% of total expenditures in 2000), whereas the trade deficit is primarily a vehicle for acquiring goods rather than services (services accounted for only 18% of all imports in 2000). If at this time the economy's spending beyond domestic output was composed heavily of spending for services as well as goods, then the inflows from the trade deficit would not be of the kind of output that would directly satisfy this demand, and a rising exchange rate and the

¹²(...continued)

result of this phenomenon and can be expected to be even higher for the trade of an advanced industrial economy such as the United States. For further examination of the nature and significance of intraindustry trade see: Paul Krugman and Maurice Obstfeld. *International Economics: Theory and Policy* (Reading, MA, Addison Wesley, 1997). Pp 139-142. For further examination of the *vertical specialization* phenomenon see: David Hummels, Dana Rapoport, and Kei-Mu Yi , “The Nature and Growth of Vertical Specialization.” *Journal of International Economics* 54 (June 2001) Pp. 75-96.

¹³ See: “ The Operation of U.S. Multinational Companies, *Survey of current Business* (Washington, March, 2002) Pp. 24-54.

exigencies of economic efficiency would likely induce some substitution of foreign manufactured output for domestic manufactured output. In other words, market forces, acting primarily through a rising exchange rate that makes foreign goods relatively less costly, will reallocate some domestic resources away from the relatively less efficiently produced (at the higher exchange rate) domestic manufactured goods and allocate those resources towards the domestic service sector. The import of relatively more efficiently produced (at the higher exchange rate) foreign manufactured goods serves as a *substitute* for the reduced domestic production of certain manufactured goods. As a result the size of the domestic manufacturing sector is smaller and the service sector larger than they otherwise would have been.

Remember that this substitution effect occurs concurrently with the augmentation effect discussed above. Therefore the manufacturing sector can still be expanding output overall, it would simply not be expanding as much as it otherwise might. Overall the economy, with the use of the trade deficit, finds the most efficient way to use domestic and foreign sources of supply to meet its total demand for goods and services.

An Estimate of the Employment Effect of the Trade Deficit. In the 1992–2000 period, how substantial was the adverse effect of the trade deficit on manufacturing? The apparent relative steadiness of the manufacturing share of real GDP and level of employment make it clear that the trade deficit did not induce any absolute decreases of output or employment in the manufacturing sector. Therefore, what adverse effect there was would have to be essentially a question of how much larger would the manufacturing output share and employment level have been if there had been no increase of the trade deficit. That is, during a vigorous economic expansion, led by a rapid increase in domestic spending on investment goods, which are largely output of the manufacturing sector, might domestic manufacturing's share of real GDP have pushed higher than it did if the trade deficit had not risen?¹⁴

A rough estimate of this effect can be made. As a first step, let us establish an absolute upper bound for the rising trade deficit's impact on output and employment in manufacturing between 1992 and 2000. For this purpose it is assumed that no increase in the economy-wide trade deficit would also translate into no increase in the manufacturing trade deficit. If the \$300 billion rise of the manufacturing trade deficit in this period had represented a one-for-one substitution of foreign manufactured goods for domestic manufactured goods, then without the rise of the trade deficit domestic manufacturing output could have been \$300 billion higher in 2000. Given that the average value added for a manufacturing worker in 2000 was about \$92,000 (i.e. total value added divided by total employment), then to produce an extra \$300 billion would have required about 3.3 million more workers. This

¹⁴In the framework outlined above, the trade deficit would not have increased over the course of the economic expansion if the investment boom had been financed by domestic saving. If that occurred there would be no net capital inflow, no appreciation of the exchange rate, and no increase of the trade deficit. This scenario also assumes that domestic manufacturing's productive capacity could expand apace with rising demand.

increase would have brought the sector's total employment to 20.6 million in 2000, and its share of total employment from 13.0% to 15.6%. (It is interesting to note that the maximum possible employment effect of the trade deficit is much smaller than the estimated employment effect of the productivity increase over the same period that was calculated earlier.)

Of course, the probable effect of the trade deficit on manufacturing employment would likely be less than 3.3 million. As was discussed earlier in the report, because of domestic capacity constraints, because of the fragmentation of most production processes, and because there is no domestic source of supply, a sizable portion of the trade deficit does not come at the expense of domestic output and employment. So erasing those imports would not add to domestic output or employment. Also, the conditions that caused the overall trade deficit not to rise would also likely lead to a significant increase in the level of services exports and forestall a full shifting of domestic resources into the production of manufactured goods.

The other point that suggests a manufacturing employment gain of less than 3.3 million is that an increase to 20.6 million workers would push the sector's level of employment far above its historical peak of 19.4 million workers reached in 1979. We also observe that throughout the 1970s when trade pressures were negligible and when manufacture's share of total spending was likely higher than now, the sector's employment fluctuated in a range of between 18 and 19 million workers. Given that since the 1970s productivity in manufacturing increased faster than output, it seems improbable that, even without a rising trade deficit, employment in 2000 would have reach 20.5 million. If we take the historical high of about 19 million workers as a plausible upper bound then the employment gain from having no increase of the trade deficit falls to 1.7 million. Nevertheless, whether the employment impact was 1.7 million or 3.3 million without an increasing trade deficit during the 1992– 2000 expansion, employment in manufacturing would have likely been significantly higher. However, by comparison this analysis finds that the negative impact of the trade deficit on manufacturing employment was likely 1/3 the magnitude of the negative impact of productivity increase (estimated above) over the same time period.

Events since 2000

A Confluence of Negative Forces. From 2000 to 2001 the real output of the manufacturing sector fell nearly \$100 billion and through 2002 real output of the sector was still \$70 billion below the 2000 level. Data on GDP by sector for 2003 are not yet available, but the absence of any significant rebound in the industrial production index for the sector in 2003 suggests improvement may not be great. The fall of manufacturing employment in this period was more dramatic, down by about 15% or by about 2.6 million jobs.¹⁵ Three broad macroeconomic forces have most likely come together to cause these declines, two from the demand-side and one from the supply-side.

¹⁵ Output and employment data can be found in the 2004 Economic Report of the President cited above.

One demand-side force is the recession of 2001 and the tepid pace of recovery in 2002 and early 2003. Real GDP increased only 0.3% in 2001 and advanced at a rather slow 2.1% in 2002. The pace of economic growth steadily improved during 2003, moving up at 3.1%. This gives hope that the economic expansion is now progressing at a healthy pace, but so far has not had a strong positive impact on the manufacturing sector. The demand for manufactured goods is particularly sensitive to the economy's cyclical path. In the face of short-term economic weakness, spending on consumer durables and capital goods tends to be postponed until better economic conditions emerge. Also, in contrast to the service sector, accumulating inventories must be worked off before increasing current production and employment. Thus, while the overall economy had a significant slowing of economic activity, the manufacturing sector, the maker of those consumer durables and capital goods, experienced outright declines, with output falling nearly 6% since 2000.

The second demand-side factor is the continued rise of the U.S. trade deficit. Since 2000 the overall trade deficit increased about \$130 billion and the deficit in manufactures increased about \$80 billion. It is likely that a growing trade deficit in a period of economic slack would have a stronger negative effect on domestic manufacturing as domestic producers face not only falling demand but also a smaller share of that demand relative to foreign producers (i.e. a smaller share of a smaller pie). During an expansion, a rising trade deficit also reduces the domestic share, but rapidly rising demand can still cause domestic producers' absolute position to rise (i.e., a smaller share of a bigger pie).

The force working from the supply-side is continued rapid advance of productivity in the manufacturing sector. Despite the slow pace of economic growth, productivity in this sector has advanced by at least 11% since 2000. While this will translate into a benefit for the overall economy, rapid efficiency advance now means on average that fewer workers are needed to produce any given volume of manufactured goods. In other words, even if there had been no recession and no further increase of the trade deficit, employment in the manufacturing sector would likely have fallen substantially. When this sizable productivity effect is combined with the demand weakness that has occurred, it is not surprising that there has been a fairly substantial negative impact on employment in the manufacturing sector. Not only has the demand for manufactured goods fallen, and not only has the domestic producers' share of that demand fallen, but the number of employees needed to produce that smaller output has also fallen substantially. (i.e. a smaller pie, a smaller piece, and many less workers needed to produce that piece than was true only three years earlier).

Estimating the Separate Impacts. The relative impact of these three forces on the manufacturing sector can be approximated using some simple calculations. In 2000 real GDP originating in the manufacturing sector was about \$1,600 billion and the sector employed about 17.3 million workers. This translates into an average real output produced per worker of about \$92,000. With 11% cumulative productivity increase in manufacturing since 2000, the comparable real GDP per employee value in 2003 is estimated at \$102,000. With these values in hand some simple estimates are possible.

The Effect of Weak Demand. What would manufacturing employment be in 2003 if there had been no productivity gains since 2000? A rough estimate can be made by dividing 2003's value of real GDP originating in manufacturing by 2000's real GDP per worker (with no change in productivity, the value of GDP per worker would be same in 2003 as in 2000). It is too early to know the actual real GDP value for 2003, but a conservative estimate would probably be about \$1,500 billion. Dividing that \$1,500 billion by the 2000 real output per worker value of \$92,000 tells us that with unchanged productivity since 2000 about 16.3 million workers would have been needed to produce the 2003 output level. This is a reduction of one million workers from the 2000 employment level. This number can be taken to be the approximate effect of weaker demand on employment in manufacturing.¹⁶

Apportioning the Weak Demand Effect Between Recession and the Trade Deficit. It is also possible to make a rough estimate of the relative contribution of the two demand-side forces: recession and the trade deficit. This can be accomplished by estimating an upper bound for possible effects of the trade deficit on employment in manufacturing. As noted earlier, the trade deficit's potential decrement to manufacturing output can be no larger than the change in the manufactures trade balance between 2000 and 2003. That deficit in manufactures was \$325 billion in 2000 and is running at about a \$400 billion pace for 2003, suggesting a cumulative increase of about \$75 billion over this three-year span. If we assume that this increase in the trade deficit in manufactures represents a one-for-one reduction in the demand for domestic manufactured goods, then at the 2003 level of GDP per worker of \$102,000 the \$75 billion in lost domestic sales could translate into a reduction of as much as 730,000 domestic manufacturing jobs. Therefore, perhaps as much as three fourths of the million lost jobs lost to weak demand is the result of the rise of the trade deficit in this period of slack demand.

This 730,000 jobs is, however, an upper bound and we must consider that there are other forces associated with the trade deficit that may lead to some positive effects on domestic manufacturing output and employment. The overall trade deficit, which increased about \$100 billion between 2000 and 2003, occurs with a like sized inflow of foreign capital. Such capital inflows tend to lower interest rates and provide stimulus to spending for interest rate sensitive activities such as housing and consumer durables. Spending stimulated in these areas of the economy will likely induce some increased spending on manufactured goods, foreign and domestic. Also, the generally lower price of imports tends to increase U.S. real income, inducing increased demand for all other goods, foreign and domestic. It is plausible that these effects could work to create 100,000 or more manufacturing jobs and would bring the estimate of impact down to 650,000 jobs lost to the trade deficit's rise since 2000. Nevertheless, it is likely fair to assume that a rising trade deficit in a period of slack demand will largely come at the expense of domestic production and employment. And, as observed in the 1992-2000 period, even at its maximum possible effect, the impact of the trade deficit on employment in manufacturing in this more recent period is also much smaller than the effect of productivity.

¹⁶This does not take into account that absent productivity increases and the associated reduction of the price of manufactured goods, the demand for manufactured goods could have weaker and employment lower.

The Effect of Productivity. Productivity growth, however, has not been constant. With a cumulative productivity increase of at least 11% between 2000 and 2003, real GDP per worker has likely increased to about \$102,000. To produce the estimated 2003 output of \$1,500 billion at this higher productivity level would require about 14.7 million workers. The difference between 14.7 million and the 16.3 million calculated above is 1.6 million workers and is the estimated contribution of productivity increases to overall job loss in the manufacturing sector since 2000. This tells us that since 2000, had there been no reduction of demand for manufactured products, whether due to recession or trade deficits, as much as 62% of the 2.6 million job loss would have likely occurred because of improved efficiency.

Summarizing the discussion of this section: It is far too early to tell whether a portion of the fall in the output of the manufacturing sector since 2000 is a consequence of a structural reduction in the economy's long-term demand for domestic manufactured goods. That share has fallen from the peak levels reached in the 1970s and a further decrement could be occurring. We do know, however, that over the last two decades the domestic manufacturing share of real GDP has remained fairly steady. Therefore, until proven otherwise, the more credible assumption is that the recent weak demand for domestic manufactured goods is, in part, the lingering effect of the recent recession and the fairly tepid recovery that has followed; and also the effect of the continued rise of the trade deficit at a time when there was sizable economic slack. The analysis above suggests that these demand side forces can account for about 40% of the manufacturing jobs shed since 2000. The remaining 60% of the manufacturing jobs lost since 2000 are likely the result of rapid productivity increases that occurred over the subsequent three years. This has meant that not only was there less output to produce due to weakness of demand, but also that it took significantly fewer workers to produce that smaller output than would have been required only three years earlier.

Looking to the Future: Can Demand Keep Pace with Productivity?

The demand-side forces of weak aggregate spending and large trade deficits need not be enduring because they can be allayed by macroeconomic policy. Rapid productivity increases, however, may well be an enduring feature of the economy and from the standpoint of the overall economic well-being, not one policymakers would want to stop. For the manufacturing sector, the prospect of fading negative effects from the demand side means that it could possibly regain or surpass its pre-recession share of GDP. But for employment it is not just a question of demand. The manufacturing sector's ability to reclaim lost jobs will hinge importantly on the pace of productivity increase over the course of the ongoing economic expansion.

Expectations for Demand. There are good reasons to expect that as the current economic expansion progresses, the manufacturing sector's output will rise from its current low level, but will it reclaim its pre-recession share of real GDP?

Employment in manufacturing can also be expected to rise along with rising sector output, but will the 2.6 million jobs lost since 2000 be reclaimed? This report does not attempt to forecast what will happen, but projections of plausible scenarios can give some insight into the shape and magnitude of the forces which will determine these outcomes.

The problems related to recession are expected to soon pass. Therefore, the level and share of output the U.S. manufacturing sector will likely achieve as the economic expansion proceeds will depend on: one, the economy's demand for manufactured goods relative to non-manufactured goods; and two, the degree to which the forces that determine the trade balance alter the demand for domestic manufactured goods relative to foreign manufactured goods. As mentioned above there is no strong evidence that the economy's spending share for manufactured goods has been permanently reduced. But, the likely pace of economic growth in the ongoing expansion is generally projected to be somewhat slower than was true in the previous expansion. Of particular importance for domestic manufacturing in this regard is the prospect of less exuberant investment spending by businesses, a prime source of demand for manufacturing output.

However, a boost to the demand for manufactured goods may well come from the trade balance. The real dollar exchange rate, on a trade-weighted basis, has already fallen about 13% since 2002 and further depreciation is expected. If this occurs, it is probable that the trade deficit, particularly the real trade deficit, will soon stop rising and begin to fall. Such a shift in spending from foreign to domestic output would likely give a significant boost to the demand for domestic manufactured goods. The likely coincidence of a healthy paced economic expansion and a decrease in the trade deficit, suggest that the manufacturing sector could, over the next three to four years, return to near the 17% share of real GDP that has been typical in recent years.

Of course, any given percentage share of GDP will represent a higher or lower level of real manufacturing output depending on the level of GDP at that point in time. The faster the overall economy grows, the greater will be the level of real manufacturing output for a given share by manufacturing and the larger will be the level of employment associated with that share, other factors equal. How fast will the overall economy grow? Currently most forecasts for real economic growth fall in the 3.5% to 4.0% range. Proceeding conservatively, we will assume for this exercise that real economic growth will advance at an average pace of 3.5% over the course of the current economic expansion. We will also assume that by 2007 the overall economy will have reached full employment and that in 2007 the manufacturing sector has, as occurred in the last expansion, reached a 17% share of real GDP.

Expectations for Productivity. Given a 17% share of real GDP, the level of employment in manufacturing will depend on the pace of productivity growth in the sector over the four-year interval being considered here. Making an assumption about the near-term path of productivity in manufacturing is somewhat problematic due to the sizable variations in its rate of increase in recent years. We know that during the 1982 to 1991 expansion, productivity in the manufacturing sector had an

average rate of increase of 2.8%. During the 1992 -2000 expansion, that rate increased substantially to 3.7%, and over the 1994-2000 sub-period productivity moved up still faster at a 4.3% average annual rate. Slowing to less than 2.0% in recession-dominated 2001, manufacturing productivity came back strongly at 6.0% in 2002 and advanced at a 4.3% pace in 2003.

What pace through 2007? There is a consensus among economists that the trend rate of productivity change has increased significantly over the pre-1990s pace of near 3.0%. But that trend rate is probably not as high as the 6.0% pace set in 2002 and probably somewhat slower than the brisk 4.3% pace of the booming late 1990s. A conservative but credible assumption for productivity growth in the manufacturing sector would seem to be a trend rate increase of around 4.0% per year.

Prospects for Employment in Manufacturing. Given the above assumptions, what would be the implied level of employment in the manufacturing sector in 2007? Growing at a 3.5% average annual pace, real GDP in 2007 would be \$11.2 trillion and manufacturing's 17% share of that total would be approximately \$1.9 trillion. With productivity in manufacturing increasing at a 4.0% annual pace, the value of real GDP produced per worker in manufacturing would rise from \$102,000 in 2003 to about \$118,000 in 2007. Dividing the dollar value of manufacturing's assumed share of real GDP in 2007 by the estimated dollar value of the average worker's contribution to real GDP in that year tells us that about 16.1 million workers would be needed. That would be an increase of 1.4 million manufacturing jobs over the 2003 level and mean that about 54% of the 2.6 million jobs lost between 2000 and 2003 would be restored. Thus despite economic recovery and regaining a typical share of real GDP the manufacturing sector would not re-employ about 1.2 million workers if productivity in that sector advances at 4% per annum during the current expansion.

The question that might be asked is: what share of real GDP would manufacturing have to reach by 2007 to re-employ the whole 2.6 million workers? Within the assumptions of this scenario, the manufacturing sector would need to reach a real output level of near \$2.1 trillion, which translates to an 18.5% real GDP share. As discussed above, a share of that size has not been reached in recent years but is probably not beyond reach if the demand for domestic manufactures gets a sufficient boost from a smaller trade deficit. In the framework of this scenario, if the trade deficit in manufactures fell by enough to boost demand for domestic products by \$150 billion, manufacturing employment would rise to 17.3 million in 2007, reclaiming the 2.6 million jobs lost between 2000 and 2003.

While optimism about the trade deficit in the exercise above leads to more favorable results for manufacturing, the assumption of a 4% annual average rate of productivity increase could be seen as overly conservative and some might judge that a significantly faster rate is more likely. This report does not venture to predict what the actual rate might be, but it is illustrative to consider what the effect might be of a plausible faster average productivity increase. For instance, consider the impact of assuming that productivity in manufacturing moves up at 5.0% rather than 4.0% over the next four years. The outcome is that with a 17.0% real GDP share, 5.0% productivity growth leads to an employment level in manufacturing of about 15.5

million in 2007, as compared to 16.1 million in the first scenario. In this circumstance about 2 million of the 2.6 million lost jobs would not be reclaimed.

What level of demand for manufactures is needed to reclaim all 2.6 million jobs? Doing the same type of calculation as above tells us that the that manufacturing's share of real GDP in 2007 would need to be about 19.0%. That size share is well beyond recent experience as well, but probably could be achieved if there was a large enough reduction in the trade deficit in manufactures. That would probably require a trade deficit reduction of about \$250 billion.

Likelihood of Alternative Outcomes. Again, these are only rough estimates, but they do convey the relative importance and dynamic tension of demand and supply forces on the future level of employment in manufacturing. In thinking about the actual future path of these several variables, we can make some reasonable judgements about the most probable direction of error in the assumptions made above, and perhaps narrow the range of possible outcomes.

Regarding productivity, recent history would strongly suggest that productivity growth in the manufacturing sector is more likely to fall above than below 4.0% per annum. Most economists think the U.S. economy has experienced a substantial and likely long lasting increase in productivity and is unlikely to see any deceleration from this faster pace. That productivity has grown more rapidly since 2000 than in the 1990s can be seen as limited evidence that the trend rate of productivity in manufacturing could be above the 4.0% assumption used in the first scenario.

Regarding, the trade deficit, it seems likely that it will soon stop rising, and perhaps see a significant fall. Dollar depreciation that has already occurred, combined with the prospect of further depreciation and accelerating economic growth abroad bode well for some turnaround in the trade deficit, but a fall on the scale suggested above is problematic. Nevertheless, sustained reduction of the trade deficit would present the best chance for more favorable output and employment outcomes in manufacturing. That said, a falling trade deficit does not mean that particular industries will not still face stiff foreign competition and continue to lose market share and shed jobs. Most often these will be situations where comparative advantage is shifting to foreign sources of production and the domestic industry will continue to decline despite an expanding economy and a falling trade deficit.¹⁷

Finally, regardless of their nation of origin, it is unlikely that consumers will allocate a substantially larger share of their spending to manufactured goods than has been true in recent decades. The trend in the U.S. and other industrial economies in

¹⁷China probably comes to mind as an example of a country many of whose industries are gaining comparative advantage over many U.S. producers. Yet, a very large part of what China has gained in the United States has been at the expense of imports from other foreign producers in Latin America and other Asian nations. For a discussion of this point and other aspects of trade with China see: *The Economic Report of the President*, (Washington, February, 2004) Pp. 65-68.

recent years has been a relative steadiness of that share. If that share does change, the long-term evidence indicates that the movement will most likely be down.

Taken together, these probable tendencies suggest that it is optimistic to expect manufacturing real output to greatly exceed 17% or for employment to increase by much more than 1.5 million workers over the next few years. Given the uncertainties for productivity and the trade balance, the more probable direction to correct for error in this estimate is down rather than up.

Policy Options

There are two classes of policy responses to deindustrialization: those that are an attempt to arrest the process and those that are an attempt to ameliorate the process. Policies to arrest include: industrial policy (to promote specific industries), trade policy (to protect specific industries), technology policy (to support growth of productive knowledge), and macroeconomic policy (to reduce the trade deficit). Policies to ameliorate include all policies that attempt to support and facilitate the adjustment of workers hurt by the often disruptive process of economic change in a market economy. These include: unemployment insurance, adjustment assistance, support for retraining, and wage insurance.

Arresting Deindustrialization's Advance ?

In considering policies to arrest the process of de-industrialization, the question that needs to be asked is: should this process be stopped? We have already noted that this is a process evident over several decades to varying degrees in nearly all industrial countries. It would largely seem to be a market driven process that occurs along with rising prosperity and may be seen as a natural evolution for successful economies. A traditional or pre-industrial economy will avoid the disruptions and change that market forces cause. But this stability comes without the steadily rising living standard brought by sustained economic growth. Such growth is the hallmark of the modern industrial market based economy. It is a process of "creative destruction," however, where advance seldom comes without costs.

Yet, there can be market failure; that is, for some reason, markets are not performing efficiently and resources are being under or over allocated to some activities. Where market failure occurs it is possible for public policy to craft an improvement of the economic outcome. That is most often easier said than done.

The issue of economic policy responses to arrest deindustrialization is most usefully explored in the context of the three broad economic forces that have been acting upon the manufacturing sector: domestic demand (both structural and cyclical forces), trade (both the level of trade and the trade deficit), and productivity growth.

Response to Changed Demand. Because a large proportion of manufactured goods are postponable purchases for businesses and households,

downswings of the business cycle have a strong adverse affect on the manufacturing sector, leading to more severe reductions of output and employment than occur in the service sector. But the slack demand of a recession period is largely temporary and will most often be reversed during the subsequent expansion. Macroeconomic policy has done much to forestall the occurrence of downturns and minimize their severity, but recessions have not been eliminated, nor are they likely to be soon. As a recurring part of the economic landscape, recessions to a large degree must be endured. While improvement of the effectiveness of stabilization policy is an appropriate goal, as a practical matter there is probably little more macroeconomic policy could do at this time to help improve the state of the domestic manufacturing sector through a revival of aggregate spending. Large tax cuts are already in place and monetary policy has been strongly stimulative. A positive response to these policies often comes with a significant lag, but it does occur.

So too with the longer-term changes in the structure of demand economy-wide. There is no economic rationale for trying to slow or reverse the slow shift of expenditures away from manufactured goods and toward services. The economy's task is to respond in the most efficient way to the changing preferences of consumers, not to preserve the position of any particular activity such as manufacturing.

Boosting the Economy's Creative Forces. Some might argue that to some degree supply creates its own demand. That is, the development of new productive techniques, new products, and new industries will generate new demand for manufactured goods. The generation of a steady stream of such innovations has been an important strength of the U.S. economy. However, the argument proceeds, without some degree of nurturing through public support these valuable economic outcomes will not occur or will not occur at the optimal scale if left to the workings of the private marketplace alone. The class of policies used to support such "special" activities or industries is called "industrial policy." Some may assert that industrial policy could have positive effects on the size and scope of the domestic manufacturing sector through its boosting the pace of generation of new and desirable goods and of more efficient production techniques.

Most popular variants of industrial policy are not effective from an economic perspective. Selection criteria based on "high value added," "linkage effects," "growth potential," or "countering industrial policies of other countries" are flawed because they are not aimed at correcting any actual "market failure" and if pursued will most often reduce economic welfare, not increase it. Examination of actual industrial policies undertaken in Japan and Europe and driven by such criteria suggests that they achieved mixed success, at best.¹⁸

An economically sound case for one variant of industrial policy can be made if "externalities" (benefits that accrue to parties external to the firm) are important, for then markets will tend to under-allocate productive resources to activities that generate external benefits. In the presence of external benefits, government policies

¹⁸For a discussion of the "problematic" success of industrial policy in practice in several countries see: Paul Krugman and Maurice Obstfeld. *International Economics: Theory and Evidence* (Harper– Collins, New York, 2000) Pp 287-296.

to correct or compensate for the resulting market failure can increase economic welfare. A very likely source of such external benefits is in the production of new technology.

Improving technology is largely a process of generating new ideas. To the extent that new ideas lead to profitable outcomes and those profits can be secured by a private enterprise, the market economy will generate new ideas and foster technological change. An inherent attribute of ideas, however, is that they are *non-rival*, as in: my using the idea does not preclude someone else from using it. Further, ideas will often have the attribute of *limited excludability*, meaning the owner of the idea will often find it difficult or impossible to charge a fee for its use. These attributes will likely cause a divergence of private benefit and social benefit. (What the creator of the idea can expect to gain will be less than what the overall economy can expect to gain.) In this situation, less than the socially desirable level of idea generation will occur.

The presence of a *market failure* in idea production can be corrected by an appropriate amount of public support for the idea creation process. Such support could include public funding of *research and development* (R&D), both basic scientific research (where the prospect of market failure is the greatest) and enterprise specific research; public funding for investment in human capital, particularly education in the sciences and engineering; and public support for mechanisms to establish and enforce property rights, such as patent and copyright administration.

Of course, these are activities that the U.S. government supports now.¹⁹ But the open question is whether such support is well targeted and undertaken at an appropriate scale. This is not an easy question to give a precise answer to, but a considerable amount of economic evidence has shown that the social rate of return to R&D for a variety of research projects often greatly exceeds the private rate of return, suggesting that too little research is being undertaken. (At optimal scale research projects would be undertaken to the point where the social rate of return has been pushed down to the level of private return.) By some estimates, the level of investment undertaken by firms could be as little as 25% of the level what is economically optimal.²⁰

While clearly good for the overall economy and providing the prospect of benefit to manufacturing, the precise effect of an increased level of public support for knowledge production on the domestic manufacturing sector is hard to predict. All industries are unlikely to benefit equally and some may gain at the expense of others. The economic value of what the manufacturing sector produces could increase but

¹⁹For a discussion of current federal programs see: CRS Issue Brief IB10088. *Federal Research and Development: Budgeting and Priority Setting Issues, 108th Congress*, by Genevieve Knezo.

²⁰See: Zvi Griliches. “*The Search for R&D Spillovers*” (Scandinavian Journal of Economics, 1991) Pp. 29– 47; Bruce Smith and Claude Barfield. *Technology, R&D , and the Economy* (Washington: Brookings Institution, 1996); and Charles I. Jones and John C. Williams. “*Measuring the Social Return to R&D*” (The Quarterly Journal of Economics 63, no.4, November, 1998) Pp. 1119-1136.

its share of real output might not. Also, to the extent that new knowledge manifests as higher manufacturing productivity, it will tend to reduce employment in the sector.

Response to Trade and Trade Deficits.

Protectionism. A central tenet of economics is that a rising level of international trade is a means for economic enrichment and a hallmark of a steadily rising standard of living. In recognition of this the major thrust of international economic policy by the United States and most other industrial nations in the post World War II era has been to raise the level of trade through the removal of various man-made barriers to trade. Such efforts are unlikely to adversely affect the domestic manufacturing sector as a whole. There will be positive effects on some industries and negative effects on other industries. If the economy is to import more then it must also export more to earn the foreign exchange needed to pay for imports. It can export more goods or more assets. In either case, as increased imports destroy jobs, higher exports create jobs. The composition of employment will change but there is no net loss of jobs. Some that export will gain enlarged sales opportunities abroad, while those that face increased competition from imports may lose market share.²¹

Beleaguered industries may call for more protection, not less. As the removal of trade barriers is enriching, the erection of such barriers is found to decrease overall economic well-being. What a protected import-competing industry might gain will be offset by what the unprotected exporting industries lose. But there will also be the added cost to the wider economy as the trade barrier causes resources to be diverted from more efficient to less efficient uses, leading to higher product prices and a reduced array of goods available to the consumer. If trading partners retaliate with the elevation of their own barriers, the costs go higher still. Economic theory and evidence indicates that trade protection will most often be a very costly means by which to help the domestic manufacturing sector.²²

Reducing the Trade Deficit. As discussed above, trade deficits do not lead to net output or employment loss economy-wide, but they do shift the composition of output and employment and this shift in composition will likely have an adverse effect on the domestic manufacturing sector. (This adverse effect in non- recession periods, however, is likely much smaller than commonly believed.) Economic analysis also indicates that trade deficits confer benefits on the economy. The capital inflow that is the necessary counterpart of a trade deficit serves to increase the flow of saving available to the economy and has favorable effects on activities typically financed by saving flows such as business investment and residential construction. Most recently, the trade deficits of the 1993–2000 period allowed the U.S. economy to undertake rates of investment that exceeded the flow of *domestic* saving available

²¹ The increased demand for imports must also increase the demand for the foreign currency needed to buy them. As a result, the value of the foreign currency will rise relative to the dollar. This makes U.S. exports more attractive to foreigners and makes foreign imports less attractive to U.S. buyers

²²See for example: Gary Clyde Hufbauer and Kimberly Ann Elliott, *Measuring the Costs of Protection in the United State*, (Washington, Institute for International Economics, 1994).

to finance that investment. Higher investment will have the positive effect of boosting the economy's rate of economic growth and boosting future living standards. Of course, a trade deficit can also be a means of boosting current consumption. This occurred with the trade deficits of the 1980s, as government and households boosted spending at the expense of saving and used an inflow of foreign saving (the flip side of the trade deficit) to support a higher rate of consumption (both public and private) not a higher rate of investment. In this case there was no added investment or boost in productive capital and thus no increase in future output would be forthcoming. In this situation, a trade deficit is merely a means of swapping future consumption for current consumption.

In either case the borrowing from foreigners that a trade deficit reflects will have to be paid back. In the first circumstance, debt repayment can be taken from the added output the higher investment produces and not necessarily require that future consumption be reduced. If the boost in economic growth is large enough, the debt could be repaid and future consumption increased. In the second circumstance, debt re-payment comes at the expense of future consumption. This could also be an economically acceptable outcome depending on how one views the reason for boosting current consumption. Was it the result of a free and informed choice by market participants or the result of flawed economic policy? Our tolerance for trade deficits and the problems they cause for domestic manufacturing may be differentially affected by our valuation of these alternative motivations for those deficits, particularly if public policy through its spending and saving (i.e., expenditure and revenue) decisions has played a role in the process.

If a smaller trade deficit is judged the appropriate goal, economic policy can be used to reach that goal. To reduce the trade deficit the economy must save more and/or invest less. If it is also judged prudent not to achieve this reduction at the expense of domestic investment, then the economy's rate of saving will have to be raised. (This is the same thing as saying the economy's rate of consumption will have to be reduced.) Higher saving can come from the private sector (businesses and households) or from the government by the reduction of budget deficits.

Economic policy's ability to affect the private saving rate is problematic, but macroeconomic policy can certainly change the government saving rate. Smaller budget deficits reduce the government's use of the nation's saving (and budget surpluses are an addition to the nation's saving). Therefore policies that move the budget away from deficit and toward surplus, *other things unchanged*,²³ will tend to raise the saving rate and reduce the trade deficit. This will occur, of course, as a depreciating exchange rate works to change the composition of domestic output,

²³ In the 1990s we saw a rise in public saving as budget deficits fell, however this was more than offset by the strong rise in investment spending at that time, accordingly the trade deficit increased. Because government can directly control only one piece of the saving – investment relationship, it can only exert a force on this process that pushes in the desired direction, but it can not guarantee the eventual outcome. This is not unlike other forms of macroeconomic policy that generally work by biasing economic activity in a particular direction.

stimulates export sales and dampens import spending, and in the process likely boosting the output and employment of the U.S. manufacturing sector.²⁴

Response to Increased Productivity. To the degree that deindustrialization and falling employment in manufacturing are the result of increased productivity, there is no economically sound reason for trying to abate this process. Productivity improvement is the engine that drives long-term economic growth and undergirds a rising standard of living. Using policy to slow it would be an action that would make the United States (and the world economy) poorer than it otherwise would be.

From the standpoint of overall economic well-being it is best to use as few resources (capital and labor) as possible to produce any given output. A smaller commitment of resources in one endeavor frees resources to be used in other useful endeavors and thereby enlarges the output available to the economy. Productivity increases will also translate into higher wages for workers. And the increase in wages can occur without any loss of competitiveness to lower waged foreign workers. If you produce 10 times more output per hour as foreign workers you can be paid 10 times more per hour without economic disadvantage.²⁵

The economic concern with productivity is not that it is too fast, rather is it rising as fast as it should? Are there market failures that are retarding productivity growth? The discussion above about idea creation suggests there might be.

Ameliorating Deindustrialization's Costs

Economists view deindustrialization as largely a characteristic of the normal evolution of maturing market economies and most often accompanied by increased economic efficiency and improvement of overall economic well-being. However, economic progress in a market economy does not occur without costs. The recurring malady of recession and short-term unemployment seems to be an unshakeable aspect of a market economy's process of wealth creation. Workers laid off due to recession often reclaim their old job, but while unemployed their economic well-being is generally reduced.

²⁴The trade deficit will also be reduced if foreign lenders curtail their accumulation of U.S. assets. In this case, however, there would be no increase in U.S. saving. So in this circumstance the adjustment must occur through higher domestic interest rates and lower domestic investment. The favorable effect of the smaller trade deficit on trade sensitive sectors is counterbalanced by the adverse effect on domestic interest sensitive sectors. The dollar depreciation seen since early 2002 is most likely being driven by a shift away from dollar denominated assets by foreign investors. Because the economy is now operating with considerable slack the adverse effects of this capital outflow have been negligible. For a fuller discussion see: CRS Report RL31032, *The U.S. Trade Deficit: Causes, Consequences, and Cures*, by Craig K. Elwell.

²⁵The economic effects of increased productivity are qualitatively the same as a higher level of trade. Both give the country more efficient ways to acquire the goods that it wants.

Living with ‘Creative-Destruction’. In addition to periodic short-term instability, markets do their job of creating wealth through a process of “creative destruction.” Market forces prompted by changing consumer demand, advances in technology and productive efficiency, or shifting comparative advantage between nations, relentlessly allocate and reallocate the productive resources of land, capital and labor to more efficient uses from less efficient uses. Using resources to more efficient applications creates wealth, but redirecting resources out of less efficient uses is often a destructive force, disrupting the lives of workers in less efficient activities whose jobs are eliminated. In this case, unlike cyclical unemployment, workers will not be recalled to their old jobs and must often embark on a costly process of adjustment. Jobs are created and destroyed. But the new jobs will unlikely employ but a fraction of those whose job was destroyed, and for many of those who have lost jobs the adjustment to the next best alternative will be slow and costly. New skills may be needed, a move to a new location may be necessary, and for many a reduced wage may be required for re-employment.

Balancing Equity and Efficiency. Labor market disruptions are new problems and most advanced industrial economies have developed policies to provide some degree of support for those displaced by recession or the ever present churning of market forces. The policy challenge in this regard continues to be to craft initiatives that equitably compensate and assist those who are displaced, while also serving efficiency by encouraging timely adjustment to re-employment. Establishing the right balance between equity and efficiency remains a matter of controversy, however.

Generous compensation without sufficient incentive for adjustment tends to rigidify labor markets and diminish economic efficiency. This has been a common criticism of economies in the Euro area. Their compensation to unemployed workers is relatively generous and the incentives for adjustment to a new job relatively low. This has the consequence, it is argued, that the pace of economic growth in these countries is sub-par. In contrast, less generous compensation with stronger incentives for adjustment can lead to more fluid labor markets and a boost in the pace of economic growth, but will also tend to increase economic inequality and degrade the social environment. This would be the European critique of the American economy; one that achieves a high degree of economic efficiency, but without a proper degree of economic fairness, leading to a widening gap between rich and poor and between the skilled and less skilled.

Which is the better approach to balancing equity and efficiency is not judged in this report, but to better inform that judgement it is perhaps useful to consider some matters related to the “level of support” given displaced workers and the rising “level of risk” of a lost job they may face.

Labor Market Volatility and the Level of Social Insurance. It can be argued that in the United States and other industrial economies, the post World War II economic order was built upon an explicit or implicit “social bargain.” Workers would accept the periodic disruptions associated with the market economy’s cyclical and destructive traits that are inherent to its rapid creation of wealth and rising

economic well-being, if those disruptions were cushioned by government provision of various types of economic support to see them through these rough spots. Public support rather than workers themselves buying insurance against the risk of job loss is called for because the “market failure” caused by the problem of “adverse selection” will prevent the private market from providing an adequate level of coverage.²⁶ While the welfare state may have changed in form and extent over the years, these worker support policies remain an integral piece of the modern industrial economy.²⁷

The level of economic support an unemployed or displaced worker receives can be seen as a form of social insurance against the “risk” of job loss and its associated costs that a fluctuating and ever churning market economy exposes workers to.²⁸ The argument can be made that if the velocity of market “churning” has increased in recent years due to the combined or individual effects of a rapidly rising level of international trade, accelerating productivity advance, or more quickly shifting consumer demand, then the volatility of the labor market and the risk of unemployment that each worker faces has also increased. Some observers believe a higher level of risk would warrant a higher level of economic support. This does seem to be the case among OECD countries for exposure to the risk associated with international trade, where there is a fairly strong correlation between openness and levels of government support expenditures.²⁹ There is no conceptual reason for increased risk from other market forces to be seen any less deserving of increased public support.³⁰

Finally, remember that most often market forces set in motion a “positive-sum” process. They cause labor market disruption, but they have also “created” increased economy-wide income that exceeds the associated costs. Therefore, it is possible to compensate adversely affected workers and still leave the winners better off than they were before the impact of the market force

²⁶For further discussion of the issue of public versus private provision of unemployment insurance see CRS Report RL32194, *Job Loss: Causes and Policy Implications*, by Marc Labonte.

²⁷For current legislative issues about unemployment insurance see: CRS Report 95-742, *Unemployment Benefits: Legislative Issues in the 108th Congress*, by Celinda Franco.

²⁸This concept of risk encompasses both the likely incidence job loss, the duration of unemployment, and the level of possible adjustment costs.

²⁹See: Dani Rodrik. *Has Globalization Gone to Far?*(Institute for International Economics, Washington, DC, 1998) pp. 49-66.

³⁰ To offset the tendency for a higher level of unemployment support to impede timely adjustment to new employment, even if at a lower wage, some have argued that there needs to be a greater use of “wage insurance.” That is, a payment to the worker by government that would compensate the worker for a sizable percentage of the difference between a lower wage in a new job and the higher wage in the old job. This would not be a permanent subsidy, lasting only long enough to assure a firm re-attachment to a new job and to enhance the prospect of being on a steady track to higher wages. See Lori Kletzer and Robert Litan, “A Prescription to Relieve Worker Anxiety,” *Institute for International Economics*, Policy brief 01-2, Feb 2001.