

# **The China Effect:** **Assessing the Impact on the US Economy** **of Trade and Investment with China**

**A Report by Oxford Economics and The Signal Group**

**The China Business Forum**



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## Executive Summary

**D**espite the growing US-China trade imbalance that has been capturing headlines, *the long-term benefits to the United States of trade with China are substantial and likely to endure.*

This conclusion is based on a detailed assessment of US-China trade and investment since 2000 and projections to 2010, as depicted by an Oxford Economic Forecasting (OEF) macroeconomic model, which captures trade and financial flows among all major economies.

Key findings include:

### Effects on the US economy:

- By 2010, US GDP will be 0.7 percent higher as a result of increased trade and investment with China since 2001.
- US prices will be 0.8 percent lower by 2010 as a result of increased trade and investment with China since 2001.
- Together, these equate to an increase of around \$1,000 in real disposable income per US household per year. That is projected to be about 1.9 percent of median or 1.5 percent of average annual family income in 2010 (median family income was \$44,389 in 2004).
- Output per worker across the US economy will increase by 0.7 percent by 2010. Most of that increase is attributable to improvements in manufacturing productivity—annual growth in US manufacturing productivity will be boosted by 0.3 percent per year by 2010—as a result of increased trade with China. This higher productivity is the result of two effects:
  - increased competition, which causes the least productive manufacturing firms to close or to increase their productivity to compete with imports from China. Either way, the average productivity of the whole sector improves.
  - price effects, which allow US firms that source some of their inputs from China, or from other countries competing with China, to benefit from lower costs.
- The recent expansion of trade and investment with China is contributing to a decades-long shift in the structure of US employment away from manufacturing and toward services. We estimate that US manufacturing employment by 2010 will have been reduced by 500,000 jobs—equivalent to about 0.3 percent of the total US civilian labor force—but project this job loss to be offset by an equivalent 500,000 increase in US service sector jobs, in industries including distribution and financial services, by 2010. While this structural shift displaces some workers in manufacturing sectors and thus represents a real cost to workers in those sectors, the economy as a whole will benefit

from the permanent output and price effects of increased trade with China. The overall impact should be a continuing, and increasing, positive boost to US output, productivity, employment, and real wages.

### Effects on overall US trade flows:

- The bilateral imbalance with China cannot, by itself, explain the recent deterioration of the overall US trade position.
- While the bilateral trade imbalance with China has been rising dramatically in absolute terms, China's share of the overall US current account deficit has remained fairly constant, at around 20 percent, for more than a decade.
- The increase in China's share of US imports from 2000 through 2004 was offset by declining shares of other East Asian exporters, reflecting a profound shift in production patterns by Asian and other multinational firms operating in the region.
- The growth in Chinese exports to the United States since 2001 is partly the result of an increase in foreign investment in China associated with its World Trade Organization (WTO) entry, rather than any major change in the treatment of those exports under US trade policy.
- As a result of its booming import demand, China was one of the main locomotives of global economic growth in the years spanning the recent global recession—China's import growth over the 2000–04 period contributed more than any other country's to global import growth. China's demand thus stimulated export growth among its trading partners, including the United States.
- US sales to China have constituted the fastest-growing segment of US exports in recent years.
- When China joined the WTO in 2001, it confirmed the message it had been sending to global investors about its commitment to a program of economic reform and opening.
- Without such a commitment, OEF estimates suggest that US-China bilateral trade flows would have been substantially smaller—Chinese exports to the United States would have been some \$90 billion lower than they were in 2005, while its imports from the United States would have been some \$10 billion lower. So the US bilateral trade deficit with China was some \$80 billion larger in 2005 as a result of China's economic reform program. However, our model suggests that most of the extra US imports from China displaced US imports from other East Asian trade partners.
- In spite of the rapid growth in its exports, China's overall current account surplus in 2005 is still smaller than those of Japan and Germany, while its bilateral trade surplus with the United States is smaller than that of the Middle East/North Africa region.

## About the Authors

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Britton graduated from Magdalen College, University of Oxford, in 1988, with a degree in Politics, Philosophy, and Economics. He holds an MSc in Economics from Birkbeck College, University of London.

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## About the China Business Forum

**The China Business Forum, Inc.**

([www.chinabusinessforum.org](http://www.chinabusinessforum.org)) was established in 1987 by the US-China Business Council to promote broad-based policy discussion and greater understanding in both China and the United States of the economic systems and business methods of each country and of the role of commerce in the overall relationship between the United States and China.

The US-China Business Council ([www.uschina.org](http://www.uschina.org)) is the leading organization of US companies engaged in business with the People's Republic of China. Founded in 1973, the USCBC provides extensive China-focused information, advisory, and advocacy services, along with comprehensive events, to nearly 250 US corporations operating within the United States and throughout Asia.

# **The China Effect: Assessing the Impact on the US Economy of Trade and Investment with China**

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Over the past 25 years, China has emerged from relative insignificance in world trade to become one of the world's leading exporters. Unlike other East Asian countries experiencing periods of rapid export growth, however, China has remained relatively open to imports as well as to foreign investment; indeed, for the past decade it has been the principal destination for foreign direct investment among all emerging-market economies. And China's overall trade surplus has remained comparatively modest, even as its bilateral trade imbalance with the United States has soared to record levels.

Recent research undertaken for the China Business Forum<sup>1</sup> examined the implications for the United States of changing trade patterns as China became the key node in an East Asian production network geared toward serving the US market. In this paper, we assess the costs and benefits to the US economy of China's changing role in the global economy.

The impact on the United States of growing trade with China is complex, as this paper makes clear. The impact works through a variety of channels: net trade; prices; employment; and productivity. It is not distributed uniformly across the industrial sectors: some sectors benefit, while others suffer. The wider global context also is reflected, as the implications for the US economy cannot be properly assessed without taking into account the interaction of the United States and China with the rest of the global economy. And to some extent the impact can be aggravated or mitigated using trade and economic policy instruments that are available to US authorities.

Once the complex web of effects has been taken into account, the implications of our research are straightforward. For the United States—indeed, for all countries—international trade spurs both innovation and economic efficiency. While improvements in economic efficiency are often associated with painful dislocations in certain sensitive industrial sectors, in the end, everybody benefits. Thus the costs that we identify tend to be transitory and sector-specific, while the benefits tend to be permanent and distributed across the economy as a whole.

According to our estimates, the long-term benefits to the United States of trade with China are substantial—and they are consis-

tent with the findings of other research in this area<sup>2</sup>. While these long-term benefits affect the economy as a whole, there are significant costs to certain import-sensitive industrial sectors. The people whose jobs are at stake in those sectors are likely to consider the long-term benefits to the entire economy much less important to them personally. That trade-off, between temporary or sector-specific costs and permanent whole-economy benefits, is at the core of the policy debate in the United States and elsewhere on this issue. This trade-off involves a value judgment that is beyond our purview as economists. Rather, the aim of this paper is to provide an impartial and rigorous assessment of all the economic costs and benefits, so that those making those value judgments—political leaders, and the public at large—can be better equipped to do so.

The rest of this paper is organized as follows.

Section 2 looks at the changing role of China in the global economy.

Section 3 assesses recent trends in US-China trade in a wider context of global trade.

Section 4 assesses recent trends in US-China investment in a wider global context.

Section 5 explores what would have happened to US-China trade and investment if China had not committed itself to a program of economic reform and opening, cemented by its entry to the WTO in 2001.

Section 6 explores and quantifies the effect on the US economy of China's economic reform program.

Section 7 breaks down those effects into output and employment changes in key industrial sectors in the United States.

Section 8 offers some conclusions.

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1. Edward Gresser, "US-China Trade in Perspective: Asia's Emerging Union and Implications for the United States," China Business Forum, June 2005.

2. See, for example 'Multilateral tariff liberalization and the developing countries'; OECD Development Centre, Policy Brief # 18; Dessus, Fukasaku & Safadi; 1999. The relationship in our research between extra trade between the United States and China and US productivity is very close to what would be implied by the estimated equations in the OECD paper.

# The role of China in the global economy

China is a rapidly industrializing economy, with an enormous potential for continued future growth. China's role in the global economy has changed remarkably in recent years and is likely to change even more dramatically in years to come.

Table 1 shows how per capita GDP in China has evolved in recent years and how it compares with that in other economies. The comparison is telling: average output per person in China has increased three-fold over the last two decades, but still is only one-tenth as large as per capita GDP in South Korea. Even if China were to get only halfway to catching up with South Korea's current productivity level, this would imply a further five-fold increase in Chinese per capita GDP—and the impact on the global economy of a change on that scale would be enormous.

While the growth in China's GDP has been rapid, its growth in trade—particularly in recent years—has been even more so. Figure 1 shows the relationship between GDP growth and the growth in total Chinese exports (indices of dollar values) over the last 25 years.

China's export boom reflects the country's rise as a powerhouse of world trade in manufactures, driven to a great extent by inflows of foreign direct investment (FDI) associated with its economic reform program. During the 15 years from 1990 to 2004, the volume of Chinese exports rose 850 percent, compared to 550 percent for India and 100 percent for the United States, European Union, and Japan. As a percentage of world trade, China's exports rose from 1 percent in 1990 to an estimated stake of more than 10 percent in 2005. At the same time, China's share of world trade in manufactures rose from 2 percent in 1990 to an estimated 11.5 percent in 2005. The strength of growth shown in Figure 1 reflects a decade of FDI inflows to China of \$40-60 billion annually—investment that has helped to boost the productive capacity of the Chinese export sector.

One factor that is often overlooked is that, since 1998, China's import growth has generally kept pace with or exceeded its rates of export growth, as shown in Figure 2 (see page 4). Moreover, the growth in Chinese imports in the years spanning the recent global recession means that, over that period, China made the largest single contribution to global import growth of any country in the world. Figure 3 (see page 4) shows China's contribution to global non-

Table 1

## Per capita GDP in selected economies (US\$ at market exchange rates)

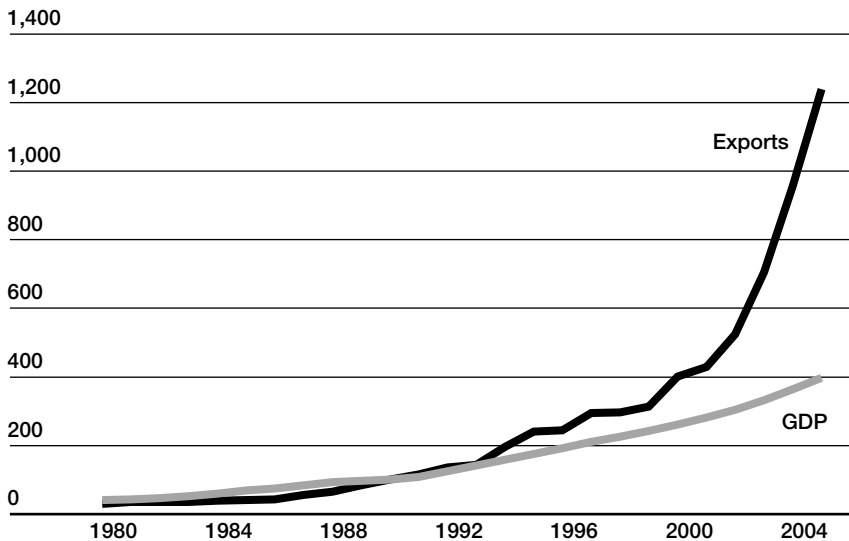
	1988	2005	Annual change
China	363	1,465	8.5%
Hong Kong	10,329	25,556	5.5%
India	354	637	3.5%
Japan	24,133	35,811	2.3%
South Korea	4,209	15,251	7.9%
Taiwan	6,337	15,251	5.3%
Thailand	1,149	2,783	5.3%
United States	20,825	42,347	4.3%

Source: OEF

Figure 1

## China: GDP and exports

1990=100



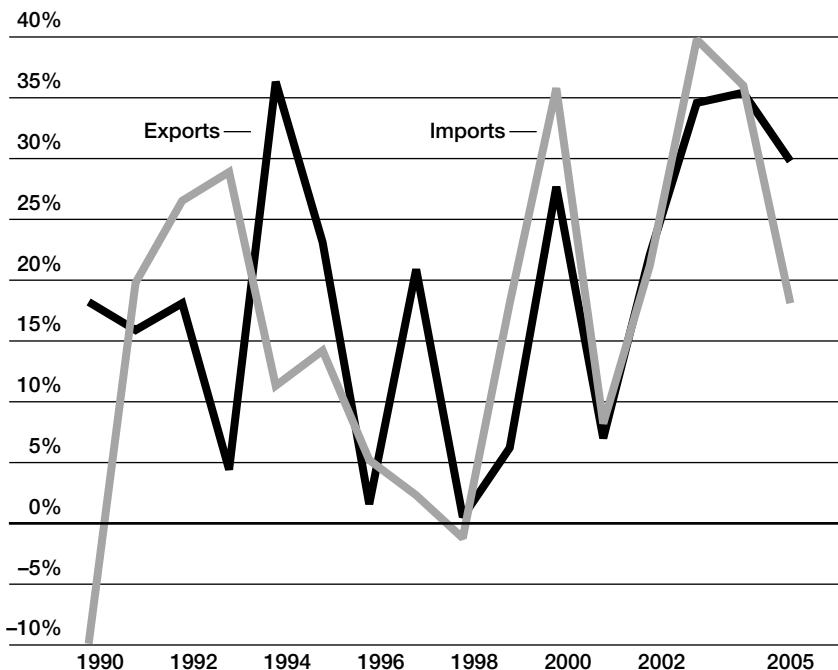
Source: OEF

fuel import growth over the period 2000 to 2004. The strength of China's demand for imports over that period was a key factor in ensuring that the impact of the global recession on the United States and other economies was not as severe as it might have been: China was one of the principal locomotives of global economic growth over that period.

Figure 2

## China: imports and exports

Percent growth per year

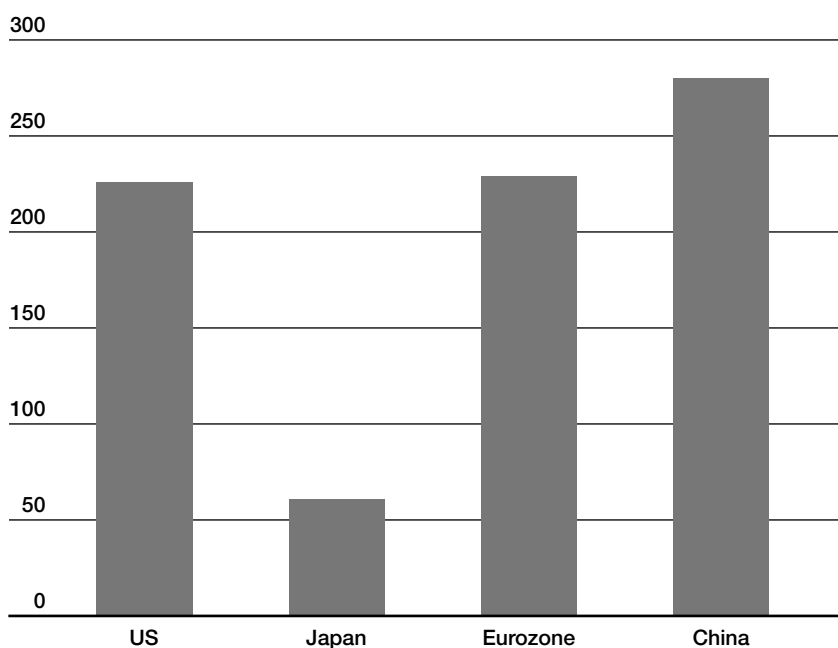


Source: OEF

Figure 3

## Contributions to global (non-fuel) import growth, 2000–04

\$ billion, 2000 prices



Source: OEF

One consequence of the strong growth in Chinese imports has been that China's current account surplus is still relatively modest in comparison with several other major trading countries, in spite of the dramatic growth of its exports. For example, China's expected global current account surplus of \$110 billion in 2005 was smaller than Japan's \$154 billion or Germany's \$115 billion trade surpluses. Figure 4 shows how China's current account position, expressed as a percentage of GDP, has evolved in recent years.<sup>3</sup>

In addition to its role in supporting global trade in recent years, China has played an increasingly important role in global demand for commodities and raw materials. The rapid process of industrialization has been accompanied by a burgeoning demand for non-labor inputs to the production process (the labor inputs can readily be found in China). These include commodities such as oil, steel, iron ore, and other base metals. A significant proportion of the recent rise in global oil prices can likely be attributed to the growth of Chinese demand for oil: China contributed one-fifth of the total global increase in oil demand between 2002 and 2005.

Looking forward, China is likely to be able to develop its own production capacity for certain raw materials, such as steel. Figure 5 shows historic and projected Chinese steel production per head, and contrasts it with the experience of other Asian economies, while Figure 6 shows the OEF projection for Chinese demand for steel and its future reliance on steel imports.

The increase in Chinese demand for imported steel in 2002 and 2003, which had a pronounced impact on the global price of steel, shows up as a barely noticeable blip on Figure 6. Such blips may well recur in future from time to time, reflecting temporary bottlenecks in the supply of Chinese-produced steel. And, if they do recur, they will probably have an impact on the global price of steel, even though in the longer term Chinese steel output is likely to keep pace with its demand for steel.

But for other commodities—notably oil, but also iron ore and other base metals—

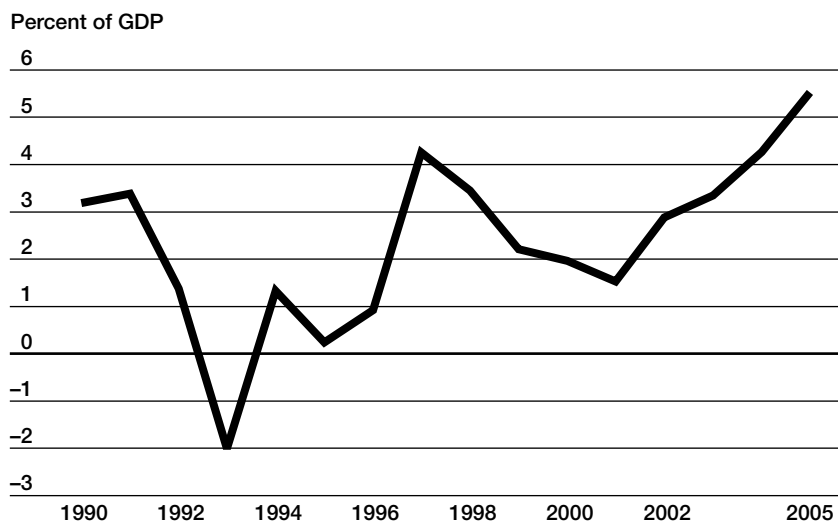
3. Note that Figure 4 takes GDP as it was measured prior to the recent National Economic Census in China (for which there is yet no complete dataset). According to that census, Chinese GDP is actually 20 percent larger than previously recorded. That would reduce the current account surplus as a percent of GDP by around 1 percentage point.

Chinese production capacity is unlikely to keep pace with Chinese demand. That expectation is partially reflected in the current prices of those commodities on world markets. And it implies that China is likely to be an important swing consumer of such commodities for the foreseeable future. The resulting stronger-than-expected GDP growth in China is likely to drive up the prices of those commodities, whereas a slowdown or a recession would have the reverse effect.

So while China is likely to become a more important consumer across a range of commodities and raw materials, the impact of Chinese consumption on their prices will depend on the rate at which China's own production of those raw materials and commodities expands. Where Chinese production is unable to keep pace with Chinese demand, global prices will increase, and resource-rich economies will find China an increasingly important market.

Figure 4

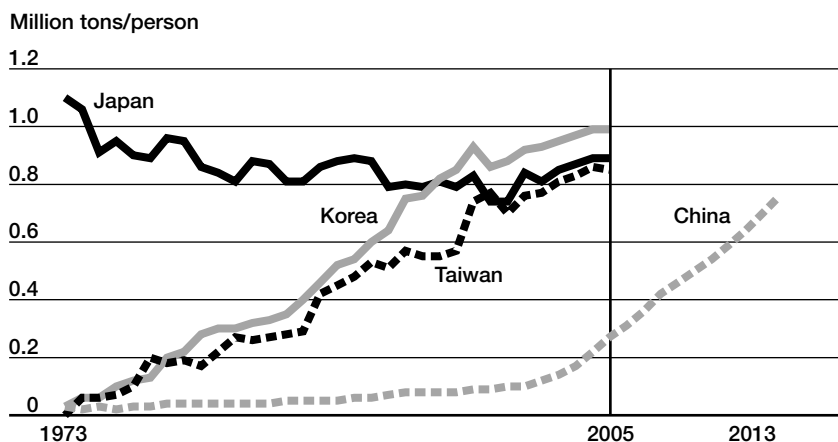
### China: current account balance



Source: OEF

Figure 5

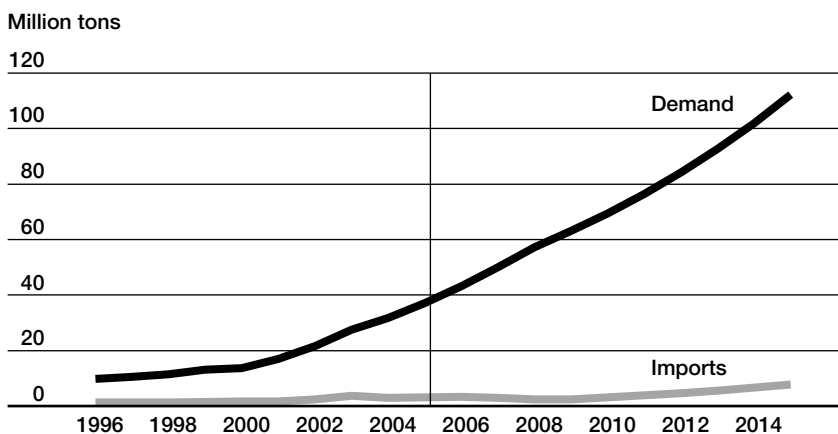
### Steel output per person in Asia



Source: OEF

Figure 6

### China: demand for steel and reliance on imports



Source: OEF



# US-China trade in context

Data on bilateral trade between the United States and China have long been beset by measurement problems. In recent years, US figures on the amount of imports from China have been as much as twice the amount that China reports as exports to the United States, with much of the discrepancy attributed to differences in how the two countries account for the trade flows going through Hong Kong. In general, US Customs data tend to detail bilateral trade by country of manufacturing origin and final destination, whereas Chinese data show bilateral trade on a “next stop” basis. Because Hong Kong is a major conduit for China’s import and exports—as much as 30 percent of Chinese trade passes through Hong Kong—the difference in reporting procedures accounts for much, although not all, of the observed discrepancy. OEF efforts to reconcile these discrepancies in US-China trade in goods are shown in Table 2, which incorporates US, Hong Kong, and PRC Customs data. The result is a \$132 billion deficit, approximately \$30 billion lower than the US government reports, but still large.

The bilateral US-China trade deficit in 2005 is likely to be even larger. We do not yet have data for the full year from either US or PRC government officials. But our forecast suggests that, on a reconciled basis, the deficit is likely to increase from \$132 billion in 2004 to around \$165 billion in 2005.

Chinese exports have grown rapidly and have taken an increasing share of the US import market. As with overall Chinese exports, the most rapid increases have taken place since China’s entry to the WTO in 2001, but to a large extent, those increases have come at the expense of other Asian exporters to the United States. Indeed, the “swing” in China’s share of US imports between 2000 and 2005 offset the declining shares of other East Asian exporters, with the result that the overall share of US imports coming from East Asia (including China) remained constant (see Table 3 and Figure 7).

Chinese exports to the United States have grown very rapidly—but are broadly in line with the pattern of growth in total exports from China. The same is not true for Chinese imports from the United States. The United States has been losing market share in China. There are many reasons for this, including:

Table 2

## Reconciliation of US-China trade data

\$ billion	US reported goods trade	China reported goods trade	Reconciled estimates
<b>2004</b>			
Imports from China	197	125 + share of HK exports	177
Exports to China	35	45	45
Balance (US deficit)	162	80 + share of HK exports	132

Source: OEF

Table 3

## US imports from selected economies (% of total US imports)

	2000	2005*	“swing”
China	8.2	14.8	+6.5
Taiwan	3.3	2.1	-1.2
South Korea	3.3	2.6	-0.7
Singapore	1.6	0.9	-0.7
Hong Kong	0.9	0.5	-0.4
Japan	12.0	8.3	-3.8
Total	29.4	29.2	-0.2

\*forecast

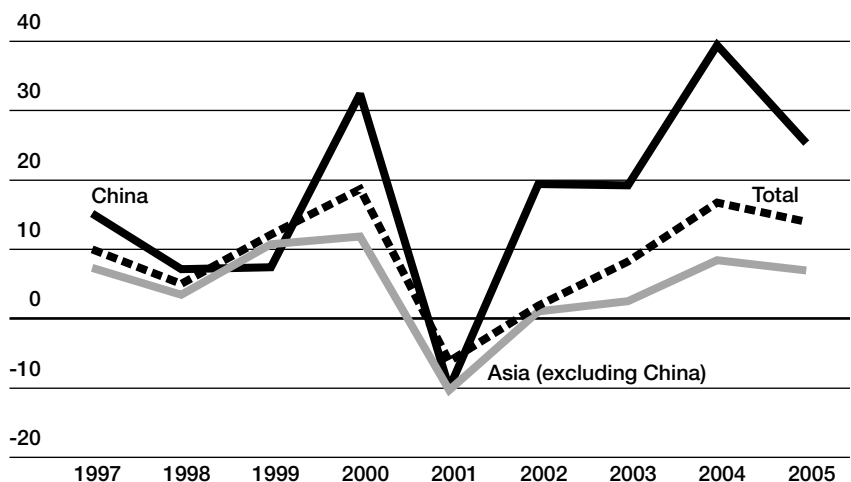
Note: Figures may not add up because of rounding.

Source: OEF

Figure 7

## US imports

Percent change per year



Source: OEF reconciled estimates

■ The growth in Chinese imports (as shown in the previous chapter) has been driven mainly by growth in demand for commodities and raw materials sourced (for the time being) outside China. These are not sectors in which the United States or any other developed economy has a comparative advantage, so it is not surprising that US exports to China, as a share of total Chinese imports, have been falling.

■ Part of the explanation of the increase in the overall US current account deficit is that US exporters are losing market share *everywhere*, not just in China. It is important to consider the bilateral US-China trade position in the context of the overall US current account position, which has also deteriorated rapidly in recent years. Figure 8 shows the dollar value of the bilateral US-China trade deficit in comparison to the overall US trade deficit, while Figure 9 shows the share of the overall US trade deficit that is attributable to the bilateral deficit with China.

As Figures 8 and 9 show, the bilateral merchandise trade deficit with China accounts for a significant proportion of the overall US trade deficit—the largest share of any single country, although smaller than that attributable to the Middle East/North Africa region, as a result of higher oil prices—but by no means all of it. And the overall US trade position has been deteriorating much more rapidly than the bilateral imbalance vis-à-vis China can explain. Looking at Figure 8, it is far from clear that the story of the overall US trade deficit is really a story about trade with China, as much of

the media commentary seems to suggest. If anything, the reverse appears to be true. The growing bilateral US-China trade imbalance certainly plays its part in the overall picture, although, as noted earlier, the deterioration in the trade deficit with China has come at the expense of other East Asian exporters to the United States. In fact, as Figure 9 shows, since 1992, the bilateral deficit with China has constituted a roughly constant share of the total US merchandise trade deficit.

The figures suggest there are other, more important, fundamental drivers of the overall US current account position. That is consistent with economic theory: economists believe that the current account position in a particular country reflects the pattern of saving in that country compared to the rest of the world. Viewed in this way, the rapid deterioration of the US current account position in recent years reflects the reality that the rest of the world has a much higher willingness to save than does the United States. In other words, the United States as a whole wants to borrow at a time when the rest of the world (on average) wants to save. The US government, along with US firms and households, are borrowing foreign currency and using it to buy foreign goods and services. To finance its operations, the US government issues notes, and foreign countries, including China, are major purchasers of these notes. The result is a current account deficit in the United States—with all countries, including China.

One interesting question that arises in this discussion is: To what extent does the value of the renminbi (RMB) against the dollar contribute to the US-China trade imbalance? According to the OEF model, the answer is not very much. Chinese exporters to the United States are likely to do their best to protect their market share in the event of an exchange rate revaluation, even if that means cutting their profits and/or squeezing their costs, including labor costs. As a result, an RMB revaluation is unlikely to have much impact on the dollar price of US imports from China. US exporters to China would benefit, as they would enjoy greater profits or a chance to increase their market share. But since US exports to China are small compared to US imports from China, the impact of higher US exports on the bilateral deficit would be marginal.

The OEF model suggests that a 25 percent revaluation of the RMB would result in a reduction of around \$20 billion in the US-China bilateral trade deficit after two years.

**Figure 8**  
**US goods trade deficit**



Source: OEF

Of course, just as higher US imports from China meant lower US imports from other Asian economies, the reverse is also true to an extent. So, according to our model, a \$20 billion reduction in the bilateral US-China deficit would only imply a \$10 to \$15 billion reduction in the US trade deficit overall after two years—and a correspondingly higher deficit against other Asian economies.

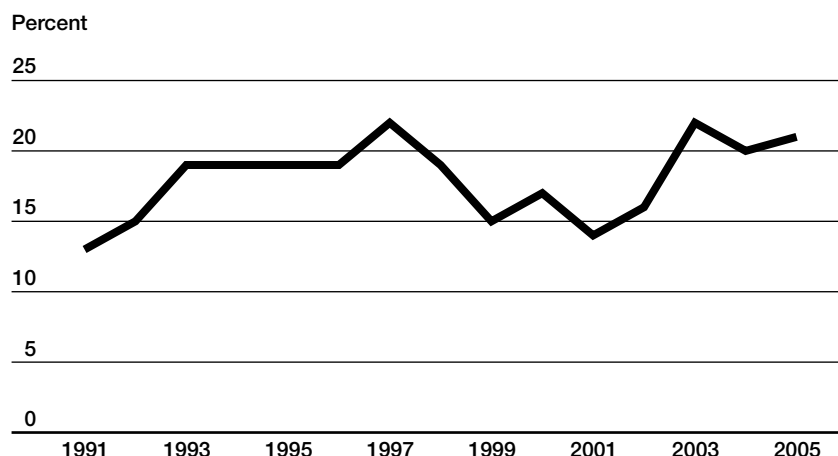
It is also important to consider the sectoral composition of bilateral trade flows between the United States and China. Table 4 shows World Trade Organization (WTO) estimates of how China's share of the US import market evolved over the 1995-2003 period, sector by sector.

As the table shows, China's import-share gains in the United States are focused in a few sectors. In 2003, China accounted for nearly 40 percent of US imports of consumer goods, within which its share of toys and games, footwear, and travel goods was even higher. And the growth in China's share of US imports of machinery has been very rapid between 1995 and 2003. China's share of overall US manufactured imports more than doubled over that period.

Therefore, some sectors within the US economy are more exposed to competition from China than others—potentially posing a problem for US-based producers and producers from other countries (outside China). To the extent that there are job losses in the United States as a result of trade with China, they are likely to be concentrated in these sectors, while the benefits are spread across the whole economy.

*Figure 9*

### China's share of overall US trade deficit



Source: OEF

*Table 4*

### Sectoral distribution of China's share of US imports

Share of:	China's share of total US imports in each product group (percent)	
	1995	2003
Total merchandise imports	6.3	12.5
Agricultural products	1.7	3.7
Of which:		
Food	1.8	3.7
Mining products	1.1	0.6
Manufactures	7.6	15.9
Of which:		
Chemicals	2.2	3.2
Other semi-manufactures	5.5	14.9
Machinery	3.5	11.9
Of which:		
Office and telecom equipment	5.4	23.7
Electrical machinery and apparatus	9.0	20.9
Textiles	11.6	19.8
Clothing	14.9	16.9
Other consumer goods	25.5	38.7
Of which:		
Toys and games	52.3	76.9
Footwear	48.4	67.9
Travel goods	47.4	69.7
Furniture	11.2	38.2

Source: WTO

## US-China investment in context

Inflows of foreign direct investment into China from developed economies, including the United States, have been substantial in recent years. Moreover, FDI clearly has a pronounced impact on the Chinese economy. There is a strong correlation between China's cumulative FDI and its export growth over the past decade, and many analysts see a direct link as FDI has flowed heavily into China's export sector. Cumulative FDI can be interpreted as the equivalent of an export sector capital stock, since it enhances China's capacity to generate exports. Chinese data on FDI by sector confirm the correlation between trade performance and cumulative FDI by sector. Table 5 shows total FDI flows into China since 1990.

One way to think about the overall FDI picture is that the prospect and then the realization of China's WTO accession, because of the positive signal sent to global investors about China's long-term intentions regarding growth and economic reform, created an incentive for foreign investors to set up operations in China. These operations were concentrated in export-oriented industries and, to a large extent, they may well have diverted FDI flows to China that had been destined for other Asian economies. China's WTO entry provided US firms and firms from other developed nations with a new option for relocating parts of their business or expanding their global operations. The consequent flows of FDI to China helped to expand export-oriented industry in China—a sector that is, to a large extent, owned by companies located outside China.

Estimates on this last point are hard to make. Nonetheless, the proportion of Chinese exports to the United States that are attributable to foreign-owned firms based in China is presumably high—given that 40 percent to 60 percent of China's total exports are produced by foreign-invested enterprises, according to official Chinese figures.

In spite of the FDI inflows to China, in part from the United States, the United States has a capital account surplus with China: a net *inflow* on the capital account to the United States from China. In fact, direct investment from the United States into China is offset by more than 14 to 1 by the financial flows in the other direction, as China continues to accumulate dollar assets such as US Treasury securities.

In 2004, mainland China, Taiwan, and Hong Kong purchased a net \$78 billion of long-term securities (including government bonds, bonds of government corporations, and corporate bonds) from US residents, accounting for 9 percent of total purchases

of those long-term securities by foreigners. This is clearly a large number, though it is dwarfed by Japan, whose net purchases of US long-term securities amounted to \$244 billion in the same year, accounting for 27 percent of the total. In the box on page 12, the impact of capital account inflows from China on the US long bond-term rate is assessed. OEF analysis finds no evidence of a significant effect.

*Table 5*  
**Chinese foreign direct investment (FDI) flows**

\$ billion					
FDI	1990	1995	2000	2004 estimate	2005 estimate
Outflow	0	3	4	12	10
Inflow	3	37	41	61	63
From US	0.5	3	4.5	5.5	6
From HK	2	20	15.5	25	25
China's share of world FDI %	1	1	2	4	4
Reported FDI-linked company capital	24	161	337	537	600
Source: OEF					

## Impact of capital account inflows from China on the US long-term bond rate

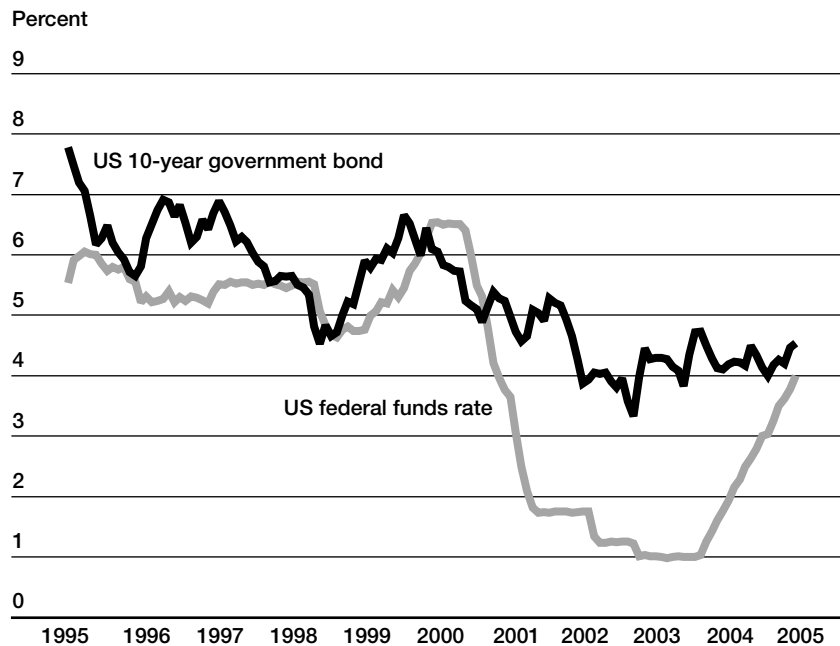
Although much smaller than Japan's contribution, the capital flow from China to the United States is large enough that it is worth considering whether it might have made a material difference in the price of long-term securities in the United States—and therefore to the prevailing US long-term bond rate. Textbook economic models that assume perfect capital markets suggest

that the price of (and yield on) securities is independent of the source of funds. But the world does not necessarily conform to those models: capital markets are not perfect, particularly in respect of the information that is available to them, and it is possible that a big increase in inflows from a new source could have a transitory effect on prices and yields.

It is very hard to find evidence for such an effect in the data, however. One way to get a handle on it is to look at what happened to the US long-term bond rate since the capital account flows from China to the United States started to pick up significantly (Figure 10). As the figure shows, the 10-year government bond rate did indeed fall during and after 2001—but most if not all of this fall can be accounted for by a reduction in the US federal funds rate over the same period. US monetary authorities, seeking to counter the post-September 11 downturn and bolster the faltering economy, cut short-term interest rates steadily, and long-term rates followed suit. The long-term bond rate is the cumulated expected short rate over the next ten years (plus any risk or term premiums), so if the short-term rate falls, the long-term rate will likely follow.

In fact, the evidence from the OEF model reveals that the long-term bond rate was, if anything, higher than might have been expected between 2001 and 2004, given what happened to short-term rates during that period. This finding suggests that the impact on the US long-term bond rate of China's purchases of US long-term securities was slight—consistent with economic theory in this area. However, the data are not decisive on this point. Indeed, it is possible that yields at all maturities, including short-term interest rates, were depressed to a degree by the impact of capital inflows from China and other foreign countries, though it is difficult to estimate how large an effect this might have been.

*Figure 10*  
**US interest rates**



# The impact of China's economic reform on US-China trade and investment

This paper aims to assess the impact on the US economy of trade and investment with China. But in order to quantify that impact, we need to decide precisely what is meant. In economic language, to assess the impact of China-US trade on the United States, there must first be a definition of the “counterfactual”—the alternative case—against which to compare the actual situation. One option would be to consider an alternative scenario in which there were no trade or investment flows whatever between the United States and China, but that would be a very extreme scenario indeed, equivalent to assuming that the Chinese economy did not exist.

Fortunately, China's WTO entry at the end of 2001 provides a basis for a more plausible alternative scenario. As many commentators at the time pointed out, the terms of China's accession to the WTO did not really imply substantial changes in how the United States treated imports from China, but they did commit Beijing to opening the Chinese market to US and other exporters, albeit in a staged implementation process spanning many years (and the full benefits of China's market openings have not yet been fully realized by US firms).

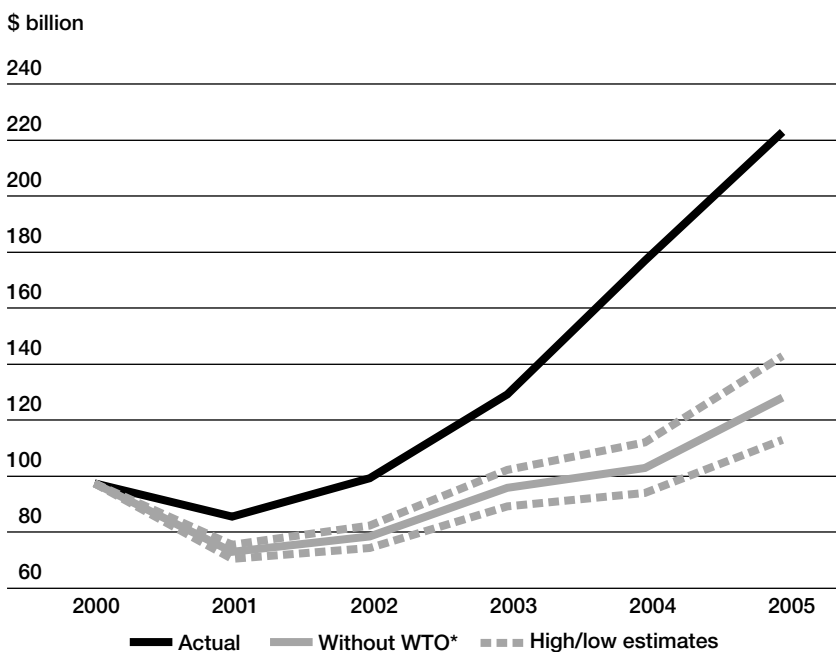
What would have happened to China-US trade and investment had China not embarked on the process of economic reform and opening, cemented by its WTO entry? And what would have been the impact of that scenario on the US economy?

Although the treatment of US imports from China was largely unaffected by the terms of China's WTO accession, the growth in those imports increased very rapidly, as the figures in Section 3 suggest. This growth in imports was not due to the lowering of US tariffs or import controls, but instead reflected the massive post-WTO inflows of new investment into China from the United States and other countries, which boosted the productive capacity of the Chinese export sector (see Section 4).

The OEF model assumes that if China had not embarked on the process of economic reform and opening associated with its entry to the WTO, its trade growth would have been roughly in line with economic growth outcomes that were in fact achieved

by other emerging Asian economies over the same period—that is, fairly robust but not spectacular growth. The basis for this assumption is that inflows of foreign investment into China would not have materialized to the degree they actually did.<sup>4</sup>

*Figure 11*  
**US imports from China**



\*Represents “counterfactual” scenario in which China does not join the WTO.  
Source: OEF

4. In fact, some of the inflows of FDI occurred before China's entry to the WTO because the expansion of the economic reform program cemented by that entry already looked highly likely, as did WTO entry, for a period before WTO entry actually happened. These inflows were nevertheless, in a sense, associated with the economic reform program of which WTO entry was the clearest outward manifestation, and everything that meant for the prospects for China in the longer term. As a result, some of the effects identified in this paper include significant effects in 2001.

The factors that apply to overall Chinese trade growth in this scenario also apply to bilateral US-China trade flows. Figure 11 compares actual Chinese exports to the United States with what we estimate would have happened had China not embarked on a program of economic reform and opening. We acknowledge that it is difficult to be sure about the size of this effect: the dotted lines on the chart indicate the range of uncertainty about these estimates.

PRC exports to the United States in 2005 were around \$90 billion higher than they would have been if China had not committed to its economic reform package, according to our model, although the OEF model also suggests that in such a case, this figure would have been to a large extent offset by higher US imports from other East Asian economies.

The OEF model also projects China's imports from the United States to be around \$10 billion higher in 2005 than they would have been if China had not embarked on its economic reform path. It is likely that at least some of these US exports effectively would be substitutes for exports to Asian countries, though there may also be an incremental increase in overall US exports.

The net impact of this scenario on the bilateral US-China trade imbalance was

therefore some \$80 billion in 2005: without Chinese economic reform, US imports from China would have been lower by \$90 billion, and exports to China lower by \$10 billion. It is worth emphasizing that lower imports from China in this case would to a large extent have meant higher imports from other East Asian trade partners, leaving the US global trade deficit less affected than its bilateral deficit with China. The OEF model suggests that the impact of China's economic reform program on the US global trade deficit was to increase it by around \$15 billion in 2005.

We also assume that the signal about Chinese intentions toward economic reform and growth that China's WTO entry sent to global investors was the driver for a large proportion of the FDI inflows to China observed since then, including US-sourced FDI, which accounts for about one-tenth of the total. The growth in output that China has achieved was in part due to the extra productive capacity resulting from those accumulated FDI inflows.

The following section assesses the likely impact of those changes on the US economy: what the US economy would have looked like if China had not embarked on its program of economic reform, and trade and FDI flows with China had not evolved in the way they did as a result.

# The impact on the US economy as a whole

The diagram below gives a simple picture of the channels through which increased trade with China has had an impact on the US economy. As the diagram makes clear, as far as the US economy is concerned, there are negative short-run effects (lasting a few years) as a result of the impact on US net trade, and positive long-run effects (lasting indefinitely) as a result of the impact on US prices and productivity.

The negative effects on net trade depress US GDP and employment for a period. That prompts the Fed to cut interest rates and, as a result, GDP and employment gradually recover. In the long run, employment recovers back to where it started from, since nothing has happened to the supply of labor in the United States as a result of this shock. But GDP recovers to a higher level than it would otherwise have achieved, boosted by the permanent impact of trade with China on US productivity.<sup>5</sup> Moreover, US households benefit in the long run not only from higher GDP, which means higher wages and higher profits, but also from lower prices as a result of trade with China. The OEF model captures all of these channels of effect, and helps quantify the overall impact on the US economy.

## a. Effects 2001–05

In this section, we quantify the effects on the US economy up to 2005 of China's program of economic reform and opening, cemented by its entry to the WTO in 2001. We find that the effect on the US economy is substantial and positive. For a detailed explanation of how we have built up this scenario, see Appendix 2.

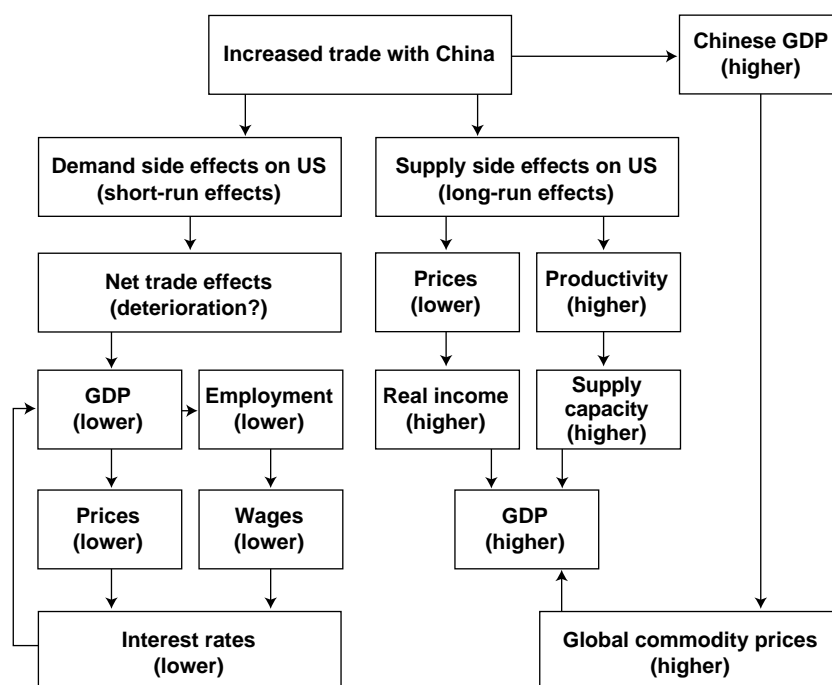
The OEF model assesses the impact of China's economic reform program as it ripples through the US macroeconomy, capturing all of the main channels of that effect, as set out in the diagram. In this scenario, we make one further key assumption, not addressed in the diagram.

The data over the period 2000 to 2005, as shown in Table 3 in Section 3, suggest that the increase in imports from China to a large extent simply displaced imports from other parts of Asia. However, there might well have been a raft of other factors affect-

ing imports from other parts of Asia over that period. Our model suggests that most—but not all—of the extra imports from China displaced imports from other parts of Asia. As a result, there was a small, temporary effect on US net trade, resulting in an overall increase in net US imports of around \$20 billion by 2005. So, taking into account displacement effects, China's economic reform package resulted in an increase in the US trade deficit of \$20 billion in 2005, compared to an increase in the bilateral US-China trade deficit of around \$80 billion.

### Diagram

#### Impact on United States of increased trade with China

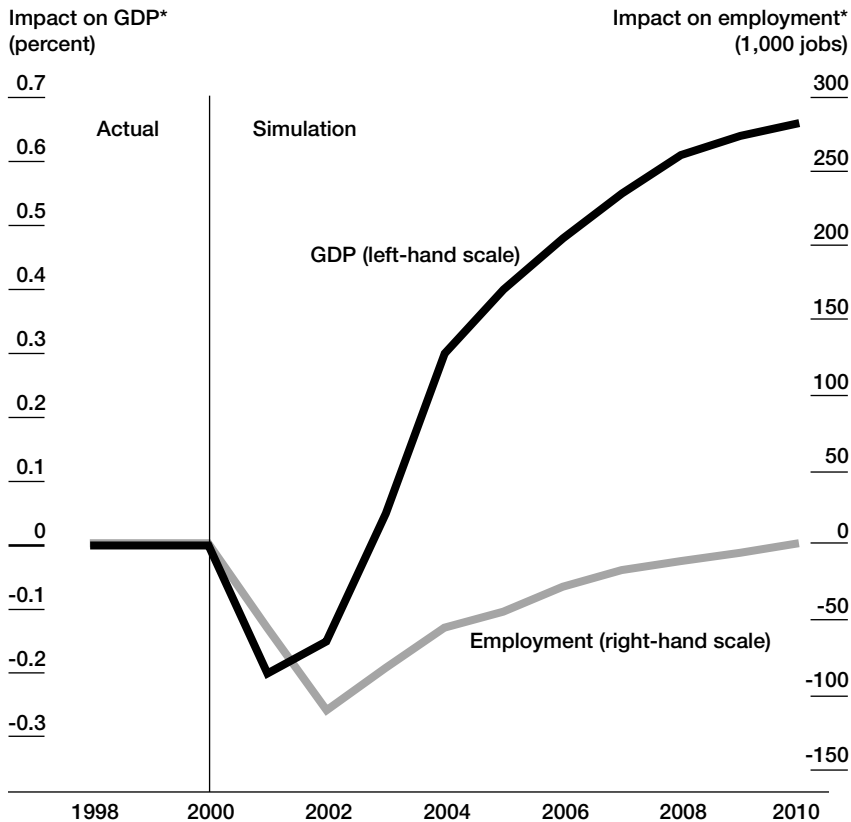


5. The positive impact on GDP in the long run is slightly reduced as a result of another feedback: rapid growth in China means stronger global demand for commodities, such as oil, driving up the prices of those commodities, and denting growth prospects in the United States and other countries.



Figure 12

## US-China trade and the US economy



\* Deviation from a counterfactual scenario where China did not enter WTO  
Source: OEF

Our model suggests that US import prices were pushed down significantly, in aggregate, as a result of the increase in trade with China.<sup>6</sup> These price effects reflect both the direct impact of the lower price of Chinese imports, and the indirect effects as other exporters to the United States are forced to bring down their prices in order to compete effectively with China. As a result, by 2005, according to OEF estimates, the aggregate US price level might have been about 0.5 percent higher had China not embarked on its program of economic reform.

The impact on the aggregate price level represents a direct benefit to US consumers and firms, boosting their real incomes and profits by 0.5 percent in 2005. As a result, aggregate demand in the United States also got a boost, as consumers had more money to spend. While some of this extra real

income would be saved, and some spent on additional imports (including those from China), a significant portion will be spent on goods and services produced by US-based firms, boosting US GDP in the short run.

Moreover, increased trade with China as a result of the FDI inflows associated with China's WTO entry has had a positive effect on US productivity, for the reasons set out in the next section. According to the OEF model, this effect was significant, even by 2005.

Overall, taking all the effects into account, and applying the most realistic assumptions (see Appendix 2 for scenarios that applied alternative and, in our view, less realistic assumptions), we find that the impact of China's economic reforms was to increase US GDP by around 0.4 percent in 2005, and to increase unemployment by some 50,000—about 0.035 percent of the total US labor force. To put this in perspective, in a single month (October 2005), according to the US Department of Labor website, net non-farm payroll employment in the United States rose by 56,000. The fact that any loss of jobs occurs is sure to be an unpopular notion among those whose jobs are actually at risk. However, the model suggests that the unemployment effects in aggregate are temporary, while the long-term effects on GDP are not, as the next section will demonstrate.

Thus, although China's economic reform program has been followed by a substantial deterioration in the US *bilateral* trade position with China, its overall impact on the US economy—including output, employment, prices, real incomes, and productivity—is nevertheless significantly positive.

Naturally, there is a great deal of uncertainty around these estimates. In our judgment, the likely impact in 2005 probably lies in the range of 0 percent to 0.5 percent of US GDP.

### b. Effects to 2010

The effects this model calculates, through 2005, are a mix of transitory effects that have not yet fully worked through to prices, and some effects that are permanent. The model's calculation of effects to come will make that distinction clear, as the transitory effects gradually wash out of the

6. We have attributed *half* of that unexplained weakness in US prices to the "China effect"—the impact of cheaper imports from China on the overall US price level. This analysis could go either way. At the upper boundary, the implication might be that the price effects would be twice as large as the model currently assumes. Conversely, at the lower boundary, if none of the unexplained weaknesses in US prices were attributed to China's exports, there would be zero effect.

US economy, leaving the permanent effects in place. Figure 12 shows the impact on US GDP projected to 2010.

According to our estimates, the impact on the US economy of China's economic reform program will be to increase US GDP by 0.7 percent by 2010. US consumer prices are projected to be 0.8 percent lower in 2010 than they would have been without increased trade with China.

As with the effects to date, there is a great deal of uncertainty around these estimates. A plausible range for the impact on US GDP in 2010 would, in our view, be a boost of 0 percent to 1 percent, as a consequence of increased trade and investment with China. Table 6 shows how the impacts build up over time for key economic variables.

Under this scenario, the average US consumer will benefit in two ways: First, his or her average income will increase to the same extent as does aggregate GDP, i.e., by about three-quarters of 1 percent. Second, the consumer price level will fall relative to the GDP deflator, to the extent that the price of Chinese and other imports in the average basket of consumer goods has fallen.

Taken together, these benefits are significant, increasing the purchasing power of the average US household by around \$500 per year in 2005, and \$1,000 per year in 2010. However, the impacts—particularly in the short term—will not be distributed uniformly across all sectors or all individuals in the US economy. This will be discussed in the next section.

*Table 6*

**Impact on the US economy of increased trade and investment with China**

<b>Year</b>	<b>GDP (%)</b>	<b>Net jobs (persons)</b>	<b>Consumer price level (%)</b>	<b>Current account (% GDP)</b>
2001	-0.20	-66,000	0.0	-0.18
2002	-0.15	-64,000	-0.1	-0.15
2003	+0.05	+30,000	-0.2	-0.12
2004	+0.30	+35,000	-0.4	-0.10
2005	+0.40	+15,000	-0.5	-0.05
2006	+0.50	+25,000	-0.6	-0.05
2007	+0.60	+10,000	-0.7	-0.03
2008	+0.60	+5,000	-0.7	-0.01
2009	+0.60	+5,000	-0.8	0
2010	+0.70	+5,000	-0.8	0

Note: Changes represented as deviations from "counterfactual" case of no Chinese WTO entry. Changes are not cumulative.

Source: OEF

## Methodology

Embedded in the OEF suite of models are the main channels whereby trade and investment between China and the United States have an impact on the US economy, which include the following:

■ **Impact on net trade** The impact of China's economic reform package on the bilateral trade position between the United States and China has led, in our view, to deterioration in the US bilateral trade position. But it does not follow that the overall US current account position was affected in the same way. The impact on the overall US current account deficit depends on the extent to which Chinese exports to the United States displaced US imports from other countries. It is the impact on the overall US current account position that matters for GDP and employment.

■ **Impact on GDP and employment in the short run** Most macroeconomic models, including our own, suggest that GDP and employment are driven by demand in the short run, and by supply in the long run. China's entry to the WTO, via its impact on net trade, saw aggregate demand<sup>7</sup> for US goods and services fall, leading to lower GDP and employment for a short period. However, in the long run, a decrease in aggregate demand cannot by itself lead to a decrease in either GDP or employment. GDP can only change in the end as a result of changes in supply. Lower demand, if it is not accompanied by productivity improvements, will in the end mean lower prices but unchanged output. Similarly, employment will only change in the long run to the extent that there are changes in the supply side, such as labor market regulations, the proportion of earned income that is deducted in taxes, etc. Without such supply-side changes, changes in

demand will in the end simply change wages without changing employment levels. So the impact on US GDP and employment of trade-induced changes in aggregate demand are short-run effects only.

■ **Impact on prices** One reason that Chinese exports to the United States grew so rapidly after WTO entry is that China was able to offer goods for sale at a very cheap price expressed in US dollars. As a result, the average price of US imports has fallen as the proportion of those imports that came from China has increased. Moreover, the prices of US imports from other countries were also probably pulled down somewhat as a result of those exporters' efforts to meet stiffer price competition from China. So the overall impact on US import prices is likely to have been negative, exerting downward pressure on US consumer prices generally. There are, moreover, two effects on consumer prices—direct effects (to the extent that the average basket of consumer goods is composed of imported goods from all countries, including China, whose prices have fallen), and indirect effects (to the extent that US firms benefit from cheaper imported inputs to their production processes, and pass on those cost savings to the consumer).

■ **Impact on purchasing power** If aggregate consumer prices in the United States are lower as a result of China's entry to the WTO, then real incomes of US consumers are higher to the same degree—in effect, lower prices stretch the real purchasing power of consumers' earnings.

■ **Impact on productivity and GDP in the long run** All countries gain from increased trade in the long run, even if there are nega-

tive effects on GDP and employment in the short run. The long-run gains from trade come about for a number of reasons: trade allows countries to specialize in industries in which they enjoy a natural advantage; it spurs domestic firms to improve their efficiency in order to compete effectively with the best foreign firms; and it provides a channel for the diffusion of technological improvements around the globe. To the extent that increased trade with China contributes in these ways to US productivity growth, it will also boost US GDP and standards of living in the long run.

■ **Impact on global commodity prices** In the event that China did not enter the WTO, weaker flows of investment into China, along with associated weaker growth in China's trade and GDP, would have reduced China's demand for global commodities such as oil and steel. As a result, the prices of those commodities would not have risen as much as they did—and the United States, along with all other commodity-consuming countries, would have benefited from the lower global commodity prices.

In sum, the demand-side effects, such as exist, are negative but temporary: in the end, prices and interest rates will adjust to bring demand into line with supply. The supply-side effects, such as exist, are positive and permanent.

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7. Economists use the term "aggregate demand" to refer to the sum of all expenditure categories—private-sector consumption and investment, government spending, and net exports—that comprise GDP.

## Quantifying the impact on industrial sectors in the United States

The distribution of the impact of increased trade and investment with China across all US industrial sectors depends on two factors: first, the relative size of each sector within the US economy; and second, the proportion of that sector's imports that come from China.

Table 7 shows how US output and employment are distributed across a selection of key industrial sectors, using data taken from OEF's International Industry Model.

Combining these figures with those reported in Table 4, on the share of imports from China in total US imports within each sector, and with the economy-wide impacts for output and employment set out in the previous section, we can estimate the impact of US-China trade and investment on various industrial sectors in the United States. These estimates, for 2005 and 2010, are set out in Table 8 (see page 20).

Whereas the aggregate employment effects are small and temporary, the effects on employment within a given industrial sector can be more substantial and permanent: the FDI inflows associated with China's WTO entry, and the resulting stiffer competition for US producers, have the effect of hastening a decades-long shift in the composition of employment in the United States.

Those specific sectors in which imports from China make up the biggest share of total imports bear the brunt of this change. These include the manufacturing industry as a whole: in 2005, according to OEF estimates, the impact of increased trade with China was to reduce US manufacturing employment by some 205,000 jobs (or 1.5 percent). Within the manufacturing industry, the sectors worst hit proportionally are textiles, office and telecom equipment, and electrical machinery. By contrast, however, US service sector employment has increased. By 2005, that increase is not sufficient fully to offset the decline in manufacturing employment, leaving economy-wide employment down, but only by an estimated 50,000 jobs (i.e., by substantially less than the decline in manufacturing employment).

By 2010, employment in the US economy as a whole will have returned to its base level, since China's WTO entry has no impact on supply-side factors in the United States that determine economy-wide

employment in the long run—factors such as the working-age population; the proportion of earned income that is taken in taxes; the ease with which firms are able to hire and fire workers; the level of unemployment benefits; the ease with which workers can move from one part of the country to another; and the bargaining power of the labor force. These factors, therefore, are assumed to be the same as in the “no-WTO” scenario.

However, by 2010, US manufacturing employment is some 500,000 (or 3.5 percent) lower than it would have been had US-China trade not expanded the way it did since 2001—a figure offset exactly by higher service sector employment. Some of

*Table 7*  
**Distribution of US output and employment across key industrial sectors**

Sector	Output (% of total, 2004)	Employment (% of total, 2004)
Agriculture	1.5	1.5
Food	1.8	1.3
Mining	0.4	0.4
Manufactures	13.2	10.4
Of which:		
Chemicals	1.7	0.7
Machinery and transport equipment	1.1	0.9
Office and telecom equipment	0.3	0.3
Electrical machinery & apparatus	1.9	0.5
Textiles	0.3	0.5
Fuels	0.3	0.1
Utilities	1.6	0.4
Construction	4.3	5.4
Transport	3.3	3.0
Communications	4.2	1.8
Distribution	17.0	24.5
Business services	20.9	14.2
Financial services	10.0	4.6
Other services	23.2	33.0
Source: OEF		

Table 8

### Impact of increased trade with China on US industrial sectors

Sector	Output effects* (%)		Employment effects* (%)	
	2005	2010	2005	2010
Agriculture	-0.1	+0.6	-0.1	0.0
Food	-0.1	+0.6	-0.1	0.0
Mining	-0.0	+0.8	-0.1	-0.5
Manufactures	-1.0	-0.1	-1.5	-3.5
Of which:				
Chemicals	-0.2	+0.6	-0.3	-2.3
Machinery and transport equipment	-0.7	+0.1	-1.1	-3.1
Office and telecom equipment	-1.4	-0.6	-2.2	-4.2
Electrical machinery & apparatus	-1.3	-0.4	-1.9	-3.9
Textiles	-1.2	-0.4	-1.8	-3.8
Fuels	+0.6	+0.8	+0.1	+0.5
Utilities	+0.6	+0.8	+0.1	+0.5
Construction	+0.6	+0.8	+0.1	+0.5
Transport	+0.6	+0.8	+0.1	+0.5
Communications	+0.6	+0.8	+0.1	+0.5
Distribution	+0.6	+0.8	+0.1	+0.6
Business services	+0.6	+0.8	+0.1	+0.5
Financial services	+0.6	+0.8	+0.1	+0.5
Other services	+0.6	+0.8	+0.1	+0.5
<b>Total</b>	<b>+0.4%</b>	<b>+0.7%</b>	<b>-0.04%</b>	<b>0.0%</b>

\* Changes represented as deviations from “counterfactual” case of no Chinese WTO entry.

Source: OEF

the individuals previously employed in the manufacturing industry will, by 2010, have found jobs in the service sector. Others will not, and might remain permanently unemployed, while new entrants to the labor market are recruited into the newly available service sector jobs. The fact that the employment costs at an economy-wide level are transitory does not imply that they are trivial, or that the shifts in the sectoral composition of employment should be ignored. Certainly, the individuals whose manufacturing jobs are lost are unlikely to think so.

Yet shifts in employment from one firm to another and from one sector to another are constantly happening in advanced, flexible economies. In a single month (June 2005), for example, 4.3 million jobs in the United States were lost, equivalent to 3.3 percent of total employment. In the same month, there were 4.6 million new hires. That kind of turnover rate, from one job to another, and from one sector to another, is fairly standard in economies like the United States. Attempts to resist such shifts

can often prove futile in the longer term and are costly in terms of the loss of economy-wide productivity that they can imply.

A similar story emerges for sectoral output. The model predicts a permanent loss in output in the US manufacturing sector, although—particularly by 2010—it is much less pronounced than the loss in employment in that sector, since average productivity will increase. But the output loss in manufacturing, such as it is, is more than offset by a permanent gain in output in the service sector, so that economy-wide output in the United States is likely to be 0.7 percent higher by 2010 as a result of increased trade with China.

With economy-wide output up by 0.7 percent in 2010, and aggregate employment unchanged, labor productivity at the economy-wide level is also up by 0.7 percent by 2010. Nearly all of that productivity gain at the sectoral level accrues to the sectors most directly affected by increased trade with China: the manufacturing sectors. Average labor productivity in the US manufacturing sector increases by 3.3 percent by 2010, compared to an average productivity increase of only 0.3 percent in the service sectors. Growth in manufacturing productivity is boosted by 0.3 percent per year over the period 2001 to 2010. The boost in service sector productivity growth is negligible, although the boost to service sector output is substantial, resulting from higher employment in the service sector.

China's entry to global markets, as a result of its economic reforms, exposed US manufacturing firms to increased competition. Some were forced to cut employment as a result, with some firms perhaps going out of business forever. But those that remain in business are obliged to increase their productivity in order to compete effectively. Meanwhile, firms in the service sector boost their employment, although their productivity is barely affected. At an economy-wide level, thus, the net impact on the United States is higher average productivity and unchanged employment over the long run.

Figures 13 and 14 show how the impact on US manufacturing employment of increased trade with China compares with trends in overall manufacturing employment.

Manufacturing employment in the United States has been in decline for a long time, particularly when expressed as a share of total employment. The recent global recession saw a pronounced fall in economy-wide employment, within which the manufacturing share fell rather more rapidly than usual. This was not unexpected, as

manufacturers tend to lay off more workers in times of recession than firms in other sectors.

Although, by 2010, according to our estimates, the impact of China's economic reform program on US manufacturing employment is substantial, reducing manufacturing employment by around 500,000 jobs, viewed in the context of overall manufacturing employment (13.9 million in 2005), the impact appears relatively small. The FDI inflows associated with China's economic reform program cause a marginal acceleration in the rate at which the manufacturing share of overall US employment is already declining—perhaps pulling forward changes in the composition of overall employment that would have been inevitable in the long run anyway.

### Caveats

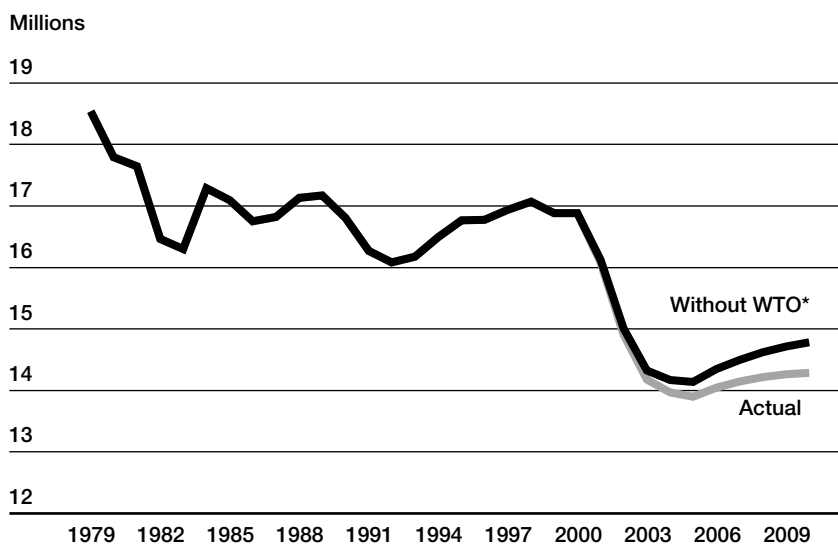
Some observers may ask whether there are circumstances under which the shift of resources across sectors that our model shows does not hold or requires modification. The answer is yes, if one believes that “hysteresis effects” are pronounced. That would mean, for example, that a shock that drives up unemployment then leads to discouraged workers, or perhaps implies issues to do with labor mobility (so that laid-off manufacturing workers in Detroit, for example, cannot relocate to take advantage of service sector opportunities in Atlanta). Or perhaps these effects would combine with skill shortages in certain service sectors, or other kinds of labor market rigidity (such as insider-outsider effects, whereby the prevailing wage is determined by those in employment, and therefore remains “too high,” keeping the demand for labor low even when unemployment is high).

All of these would mean the negative employment effects might be longer lasting than projected. But, in our view, these effects are not pronounced in the United States, where big macroeconomic cycles in recent years have not resulted in a ratcheting up of unemployment, which would have occurred if these effects were important. In Europe, in contrast, macroeconomic swings and these other factors have had a much greater impact on overall unemployment patterns.

Some analysts in the United States have also debated whether the vitality of the US economy could be sapped and its long-term growth potential reduced by shrinking the manufacturing sector “too much.” A full answer to this question is beyond the scope of this paper. In our model, however, there are countervailing effects on the manufac-

Figure 13

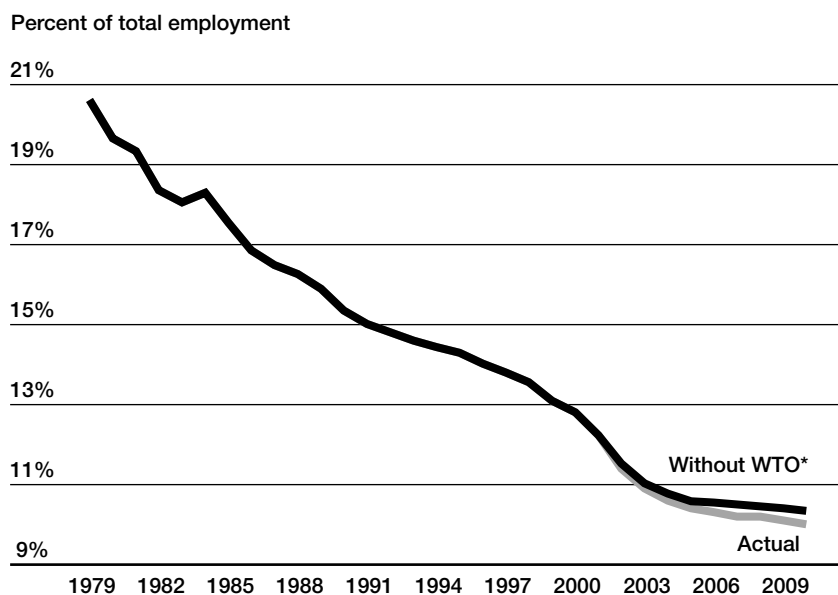
### US manufacturing employment



\*Represents “counterfactual” scenario in which China does not join the WTO.  
Source: OEF

Figure 14

### US manufacturing employment share



\*Represents “counterfactual” scenario in which China does not join the WTO.  
Source: OEF

turing sector—lower employment, offset by higher productivity—so that manufacturing output is very little changed in the long run. Thus, although manufacturing employment shrinks, manufacturing output does not (to a first approximation).

**T**here is a substantial and positive long-term impact on the US economy of increasing flows of trade and investment between the United States and China. By 2010, the OEF model predicts an average increase in the standard of living worth \$1,000 to the average US household. The OEF model suggests that both US producer and consumer prices are being pushed down significantly, in aggregate, as a result of China's WTO entry. Lower-priced Chinese imports also have the indirect effect of boosting US competitiveness, as US producers are forced to become more productive so they can reduce their prices to compete. By 2010, according to OEF estimates, the aggregate US price level will be 0.8 percent lower than it would have been in the absence of increased trade and investment in China. Over the long term, US consumers will have more money to either spend or save, as a result of the stepped-up trade with China.

Over the long term, US GDP also stands to gain. Manufacturers will benefit from the boost to productivity the OEF model predicts, while US service sector firms are likely to find new opportunities in China and elsewhere around the globe. The OEF model suggests that by 2010, US GDP will be some 0.7 percent higher than it would have been in the absence of a decade of increased trade and investment with China.

There are some transitory negative effects on economy-wide employment, and in certain industrial sectors those negative effects are significant and permanent. The

balance between those positives and negatives is beyond the scope of this paper. Our study therefore suggests that US authorities face a choice: they can attempt to resist or delay the growth in trade and investment with China, acting in the interests of particular industrial sectors or regions within the United States, but against the longer-term interests of the economy as a whole. Or they can embrace the process of change and seek to position US firms to take maximum advantage of such change, while mitigating the short-term and sector-specific costs to be borne along the way.

# Appendix 1:

## Quantifying the effects on the United States of trade and investment with China using OEF's suite of global economic models

**T**he effects of trade and investment flows between China and the United States can only be understood properly in the context of a model that identifies not only those flows but also their relationship with other key economic variables such as GDP, employment, inflation, and interest rates; and also addresses the relationships between those two countries and the rest of the world.

OEF has developed a suite of global macroeconomic models that capture these channels of international influence. These models are designed precisely to address projects such as the impact of US-China trade and investment on the US economy. At OEF, we believe that it is increasingly the case that the problems confronting business and government in the United States are international in origin, and our models are designed to address those issues. Outlined below are brief details for two of the models used in this project. Further details can be supplied on request.

**The OEF Global Macroeconomic Model (GMM)** is a fully linked model in which 40 economies are modeled in detail. The larger economies such as the United States include up to 300 variables, covering GDP and all its expenditure components; a variety of price indicators; employment, wages and unemployment; interest rates and exchange rates; industrial production; trade; government accounts; and a host of other variables. In the GMM, trade linkages are established for each country via an index of world trade that weights together all the imports of each other country in the model, according to the weight of each other country in the first country's exports. There are also interest rate, exchange rate, risk, and asset price linkages identified in the model. Commodity prices, including oil, are determined by aggregate global sup-

ply and demand. The GMM (the most widely used global model in the world) is the tool used for OEF's regular global macroeconomic forecast and analysis, and it is also distributed to a large number of clients who use it to generate their own forecasts and scenarios.

**The OEF China-Global Model (CGM)** is a fully linked model in which the major ten global economic regions (including China, and the Eurozone as a whole) are identified, as are the bilateral trade and foreign direct investment flows between those regions. Each regional bloc has its own macroeconomic model into which those trade and investment flows are embedded, and the other linkages (interest rates, risk, exchange rates, commodity prices, etc.) are factored as in the GMM. The CGM is the tool OEF uses specifically for projects that involve analysis of bilateral flows of trade and investment.

The GMM provides a convenient tool for assessing how different economic scenarios ripple around the global economy. This model is used to assess both the effects to date, as well as those to come.

The CGM provides an ideal framework for assessing the impact of different bilateral trade and investment flows between China and the United States on the US economy, and it is the principal tool used for this project.



## Appendix 2:

# Building the “China Effect” scenario

It is important to be clear how OEF arrived at the conclusions stated in this paper, and why some commentators might be concerned about a negative impact, particularly on certain sectors, particularly in the short term. For that reason, we build up to our final conclusion in four stages, set out below, starting from a very exaggerated scenario that makes a set of highly unrealistic assumptions—the sort of alarming scenario that has attracted a great deal of attention in the media—and ending up with our view of what the effects are under the most realistic assumptions.

### Scenario 1:

- US boost in imports
- No displacement
- No response through the rest of the economy
- No impact on productivity and prices

**Assumptions:** Our first scenario assumes that the boost in US imports from China since 2001 did not displace imports from other countries at all. We assume, in effect, that the impact on the bilateral trade deficit between the United States and China passed through in full to the overall US trade deficit. In other words, the scenario assumes the extra US imports from China effectively displaced only domestic sales that would otherwise have been achieved by US firms, but had no effect on US sales by suppliers in low-cost countries competing with China. Clearly, this assumption does not conform to reality.

This scenario also assumes that aggregate demand in the United States, already struggling to shake off the effects of a recession in 2001 and 2002, was further damaged by weaker net trade. The weaker growth and employment did not prompt any response on the part of US monetary authorities: interest rates remained exactly where they would have been without increased trade with China. In this scenario, then, the impact on GDP does not imply any other change in the economy in response to what would be a substantial negative shock.

**Effects:** In this unrealistic, exaggerated case, the effects on US GDP and employment to date are large and negative. We estimate that, under these assumptions, US GDP was about 1.7 percent lower in 2005, while unemployment was some 500,000 higher than it otherwise would have been. Negative effects of this magnitude are the sort that have prompted widespread concern among some commentators.

### Scenario 2:

- Boost to US imports
- Adjustment of interest rates
- No effects of displacement
- No effects on prices or productivity

**Assumptions:** In this scenario, we direct our model to assume that interest rates react to the increased trade spurred by China's WTO entry. Yet this scenario also maintains the assumptions of scenario 1 that the extra US imports from China do not displace imports from other countries. (In fact, as Table 3 indicates, higher imports from China in recent years were fully offset in the overall US current account position by reduced imports from other East Asian economies.) We also maintain the assumption that US prices and productivity are not affected.

**Effects:** According to our model, this scenario would cause interest rates to fall by 70 basis points in 2005, significantly reducing the impact on GDP. In this case, by 2005, our model projects GDP to be 0.6 percent lower, with unemployment some 180,000 higher—again, under unrealistic assumptions.

### Scenario 3:

- Boost to US imports
- Some displacement effects
- Interest rates adjust
- No effect on productivity and prices

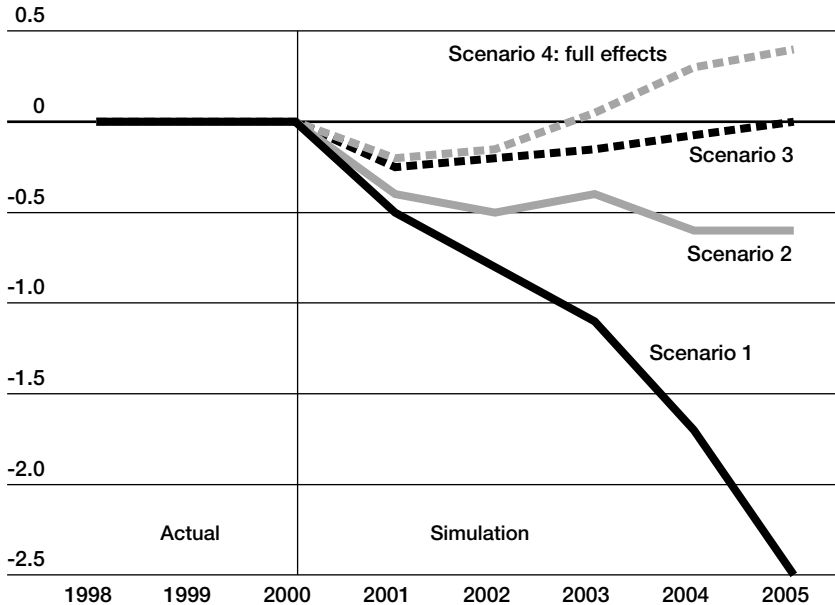
Economic theory indicates that the overall US current account position is a function of the willingness in the United States to save compared to other countries. As such, it is not affected—except at the margin—by changes in the bilateral trade position with any single country such as China. That is broadly consistent with the results of our model if left unconstrained.

**Assumptions:** Thus, if we assume that higher imports from China do not pass through in full to the overall US current account position, the impacts on output and

Figure 15

## Impact of trade with China on US GDP

Percent impact



Source: OEF

employment drop to negligible levels. This scenario also assumes that increased trade with China had no effect on either US prices or US productivity.

**Effects:** US GDP in 2005 is some 0.1 percent lower in this case, while unemployment is very little changed.

### Scenario 4: Full effects

- Boost to US imports
- Some displacement
- Interest rates adjust
- Reduction in consumer and producer prices
- Improvement in productivity

**Assumptions:** This final and most realistic scenario assumes that the major elements of the US macroeconomy react to China's economic reforms. In other words, we assume here that in response to the boost in US imports from China that resulted from China's economic reforms, interest rates adjust, displacement from third countries occurs, and US productivity and prices react.

**Effects:** Our model suggests that US producer and consumer prices were pushed down significantly, in aggregate, as a result of increased trade with China. These price effects reflect both the direct impact of the lower price of Chinese imports, and the indirect effects as other exporters to the United States—and, indeed, US-based producers—are forced to bring down their prices in

order to compete effectively with China. By 2005, according to our estimates, the aggregate US price level might have been about 0.4 percent higher had China not embarked on its program of economic reform in 2001.

These effects can be calculated as follows:

■ US import prices between 2001 and 2005 were lower than our model would have predicted, even though the model takes full account of the impact on prices of the slowdown in growth, changes in exchange rates, and other changes that occurred over that period.

■ We have attributed half of that unexplained weakness in US prices to the "China effect"—the impact of cheaper imports from China on the overall US price level. The upper boundary would be full attribution to China, implying the price effects might be twice as large as we are assuming. The lower boundary would be zero.

That impact on the aggregate price level represents a direct benefit to US consumers and firms, boosting their real incomes and profits by 0.5 percent in 2005. As a result, aggregate demand in the United States is also boosted, as consumers have more money to spend. While some of this extra real income will be saved, and some spent on additional imports (including those from China), a significant portion will be spent on goods and services produced by US-based firms, boosting US GDP in the short run.

Just as lower aggregate demand cannot change GDP in the long run, neither can higher aggregate demand—unless it is accompanied by supply-side changes that result in improving US productivity.

However, increased trade with China as a result of WTO entry will have a positive effect on US productivity. According to our model, this effect was significant, even by 2005.

Overall, taking all the effects into account, and applying the most realistic assumptions (our fourth, and final, scenario), we find that the impact of increased trade with China was to increase US GDP by around 0.3 percent in 2004, and to increase unemployment by some 50,000. Although the unemployment effects are temporary, the GDP effects are not. Thus, although increased trade with China since 2001 has been followed by a substantial deterioration in the US bilateral trade position with China, its overall impact on the US economy—including output, employment, prices and real incomes, and productivity—is nevertheless significantly positive, as Figure 15 demonstrates.

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