

United States: Selected Issues

This Selected Issues paper for the **United States** was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on **July 12, 2002**. The views expressed in this document are those of the staff team and do not necessarily reflect the views of the government of the **United States** or the Executive Board of the IMF.

The policy of publication of staff reports and other documents by the IMF allows for the deletion of market-sensitive information.

To assist the IMF in evaluating the publication policy, reader comments are invited and may be sent by e-mail to Publicationpolicy@imf.org.

Copies of this report are available to the public from
International Monetary Fund • Publication Services
700 19th Street, N.W. • Washington, D.C. 20431
Telephone: (202) 623-7430 • Telefax: (202) 623-7201
E-mail: publications@imf.org Internet: <http://www.imf.org>

Price: \$15.00 a copy

**International Monetary Fund
Washington, D.C.**

INTERNATIONAL MONETARY FUND

UNITED STATES OF AMERICA

Selected Issues

Prepared by C. Towe, P. De Masi, I. Ivaschenko, M. Kaufman,
C. MacDonagh-Dumler, G. Ramirez, and P. Swagel (all WHD), M. Kell (FAD),
G. Bannister and Y. Yang (all PDR), B. Hunt (RES), and C. Schnure (ICM)

Approved by the Western Hemisphere Department

July 12, 2002

	Contents	Page
I.	Potential Output Growth.....	5
	A. Introduction.....	5
	B. Potential Output Growth: Revised Estimates	5
	C. Sectoral Trends	7
	D. The Impact of the Terrorist Attacks	8
II.	Evaluating the Evidence of a Capital Overhang in the U.S. Economy.....	14
	A. Historical Trends in Investment and the Capital Stock.....	14
	B. Estimating the Extent of a Capital Overhang.....	17
	C. Industry- and Equipment-Specific Overhangs	19
III.	Corporate Balance Sheets and Economic Slowdowns.....	33
	A. Recent Developments	33
	B. Corporate Debt and the Macroeconomy	35
	C. Corporate Vulnerability and Recessions.....	36
IV.	U.S. Productivity Growth, Investor Sentiment, and the Current Account Deficit—Multilateral Implications	49
	A. The Base Case.....	49
	B. Productivity Catch-Up Abroad	51
	C. Lower-Than-Expected Future U.S. Productivity Growth.....	51
	D. Fiscal Shock.....	52
V.	Recent U.S. Trade and Agricultural Policies and Their International Implications	57
	A. Global Impact of the U.S. Steel Safeguard Tariffs	57
	B. U.S. Farm Policy and the Global Impact of Agricultural Liberalization	61

VI.	Some Implications of Enron’s Failure for Market Rules and Institutions	68
A.	Public Disclosures.....	68
B.	Weaknesses in the Accounting System.....	70
VII.	Monetary Policy and the 2001 Recession	76
A.	Transmission Lags	76
B.	Structural Changes in the Response of GDP and its Components to Interest Rates.....	77
C.	Alternative Measures of Monetary and Financial Conditions	79
VIII.	The Effectiveness of the Fiscal Rules Under the Budget Enforcement Act and Options for Reform	86
A.	Introduction.....	86
B.	Background.....	86
C.	Assessing the BEA Rules.....	88
D.	Options for Reform.....	91
IX.	Social Security, Medicare, and Long-Term U.S. Fiscal Prospects	97
A.	Social Security, Medicare, and the Long-Term Fiscal Situation	97
B.	Social Security Reform: The President’s Social Security Reform Commission	100
C.	Medicare Reform	102
D.	Concluding Remarks.....	103
 Boxes		
II.	1. Chain Weighting and Capital-Output Ratios	15
V.	1. Recent U.S. Trade Policy Developments.....	58
	2. Recent U.S. Farm Policy and Levels of Support to Agriculture.....	62
VI.	1. President’s Ten-Point Plan for Improving Corporate Responsibility	69
VIII.	1. The Main Provisions of the BEA.....	87
IX.	1. The Social Security and Medicare Systems	98
 Tables		
I.	1. Estimates of Potential Output Growth	11
	2. Sectoral Productivity Growth.....	11
II.	1. Private Investment Rates.....	23
	2. Private, Fixed Nonresidential Capital Stock.....	24
	3. Capital-Output Ratio, by Industry.....	25

4.	Estimates From Cointegrating and Error-Correction Models for the Stock of Equipment and Software Capital.....	26
5.	Estimates From Cointegrating and Error-Correction Models for the Computer Equipment Capital Stock	27
6.	Growth Rates of Equipment and Software, by Type	28
7.	Summary of Industries with Excessive Changes in the Capital-Output Ratio and Rapid Capital Accumulation	29
III.	1. Average Annual Growth of Corporate Assets and Debt.....	42
	2. Estimation Results of Fitting the Model to Corporate Yields.....	42
	3. Predicting the Probability of Recession, Probit Estimations	43
	4. The Severity of Recession Indices	43
	5. Predicting the Severity of Recessions, Ordered Probit Estimations	44
V.	1. Effects of U.S. Safeguard Action.....	66
	2. International Comparisons of Government Policies Aimed at Protecting Agriculture.....	66
	3. Impact of Agricultural Liberalization	67
VIII.	1. Adjustments to Discretionary Spending Caps	94
	2. Cyclical Contribution to Fiscal Consolidation.....	95
Figures		
I.	1. Measures of the Output Gap	12
	2. Inflation Response to a 1 Percentage Point Fall in the Output Gap.....	12
	3. Sectoral Output Trend Relative to Overall GDP Trend Hodrick-Prescott Filter.....	13
	4. Sectoral TFP Relative to Overall TFP	13
II.	1. Gross Private Nonresidential Investment (Fixed).....	30
	2. Net Private Nonresidential Investment (Fixed)	30
	3. Depreciation	30
	4. Capital-Output Ratios	30
	5. International Comparisons: Rates and Relative Prices of Investment	31
	6. Stock of Noncomputer Equipment and Software	32
	7. Stock of Computer Equipment.....	32
III.	1. Market Debt of U.S. Nonfarm Nonfinancial Corporate Sector	45
	2. Capital Expenditures and P/E Ratios of S&P 500 Composite Stock Index.....	45
	3. Nonfarm Nonfinancial Corporate Sector: Funds Raised	45
	4. Nonfarm Nonfinancial Corporate Sector: Bank Versus Bond Financing	45
	5. Corporate Sector: Leverage Ratios	46
	6. Corporate Sector: Gross and Net Debt-Service Burden.....	46

7.	Corporate Sector: Total Leverage	46
8.	Corporate Sector: Maturity Composition of Market Debt	46
9.	Corporate Sector: Total Leverage and Corporate Bond Spreads	46
10.	Corporate Sector: Historical Default Rates.....	46
11.	Nominal Corporate Bond Yields: Actual and Fitted.....	47
12.	Real Corporate Bond Yields: Actual and Fitted	47
13.	Corporate Vulnerability Index	48
14.	Probability of Recession, Predicted with the Corporate Vulnerability Index	48
15.	Probability of Recession, Predicted Without the Corporate Vulnerability Index	48
IV.	1. Increase in U.S. Productivity and Reduction in Risk Premium	54
	2. Alternative Productivity Scenarios	55
	3. Fiscal Shocks	56
VII.	1. Percent Impact of 1 Percentage Point Interest Rate Cut on GDP	76
	2. Simulated Impact of the Monetary Policy Easing on Output.....	82
	3. Correlations Between Federal Fund Rate Changes and Growth of Aggregate Demand.....	83
	4. Alternative Indicators of the Stance of Monetary Policy	84
	5. Alternative Indicators of Financial Conditions	85
VIII.	1. Federal Budget Deficit 1962–2001	86
	2, Federal Outlays and Revenues	96
	3. Discretionary Spending.....	96
	4. Mandatory Spending	96
	5. Projection Errors Due to Economic Factors	96
IX.	1. Social Security and Medicare Projections.....	106
	2. Budget Projections	107

I. POTENTIAL OUTPUT GROWTH¹

A. Introduction

1. The rapid growth of productivity and output in the United States has undoubtedly been the most salient economic development of the 1990s. The key question going forward is whether these rapid growth rates are sustainable and will continue to support consumer and investment spending. This chapter presents updated staff estimates of potential output growth for the United States, using data through 2001 that incorporates the full cyclical upswing of the 1990s and the subsequent mild recession, as well as taking into account the revisions to the national accounts released in July 2000.² The individual sectors that have driven the pickup in potential output and total factor productivity (TFP) growth are also examined.

2. These estimates suggest that the annual growth rate of potential output was in the range of 3¼ to 3½ percent for the period 1990–2001, marginally above earlier estimates that were based on data through 1999. The sectors exhibiting the strongest growth in potential output and TFP include communications, wholesale and retail trade, transportation and utilities, and manufacturing. Although the September 11th terrorist attacks are expected to reduce the level of potential output in the near term, recent estimates suggest that they would have only a marginal effect on potential output growth over the medium term.

B. Potential Output Growth: Revised Estimates

3. Four different methods were used to estimate potential output: the segmented trend; the Hodrick-Prescott (H-P) filter; the band-pass filter; and the production function approaches. These methodologies suggest potential output growth during 1990–01 in the range of 3¼–3½ percent, slightly above earlier staff estimates of 3–3¼ percent (Table 1).³

4. The **segmented trend approach** was used to identify points where the trend rate of growth in GDP may have changed, and in particular to determine whether there was an identifiable trend increase during the last economic expansion. Recursive residual tests were used to identify the break points in the chain-linked real GDP series over the period 1959–2001. In addition to the two break points found in previous studies—one in the first

¹ Prepared by Paula De Masi and Martin Kaufman.

² Previous staff estimates had already incorporated comprehensive revisions to the national accounts released in October 1999. These revisions showed that real GDP over the last three decades grew at a faster rate than the previous data indicated, especially in the 1990s. Several factors contributed to the stronger rates of growth in the revised data, including revisions to the source of data, new methods to adjust for inflation, and updated definitions of spending categories, the most important being the inclusion of computer software in investment. See De Masi and Kaufman (2000).

³ These results were presented in De Masi and Kaufman (2000). For methodological details see also De Masi, Chan-Lau, and Keenan (1999).

quarter of 1975, and the other in the first quarter of 1982—a new break point, around the first quarter of 1991, was also identified. As a result, potential output growth is estimated to have increased to 3½ percent in the 1990s, from just over 3 percent during the previous decade.⁴

5. The **H-P filter** was also used to identify an estimate of trend output that minimizes a weighted average of the difference between output and trend output and the rate of change in trend output.⁵ Because the H-P filter tends to overweight the end-points in the series being detrended, potential output was estimated over the period from the peak in the level of output in the fourth quarter of 1973 to the third quarter of 2001. On this basis, potential growth was estimated at 3¼ percent in the 1990s.

6. A **band-pass filter** was also used to remove the high frequency components (business cycle or higher) from the actual data, with the low frequency residual taken as a proxy for the trend component. The band-pass filter is the difference between two low-pass filters (one with a high cutoff frequency and the other with a low cutoff frequency).⁶ Since approximation requires truncating the series by 12 quarters before the end, the estimated trend goes as far as 1998. For the 1990–98 period, the average rate of growth of the low frequency component in the GDP data was 3½ percent.

7. In addition, a **production function** approach was used to explicitly model output in terms of underlying factors of production, expressing output as a function of capital, labor, and TFP.⁷ In this case, the production function was assumed to be of Cobb-Douglas type with constant returns to scale and constant elasticities with regard to capital and labor inputs.⁸ Potential labor input and trend TFP were estimated by using the H-P filter. Using these detrended series, the growth rate of potential output was estimated to be 3¼ percent over the period 1990–2000.⁹

⁴ The estimation periods for these log-linear regressions were specified from cyclical peak to cyclical peak in an attempt to eliminate the distorting effects associated with end-points that are at different points in the business cycle. Earlier estimates are in De Masi and Kaufman (2000).

⁵ See Hodrick and Prescott (1997).

⁶ The specification used to obtain the below-business-cycle frequency in the approximated band-pass filter used 0 and 36 quarters for the high and low cutoff frequencies of the low-pass filters, and a truncation point of $K=12$ for the symmetric moving average representation. See Baxter and King (1999).

⁷ See Jorgenson and Ho (2001) and CBO (2001).

⁸ The capital and labor elasticities are based on their shares in national income and are assumed at 30 and 70 percent, respectively; these are also the assumptions used in CBO (2001). The labor input series was constructed from average weekly hours and employment in the private nonfarm sector, while the capital stock was defined as the stock of fixed private nonresidential equipment and structures.

⁹ It is worth noting that the estimates of TFP growth accelerated in the second half of the 1990s to 1.2 percent, compared to 1 percent for the whole 1990s and 0.9 percent since the 1960s.

8. These estimates of potential output growth are similar to those published by the Office of Management and Budget, the Congressional Budget Office, and the Council of Economic Advisers (Table 1). It is noteworthy that the estimates prepared by Macroeconomic Advisers—a private sector consultancy—suggest that potential growth has fallen sharply from 2000 to 2002—from 3.8 percent to 3.0 percent. Because the particular production function approach used places a heavy weight on short-term developments, this significant downward revision likely reflects the effect of the sharp cutback of investment spending on capital inputs over the last year.

9. The band-pass filter, the HP filter, and the production function all showed similar patterns for the gap between output and potential (Figure 1), with the average gap at about -1.2 percent for the three quarters of 2001. Incorporating the 1991 break point in the segmented trend yields a smaller negative output gap in the recent period than previous segmented trend estimates, but the estimate is broadly similar to the other methods surveyed here.

10. In order to test the relevance of the alternative measures of the output gap for predicting CPI inflation, inflation was regressed on its lagged values and the output gap.¹⁰ Using a recursive residual test, several break points were found in the relationship, the most recent being in 1987 and 1996.¹¹ Using the most recent sample estimates, a transitory—one period—1 percentage point increase in the output gap would raise inflation from the estimated zero-gap rate of 2 percent to an estimated 2½ percent, but most of the inflationary effect is estimated to disappear very quickly (Figure 2).

C. Sectoral Trends

11. During the 1990s, some sectors—the technology sectors, in particular—grew at exceptionally rapid rates, while others lagged. This suggests considerable differences in sectoral trends in potential output growth. In order to explore this possibility, the H-P filter was applied to sectoral output data.¹²

12. In the 1990s, sectors with trend potential GDP growth above that of the total economy included communication, wholesale and retail trade, transportation and utilities, and manufacturing (Figure 3). Over the 1990s, these sectors grew by 3–18 percent more than

¹⁰ Although inflation and the output gap exhibit significant persistence, they are stationary processes. Unit root tests performed rejected the I(1) hypothesis. The measure of output gap used in the regression was estimated from the HP filter. Other measures yielded similar results.

¹¹ The change in parameter estimates observed between the 1988–2001 and 1997–2001 samples is concentrated on the autoregressive component of inflation and not on the parameter estimates for the output gap, which were remarkably stable across samples.

¹² Data limitations precluded replicating all of the other methodologies used in the previous section with sectoral data.

the economy-wide aggregate. This confirms the conclusion of other studies that suggest strong productivity growth in the wholesale and retail sectors, such as McKinsey (2001). Within the manufacturing sector, the electronic equipment aggregate exhibited a trend growth rate 50 percent higher than the economy-wide rate. The relatively slow-growing sectors included the mining sector as well as the finance and construction sectors.

13. TFP calculations on sectoral data suggest that in the second half of the 1990s those sectors that exhibited the highest output growth also experienced the fastest TFP growth.¹³ These sectors included transportation, communications and utilities, wholesale and retail trade, and manufacturing (Table 2 and Figure 4). In the construction sectors, where output growth had been modest relative to the economy-wide norm, TFP growth was relatively weak. In contrast, the service sector grew at the economy-wide trend rate, despite below average TFP growth; conversely the mining sector exhibited trend growth well below the average, but TFP growth in the first part of the 1990s was well above the economy's average.¹⁴

D. The Impact of the Terrorist Attacks

14. The September 11th terrorist attacks dealt a significant blow to an already weak U.S. economy.¹⁵ In the immediate aftermath of the attacks, consumer and business confidence and equity prices fell sharply, and economic activity was disrupted—including the shutdown of the air transport system and financial markets. The economy, however, demonstrated remarkable resilience in the face of this shock, with confidence and equity prices returning to pre-attack levels by year-end. Nonetheless, increased security costs and greater uncertainty have raised the question of whether the attacks will adversely affect potential output and TFP growth over the medium term.

15. In analyzing the impact of the terrorist attacks on the productive capacity of the economy, it is important to distinguish between one-time effects on the *level* of TFP and potential output, and their *growth* rates. A one-time increase in the cost of doing business—for example, higher security costs—is likely to contribute to a one-time decline in the *level* of

¹³ Sectoral TFP growth, similar to the economy-wide case, was calculated using a Cobb-Douglas production function with constant coefficients for labor and capital. These coefficients were estimated using long-term averages of the share of inputs in nominal output. The series for the potential labor input and trend TFP were estimated using the H-P filter. Jorgenson, Ho, and Stiroh (2002) also estimate sectoral TFP growth, and find a wide variation of productivity growth patterns across sectors. Their estimating procedure differed in that they used production function coefficients that changed over time, and were based on a rolling two-period average of the share of inputs in nominal output.

¹⁴ These results are broadly consistent with labor productivity estimates presented by Bailey (2001).

¹⁵ For a detailed discussion on the economic impact of the attacks, see OECD (2002).

TFP as businesses spend more on capital and labor without an increase in production.¹⁶ Other added costs include business travel delays; irradiating mail; the need for higher levels of inventories to guard against supply disruptions; more elaborate backup systems in case of another attack; and cross-border delays. Accordingly, CBO (2002) estimates indicate that such costs together would total around \$20 billion in 2002, and would reduce the level of TFP by about 0.3 percent after five years.¹⁷ However, some of these negative effects could dissipate as businesses adapt—for example, by using video conferencing instead of air travel.

16. Over the long term, as firms divert resources away from investment spending and toward security equipment, the terrorist attacks could also affect the *growth rate* of total factor productivity. However, CBO (2002) suggests that TFP growth would be reduced by just 0.03 percentage point over the medium term.

¹⁶ This assumes that businesses purchase increased security as an intermediate good. To the extent that firms contract with a security firm, then some offsetting increase in output could occur.

¹⁷ Based on a similar methodology, CEA (2002) estimates that increased security costs would reduce the level of TFP by about ½ percent after five years.

List of References

- Baxter, M., and R. G. King, 1999, "Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series," *Review of Economics and Statistics*; 81, No. 4:575-93, November.
- Bailey, M., 2002, "The New Economy: Post Mortem or Second Wind?" unpublished paper.
- CBO, 2002, *The Budget and Economic Outlook: Fiscal Years 2003–2012* (Washington, D.C.: U.S. GPO).
- CBO, 2001, *CBO's Method for Estimating Potential Output: An Update* (Washington, D.C.: U.S. GPO).
- Council of Economic Advisors, 2002, *Economic Report of the President* (Washington, D.C.: U.S. GPO).
- De Masi, P. R, J. Chan-Lau, and A. Keenan, 1999, "Measures of Potential Output, NAIRU, and Capacity Utilization," in *United States: Selected Issues*, IMF Staff Country Report No. 99/101, September.
- De Masi, P. and M. Kaufman, 2000, "Potential Output Growth: Revised Estimates," in *United States: Selected Issues*, IMF Staff Country Report No. 00/112, August.
- Hodrick, R. J. and E. C. Prescott, 1997, "Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit, and Banking*, Vol. 29, pp. 1–16.
- Jorgenson, D., M. Ho, and K. Stiroh, 2001, "Projecting Productivity Growth: Lessons from the U.S. Growth Resurgence," paper prepared for the conference Technology, Growth and the Labor Market, sponsored by the Federal Reserve Bank of Atlanta and Georgia State University, December 31.
- Macroeconomic Advisers, 2002, *Economic Outlook*, March.
- McKinsey Global Institute, 2001, *U.S. Productivity Growth, 1995–2000* (Washington D.C., McKinsey Global Institute)
- Office of Management and Budget, 2002, *Budget of the United States Government, Analytical Perspectives, Fiscal Year 2003*.
- OECD, 2002, *Economic Outlook*, No. 71 (Paris: OECD).

Table 1. United States: Estimates of Potential Output Growth
(Average annual percentage change)

	Revised Estimate		Previous Estimate	
Staff estimates				
Method/source	Period		Period	
Segmented trend	1982-01	3.1	1982-99	3.1
	1991-01	3.5		
Hodrick-Prescott filter	1990-01	3.2	1990-99	3.2
Band-Pass filter (0,32)	1990-98	3.6		
Production function	1990-00	3.3	1990-98	3.0
	TFP 1/	1.0		
	Labor 1/	1.5		
	Capital 1/	0.9		
Other estimates				
Congressional Budget Office (2002)	2002-12	3.4	2000-10	3.1
Office of Management and Budget (2002)	2002-12	3.1	2000-05	3.0
Macroeconomic Advisers (2002)	2002	3.0	2000	3.8
Council of Economic Advisers (2002)	2001-12	3.1	2000-08	3.1

Source: Staff estimates based on data from the U.S. Department of Commerce, Bureau of Economic Analysis.

1/ Contribution to growth.

Table 2. United States: Sectoral Productivity Growth
(Average annual percentage change)

	Total Factor Productivity Growth (Staff Estimates)			Labor Productivity Growth Bailey (2002)	
	1977-1989	1989-1995	1995-2000	1989-1995	1995-2000
Real gross domestic product	0.9	0.9	1.1		
Mining	0.1	2.5	0.8	4.6	-1.8
Construction	0.1	-0.4	-0.4	-0.1	-0.7
Manufacturing	2.5	2.6	3.3	3.2	4.5
Transportation, public utilities, and communications	2.1	2.5	2.2		
Transportation				2.5	1.5
Public utilities				2.5	2.3
Communications				5.1	2.2
Wholesale trade	0.5	2.2	2.9	2.8	5.9
Retail trade	0.8	1.2	2.7	0.7	4.7
Finance, insurance, and real estate	-0.2	0.6	1.6	1.7	3.5
Services	-0.6	-1.0	-1.1	-1.1	0.1

Source: Staff estimates based on data from the U.S. Department of Commerce, Bureau of Economic Analysis.

Figure 1. United States: Measures of the Output Gap
(In percent of potential output)

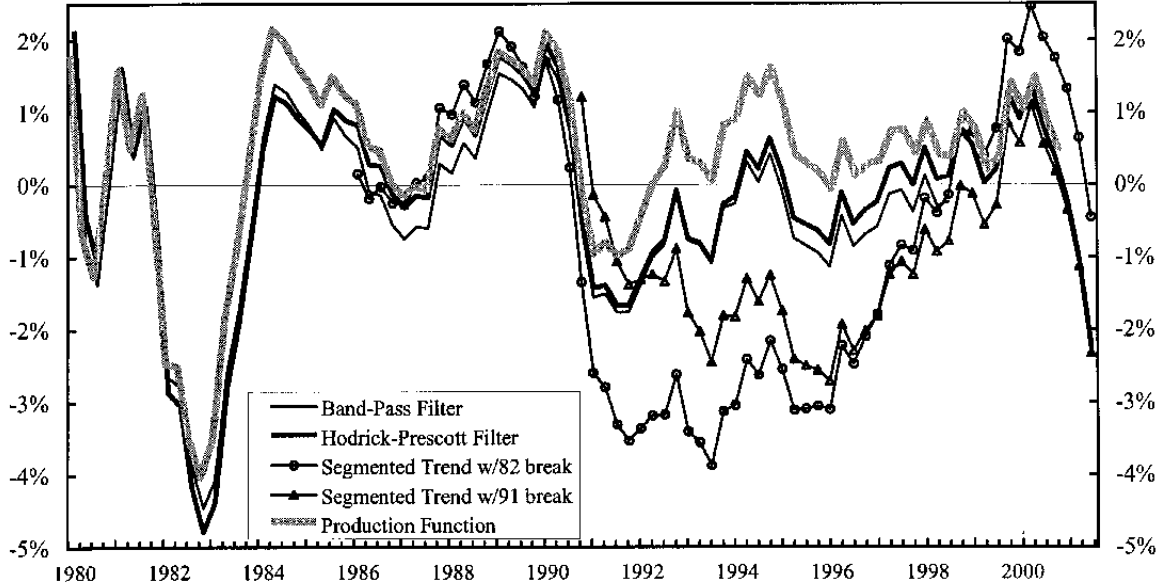
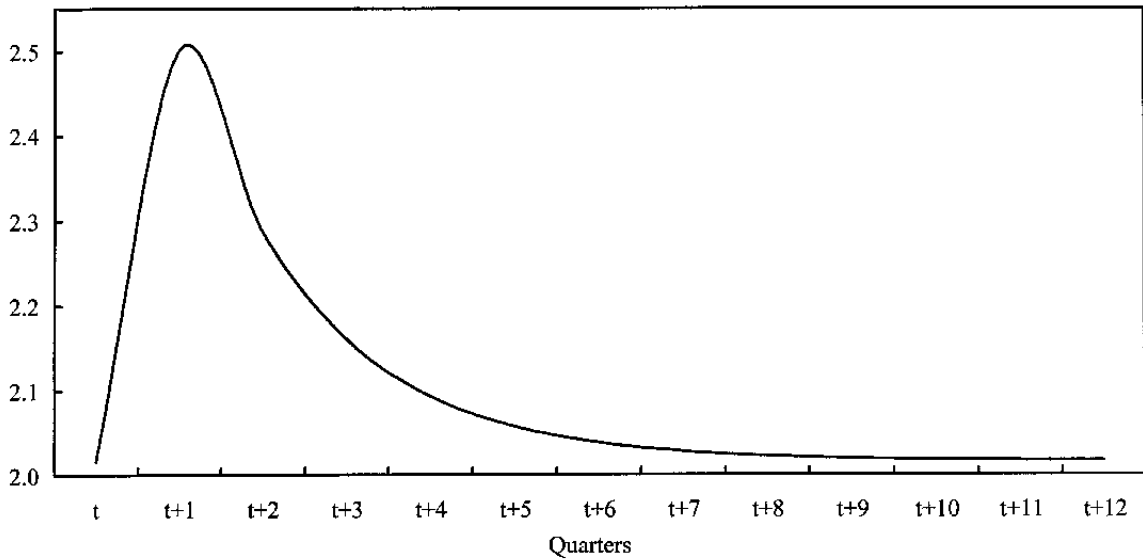


Figure 2. United States: Inflation Response to a
1 Percentage Point Fall in the Output Gap 1/
(In percent)



Source: Staff estimates.

1/ Using an output gap based on the Hodrick-Prescott filter.

Figure 3. United States: Sectoral Output Trend Relative to Overall GDP Trend
Hodrick-Prescott Filter
(1990=100)

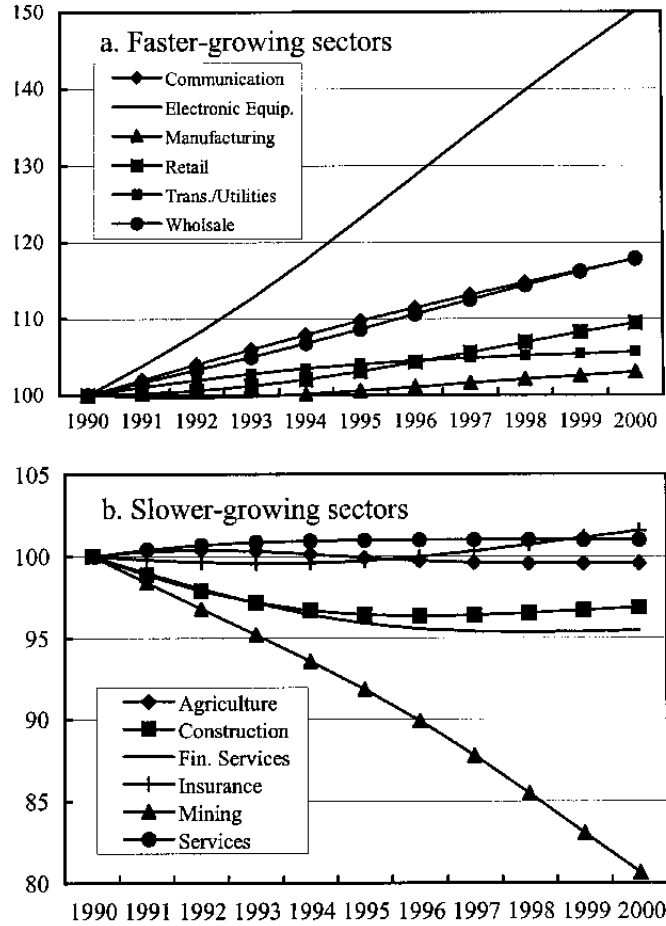
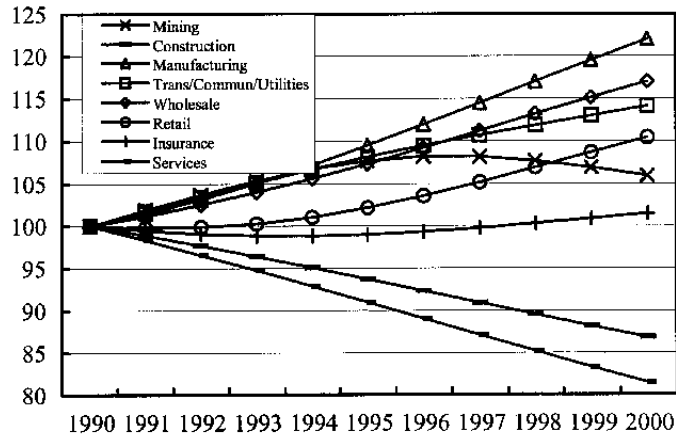


Figure 4. United States: Sectoral TFP Relative to Overall TFP
(1990=100)



Sources: U.S. Department of Commerce, Bureau of Economic Analysis; and staff estimates.

II. EVALUATING THE EVIDENCE OF A CAPITAL OVERHANG IN THE U.S. ECONOMY¹

1. After nearly a decade of decline, U.S. investment as a share of GDP rose sharply during the 1990s. This increase, which was concentrated in equipment purchases, is widely considered to have played an important role in boosting U.S. productivity growth during the latter half of the decade.
2. However, the subsequent collapse of investment spending in 2001 has reinforced concerns that the earlier surge was a “bubble” and that a capital stock overhang could retard the U.S. recovery from the 2001 recession. These fears have been exacerbated by high profile bankruptcies in the information, technology, and communication sectors, as well as by concern that firms had overinvested in computer equipment in the late 1990s, including efforts in preparation for “Y2K.”
3. This chapter reviews recent investment trends and provides estimates of the extent to which the capital stock has deviated from its long-run equilibrium. The results suggest that a modest overhang of computer equipment did arise in late 2000, but that it has subsequently eroded. An economy-wide overhang in noncomputer-related equipment is not apparent, but several industries may have invested excessively in communications equipment and trucks.

A. Historical Trends in Investment and the Capital Stock

4. Private nonresidential investment as a share of GDP rose sharply during the 1990s, largely reversing the decline that had occurred during the 1980s (Figure 1). On a gross basis (including depreciation), nominal investment fell from a post-war peak of nearly 14 percent of nominal GDP in the early 1980s to around 9¾ percent of GDP in 1992. The decline reflected a response to a range of factors—slower productivity growth, higher real interest rates, overbuilding in the oil and residential sectors in the 1980s, and the recession in the early 1990s. In addition, the relative price of investment goods fell sharply, reflecting the effects of the IT revolution. However, with the robust economic recovery and the decline in the cost of capital, the investment rate recovered strongly during the 1990s, reaching nearly 13¾ percent of GDP in 2000, before falling to around 11 percent during the subsequent economic slowdown.
5. The investment boom during the 1990s was associated with significantly higher spending on equipment, which rose from 7 percent of GDP in 1992 to 9¾ percent of GDP in 2000 (Table 1 and Figure 1). Outlays for computers and software were particularly strong, increasing by 1½ percentage points of GDP and accounting for nearly 40 percent of the increase in the business investment rate.² Structures investment, which had exhibited a

¹ Prepared by Christopher MacDonagh-Dumler.

² The balance was largely due to higher investment spending on: communications equipment, industrial machinery, and trucks (which together accounted for 40 percent of the increase) and office building and other commercial, nonfarm, and natural gas structures (20 percent of the increase).

secular decline since the early 1980s because of consolidation in the mining industry, rose only marginally during the 1990s.

Box 1. Chain Weighting and Capital-Output Ratios

- In 1996, the U.S. national accounts shifted to a system of chain weighting.¹ Previously, real magnitudes had been constructed by using fixed-weight deflators—i.e., nominal magnitudes were deflated by prices that were constructed from a fixed set of goods and in fixed proportions. Under the chain-weighted system, the indices are calculated on a rolling basis.
- The advantage of the chained indices is that they avoid overstating measures of real growth rates when relative prices change rapidly.² This problem had become particularly acute during the 1990s given the relative decline in the price of investment goods.
- An important implication of chain-weighted data is that the real components of GDP no longer sum to total real GDP. Similarly, ratios of real magnitudes no longer have economic relevance.
- As a result, investment/output and capital/output ratios in the text are all expressed in nominal terms. See Whelan (2001) for a detailed discussion.

¹ See Whelan (2000) for a discussion of the methodological issues regarding chain-weighted data.

² Components of chain-weighted data can grow faster than the overall total forever, which is impossible with fixed-weighted data. The further away from the base year, the greater the difference between the components and the chain-weighted total. For example, in 1970 the sum of the real values of the individual components of the information-processing capital stock (computers and peripheral, software, communications, instruments, photocopies, and other office equipment) was 54 percent larger than the chain-weighted total.

6. The decline in the investment rate during 2001–02 was led by a sharp drop in spending on equipment.³ However, cutbacks in computers and software spending played a less important role than during the boom years, falling by only ½ percentage point of GDP, less than one-quarter of the decline in the business investment rate. Instead, the decline primarily reflected lower outlays on communication equipment, machinery, and trucks.

7. The net investment rate (i.e., excluding depreciation) exhibited broadly similar trends from the 1980s to 2000. Net private nonresidential investment declined sharply from the early 1980s to the early 1990s, reaching a low of around 1½ percent of net domestic product (NDP), before rebounding in the early 1990s and reaching around 5 percent of NDP in 2000 (Figure 2). Equipment investment led the increase—during 1995–2000, net investment in these categories averaged about 2¾ percent of NDP, nearly twice the rate during 1986–94

³ A slowdown in structures investment—as reflected in rising vacancy rates in office building and other commercial and nonfarm structures—accounted for 35 percent of the decline in the investment rate (0.2 percentage point of GDP).

(Table 1). The net investment rate for structures also rebounded somewhat during the 1990s but remained well below its average in previous decades.

8. The share of gross investment devoted to offsetting depreciation has remained broadly unchanged since the mid-1980s, averaging around 9¾ percent of NDP.⁴ This was in contrast to the sharp increase in depreciation that occurred during the late 1960s and 1970s (Figure 3). The earlier increase was mostly accounted for by just nine industries—representing less than one-third of GDP.⁵

9. The growth of the capital stock also accelerated during the 1990s. The growth of the net stock of real, private fixed nonresidential assets had slowed to an average annual rate of around 2¼ percent during 1986–94 from 3–4 percent per year earlier (Table 2). However, during 1995–2000, the growth rate of the capital stock accelerated to 3½ percent, mainly reflecting investment in high-technology equipment—computers, software, and communication equipment—as well as transportation equipment. Again, the stock of nonresidential structures in real terms grew relatively modestly.

10. High investment rates in the 1990s arrested the sharp decline in the capital stock to NDP ratio that began in the 1980s (Figure 4). The capital stock fell from over 150 percent of NDP in the early 1980s to around 125 percent of NDP in the late 1990s, reflecting the effects of the lower investment rate during the first half of the 1990s, which was insufficient to maintain the capital/NDP ratio at the high level reached in the late 1980s. The drop in the price of investment goods also worked to lower the ratio, since the capital stock data are measured at the current cost of replacement.

11. Despite increased investment in high-tech capital, its share in the total stock remains relatively modest. Rapid increases in the quantity of investment in computer equipment were largely offset by falling computer prices, and the share of computer equipment in the total capital stock increased to only about 1 percent during 1995–2000 (Table 2). Similarly, price declines for communications equipment helped keep its share at only around 4 percent.

12. Sectoral data also do not indicate excessive increases in capital stocks during the late 1990s (Table 3). The ratio of private capital to business output actually declined, on average, from above 135 percent of business output in 1965–94 to just under 130 percent of business output in 1995–2000. The decline was evident in nearly all industries except for mining, whose capital-to-output ratio rose over the past 35 years, partly in response to preferential tax breaks given to the oil industry and the sharp rise in the price of oil during the

⁴ As a share of the capital stock, depreciation has steadily increased, however. In 1980, BEA's measure of depreciation in the capital stock data was about 6¼ percent of the capital stock. By 2000, it reached 8 percent.

⁵ The industries were: industrial machinery and equipment; electronic equipment, motor vehicles; petroleum and coal products; telephone and telegraph; electric, gas and sanitary services (public utilities); wholesale trade; retail trade, and business services.

1970s. The capital-to-output ratios in the wholesale and retail trade sectors increased significantly during earlier periods, but increased only modestly during the late 1990s.

13. Investment rates in many other OECD countries also rose during the 1990s (Figure 5). Although the pickup was less pronounced than in the United States, a broad-based increase was apparent, especially in the EU and Australia.⁶ The investment boom abroad was also associated with an accelerating decline in the relative prices of investment goods in most countries. However, the relative prices of investment goods has fallen the fastest in the United States during the late 1990s, possibly reflecting the higher share of high-technology goods in investment than in other countries.⁷

B. Estimating the Extent of a Capital Overhang

14. To investigate the extent to which the increase in investment may have resulted in the capital stock overshooting its equilibrium level, an investment model is developed and estimated. The model allows the capital stock to deviate from its optimal level in the short run, but it requires that capital revert to the optimal level over time. In this framework, investment occurs as firms adjust stocks to the long-run equilibrium. In the econometric analysis described below, separate equations were considered for computer and noncomputer capital in order to take into account the possibility that rapid price declines and high depreciation rates for computer equipment resulted in different adjustment patterns.

15. The model is similar to an approach suggested in Tevlin and Whelan (2000), but it also accounts for the long-run relationships between capital, output, and the cost of capital, while including short-run dynamics.⁸ Specifically, an error-correction model was estimated, using a long-run cointegrating vector between capital, business output, and the Hall-Jorgenson cost of capital.⁹ Following Hubbard (1998), the short-run adjustment model also

⁶ As Figure 5 indicates, and Kirova and Lipsey (1998) note, the United States has had a relatively lower investment rate through much of the post-war period. OECD (2001) and Pelgrin, Schich, and de Serres (2002) note that the recent increase in investment is largely in line with fundamentals.

⁷ Collecchia and Schreyer (2001) illustrate that although high-technology investment provided a boost to growth in all countries, the United States benefited the most, followed by Australia, Finland, and Canada. Technology contributed the least to economic growth in Germany, France, Italy, and Japan. Prices of high-technology goods declined most rapidly in the United States, although after accounting for different statistical methodologies, the U.S. decline is not as pronounced.

⁸ See Caballero (1999). By including a cointegrating term, this model differs from many traditional models. Oliner, Rudebusch, and Sichel (1995) provide a comprehensive survey of the performance of common investment models, all of which fit the data poorly, and most of which suffer from theoretical and methodological problems. Tevlin and Whelan (2000) show that the perpetual inventory method used to derive the traditional estimating equation is not valid because of the chain-weighting methodology used by BEA to aggregate the capital-stock data.

⁹ Pelgrin, Schich, and de Serres (2002) estimate a cointegrating relationship between investment, output, and the cost of capital in nine OECD countries and find some support for cointegration.

includes a cash-flow variable (from the National Income and Product Accounts) to reflect the effect of short-run constraints on firms' investment decisions.

16. The estimated results are broadly consistent with economic theory (Tables 4 and 5). In both the long-run equation and error-correction model, higher output (and lower cost of capital) leads to higher levels of long-run capital. Furthermore, the estimates suggest that the computer capital stock is more sensitive to output and the cost of capital than the aggregate, noncomputer stock. This is consistent with anecdotal evidence for the computer industry—that is, its short product cycles, and the sensitivity of computer prices to demand. The coefficient on the error-correction term is also consistent with theory; when the capital stock is above equilibrium ($CV_{t-1} > 0$), economic forces adjust to reduce the growth rate of capital ($\Delta k_t < 0$). The speed of adjustment—measured by the coefficient on the error-correction term—is 3½ times larger on the computer equation. This implies that excess computer capital is eliminated much more quickly than noncomputer equipment.

17. The results of the model for noncomputer capital indicate that there is little evidence of a widespread capital overhang. Indeed, the forecast results from the error-correction model suggest persistent *underinvestment* in capital, starting in the late 1980s and corresponding to the period of low net investment in the United States (Figure 6). However, the estimates should be interpreted with caution, since the fit of the cointegrating model is not very strong, and since the cost of capital term has the correct sign but is insignificant.

18. The model for the computer capital suggests that the stock fell below its equilibrium level starting in 1991 (Figure 7). However, as a result of the rapid increase in the investment rate in the late 1990s, overinvestment of computer equipment totaling \$37 billion had emerged by end-2000. The apparent overinvestment was equivalent to 9½ percent of the computer stock, or about ½ percent of the overall stock of equipment and software on a nominal basis.¹⁰

19. Although the estimated overhang is apparently significant, the rapid depreciation rate of computer equipment would mean that this overhang would be quickly erased. The median age of computer equipment is less than two years, and BEA assumes that its economic depreciation rate is 32 percent.¹¹ As a result, most of the excess capital would have been erased by the end of 2001.¹²

¹⁰ In contrast to the overall capital-stock equation, the fit of the cointegrating relationship in the computer-equipment model is significantly better, and the coefficient on the cost of capital is negative, significant, and appropriately close to -1.

¹¹ See Fraumeni (1997).

¹² These results are similar to recent research by Macroeconomic Advisers (2002) that estimates a capital overhang in the technology sector (computers and software) of about \$55 billion by the end of 2000, declining to \$25 billion by the end of 2001.

20. While the results above do not suggest a significant capital overhang, the analysis of broader aggregates leaves open the possibility that excess stocks might have been accumulated in specific types of capital or in specific sectors. This uncertainty is underscored by the fact that the estimation results for the equation for the noncomputer capital stock were relatively poor. The possibility that pockets of excess stocks may have arisen in recent years is explored below.

C. Industry- and Equipment-Specific Overhangs

21. Analysis of industry-level data point to a range of assets where excessive stocks may have been built up. In particular, there were six categories of equipment that had a substantial (more than 5 percentage points) swing in the annual rate of growth of capital accumulation from the first to the second half of the 1990s (the change in the growth rate is in parentheses, see Table 6 for greater detail):¹³

- Computers and peripheral equipment (27 percent)
- Mining and oilfield machinery (11½ percent)
- Construction tractors (8¾ percent)
- Trucks, buses, and truck trailers (8½ percent)
- Communication equipment (6 percent)
- Construction machinery (excluding tractors) (5½ percent)

22. In order to explore further the possibility that specific pockets of overinvestment may have occurred, unpublished industry-level data on capital stocks from the Bureau of Economic Analysis (BEA) were examined. These data also suggest the possibility of overinvestment in a small number of sectors and types of equipment—most notably: communication equipment; construction machinery (except tractors); custom software; mainframe computers; trucks, buses, and truck trailers; and wire and cable structures (Table 7).¹⁴ Moreover, rapid investment was concentrated in industries representing only 12 percent of private output and in assets representing 5 percent of the nonresidential capital stock. The apparent overinvestment in the telecommunications sector is well known, and

¹³ BEA data cover 62 types of capital (equipment, software, and structures) for 58 industries and include the average age of capital, real capital stocks (in 1996 chain-weighted dollars), and nominal capital stocks and are combined with industry output data from Lum and Moyer (2001). Both data sets are available on BEA's website (www.bea.gov).

¹⁴ Specifically, industries and capital types were selected as follows: industries were ranked by the ratio of the nominal stock of capital (for each asset type) to nominal industry output, and by the growth rate of the real stock of capital (for each type) between 1995 and 2000. Individual asset types in an industry were selected if: (i) the change in the capital-output ratio between 1995 and 2000 was disproportionately large (that is, the change in the ratio was in the lowest or highest 2½ percentile, measuring extreme changes), and (ii) if the real stock of capital grew by more than the industry average (to measure rapid capital accumulation). Attention was focused on only types of capital that grew significantly faster in the late 1990s than the early 1990s (the annual growth rate of real capital was more than 5 percentage points higher in the latter 1990s than in the early 1990s).

industry analysts have ascribed the overinvestment in trucking to preferential leasing arrangements that have encouraged purchases of trucks.

23. While overinvestment in these areas seems too small to pose a systemic risk to the U.S. economy, it suggests challenges to the affected sectors, especially since the depreciation rates on trucks and communications capital are far lower than for computers. According to Fraumeni (1997), the BEA uses a depreciation rate of 31 percent for computer equipment. For communications equipment it is 11 to 15 percent; for trucks, the rate is 12 to 19 percent.

List of References

- Collecchia, A. and P. Schreyer, 2001, "ICT Investment and Economic Growth in the 1990s: Is the United States a Unique Case? A Comparative Study of Nine OECD Countries," *STI Working Paper, DSTI/DOC(2001)/7*, 25 October 2001 (Paris: OECD).
- Caballero, R., 1999, "Aggregate Investment," in *Handbook of Economics*, Taylor, J.B. and M. Woodford, eds. (New York: NorthHolland).
- Fraumeni, B., 1997, "The Measurement of Depreciation in the U.S. National Income and Product Accounts," *Survey of Current Business*, July (Washington, D.C.: Department of Commerce) 7–23.
- Hubbard, R.G., 1998, "Capital-Market Imperfections and Investment," *Journal of Economic Literature*, March (Nashville, TN) 193–225.
- Kirova, M. and R. Lipsey, 1998, "Measuring Real Investment: Trends in the United States and International Comparisons," *Federal Reserve Bank of St. Louis Review*, January/February (St. Louis, MO: Federal Reserve) 3–18.
- Kopcke, R., 1993, "The Determinants of Business Investment: Has Capital Spending Been Surprisingly Low?" *New England Economic Review*, January/February (Boston: Federal Reserve) 3–31.
- Lum, S. and B. Moyer, 2001, "Gross Domestic Product by Industry for 1998–2000," *Survey of Current Business*, November (Washington, D.C.: Department of Commerce) 17–33.
- Macroeconomic Advisers, 2002, *Economic Outlook* (St. Louis) February.
- OECD, 2001, "Saving and Investment: Determinants and Policy Implications," in *Economic Outlook*, No. 70 (Paris: OECD).
- Oliner, S., G. Rudebusch, and D. Sichel, 1995, "New and Old Models of Business Investment: A Comparison of Forecasting Performance," *Journal of Money, Credit and Banking*, Vol. 27, No. 3, August, 806–826.
- Plegrin, F. S. Schich, and A. de Serres, 2002, "Increases in Business Investment Rates in OECD Countries in the 1990s: How much can be explained by Fundamentals?," Working Paper ECO/WKP(2002)13 (Paris: OECD).
- Tevlin, S. and K. Whelan, 2000, "Explaining the Investment Boom of the 1990s," mimeo. (Washington, D.C.: Federal Reserve Board of Governors).

Whelan, K., 2001, "A Two-Sector Approach to Modeling U.S. NIPA Data," *Finance and Economics Discussion Series*, Working Paper 2001-4 (Washington, D.C.: Federal Reserve Board of Governors) January.

Whelan, K., 2000, "A Guide to the Use of Chain Aggregated NIPA Data" *Finance and Economics Discussion Series*, Working Paper 2000-35 (Washington, D.C.: Federal Reserve Board of Governors) June.

Table 1. United States: Private Investment Rates

	1950-1964	1965-1985	1986-1994	1995-2002
(As a share of gross domestic product)				
Gross fixed investment	14.7	15.9	14.9	16.3
Nonresidential	9.3	11.4	10.8	12.1
Equipment and software	5.7	7.3	7.5	9.1
Computers	0.0	0.4	0.7	0.9
Software	0.0	0.3	0.9	1.5
Structures	3.6	4.1	3.3	3.0
Residential	5.3	4.6	4.1	4.2
(As a share of net domestic product)				
Net fixed investment	7.8	8.1	5.5	7.0
Nonresidential	3.5	4.7	2.7	4.1
Equipment and software	1.5	2.2	1.2	2.7
Structures	2.0	2.5	1.5	1.4
Residential	4.3	3.3	2.7	2.8
Depreciation	8.6	9.9	11.5	11.6
Nonresidential	6.9	8.1	9.6	9.7
Equipment and software	4.8	6.0	7.3	7.7
Structures	2.1	2.2	2.2	2.1
Residential	1.7	1.8	1.9	1.8

Source: U.S. Department of Commerce, Bureau of Economic Analysis. Disaggregated net investment data are not yet available for 2001. Net investment data are not available on a disaggregated basis in the NIPAs.

Table 2. United States: Private, Fixed Nonresidential Capital Stock

	1950-1964	1965-1985	1986-1994	1995-2000
(Average annual percent change, in real terms)				
Private (fixed) nonresidential	3.0	3.9	2.2	3.6
Equipment and software	4.1	5.4	2.8	6.2
Computers		42.8	13.2	38.6
Software		18.3	12.5	14.2
Communication equipment	10.4	8.8	4.6	9.4
Industrial	4.4	3.7	1.5	3.1
Transportation	2.5	4.5	1.8	5.9
Other	3.4	4.0	1.2	4.2
Structures	2.5	3.0	1.8	1.9
(Average share of capital stock, in nominal terms)				
Equipment and software	32	37	38	39
Computers	0	1	1	1
Communication equipment	2	3	4	4
Software	0	0	1	2
Industrial	13	14	13	13
Transportation	8	8	7	8
Other	8	8	8	7
Structures	68	63	62	61

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

Table 3. United States: Capital-Output Ratio, by Industry

	1950-1964	1965-1985	1986-1994	1995-2000
(As a percent of business GDP)				
Private nonresidential capital	126	138	136	129
(As a percent of an industry's own GDP)				
Agriculture	186	288	315	315
Construction	34	40	33	34
Mining	272	333	433	475
Durables manufacturing	64	92	107	104
Nondurables manufacturing	87	120	129	130
Retail trade	55	65	76	79
Wholesale trade	24	47	75	77
Public utilities	620	595	499	495
Communications	268	308	289	273
Transportation	539	409	324	279
Finance, insurance, and real estate	109	132	143	136
Services	58	65	57	55

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

Table 4. United States: Estimates From Cointegrating and Error-Correction Models for the Stock of Equipment and Software Capital (Excluding Computer Equipment)

a. Cointegrating equation:

$$k_t = -2.506 + 1.119y_t - 0.035c_t$$

0.564
0.028
0.105

b. Vector error-correction model (VECM):

	Δk_t	Δy_t	Δc_t
Δk_{t-1}	0.931 <i>0.025</i>	-0.114 <i>0.231</i>	1.394 <i>0.740</i>
Δy_{t-1}	0.032 <i>0.008</i>	0.265 <i>0.077</i>	0.141 <i>0.247</i>
Δc_{t-1}	-0.007 <i>0.003</i>	-0.054 <i>0.026</i>	0.191 <i>0.084</i>
CV_{t-1}	-0.004 <i>0.002</i>	0.003 <i>0.016</i>	0.023 <i>0.051</i>
Constant	-0.009 <i>0.004</i>	0.014 <i>0.040</i>	0.045 <i>0.129</i>
Cash flow	0.002 <i>0.003</i>	0.125 <i>0.023</i>	-0.197 <i>0.073</i>
R ²	0.941	0.271	0.128
AIC		-21.658	

Source: Staff estimates.

Note: standard errors in *italics*. The CV term is the residual from the cointegrating vector; that is, $CV_{t-1} = k_{t-1} - 1.119 y_{t-1} + 0.035 c_{t-1}$.

Table 5. United States: Estimates From Cointegrating and Error-Correction Models for the Computer-Equipment Capital Stock

a. Cointegrating equation:

$$k_t = -15.760 + 1.710y_t - 0.867c_t$$

$$13.547 \quad 0.868 \quad 0.179$$

b. Vector error-correction model (VECM):

	Δk_t	Δy_t	Δc_t
Δk_{t-1}	0.905 <i>0.029</i>	0.030 <i>0.034</i>	-0.148 <i>0.088</i>
Δy_{t-1}	0.163 <i>0.081</i>	0.292 <i>0.097</i>	-0.036 <i>0.247</i>
Δc_{t-1}	-0.048 <i>0.036</i>	-0.089 <i>0.043</i>	0.258 <i>0.109</i>
CV _{t-1}	-0.014 <i>0.005</i>	0.011 <i>0.005</i>	0.003 <i>0.014</i>
Constant	-0.221 <i>0.072</i>	0.173 <i>0.086</i>	0.032 <i>0.220</i>
Cash Flow	0.016 <i>0.024</i>	0.095 <i>0.028</i>	-0.072 <i>0.072</i>
R ²	0.950	0.301	0.161
AIC		-18.590	

Source: Staff estimates.

Note: standard errors in *italics*. The CV term is the residual from the cointegrating vector; that is, $CV_{t-1} = k_{t-1} - 1.710 y_{t-1} + 0.867 c_{t-1}$.

Table 6. United States: Growth Rates of Equipment and Software, by Type
(Average annual growth)

	1990-1994	1995-2000	Difference
Private fixed nonresidential equipment and software	4.5	6.0	1.5
Computers and peripheral equipment	11.6	38.6	27.0
Mining and oilfield machinery	-6.3	5.2	11.5
Construction tractors	-3.9	4.8	8.7
Trucks, buses, and truck trailers	2.9	11.4	8.5
Communication equipment	3.5	9.4	5.9
Construction machinery, excluding tractors	-1.2	4.2	5.4
Office and accounting equipment	-2.8	1.4	4.2
Electric household appliances	-3.2	0.5	3.8
Service industry machinery	0.2	3.9	3.7
Internal combustion engines	1.7	5.3	3.6
Nonresidential household furniture	-1.8	1.7	3.5
Farm tractors	-0.1	3.3	3.3
Railroad	-1.0	1.8	2.8
Other furniture	2.8	5.1	2.3
Metal-working machinery	1.2	3.5	2.3
Software	12.0	14.2	2.3
Special industrial machinery, nec	1.4	3.7	2.2
Ships and boats	-2.8	-0.8	2.0
General industrial and material-handling equipment	0.9	2.7	1.8
Agricultural machinery, excluding tractors	-0.7	1.0	1.7
Aircraft	2.4	4.1	1.7
Fabricated metal products	-0.4	1.1	1.5
Other private nonresidential equipment and software	3.2	4.7	1.5
Electric transforms and distributors	2.3	3.6	1.3
Miscellaneous electric equipment, nec	5.9	6.7	0.8
Steam engines	0.3	0.9	0.6
Instruments	6.4	4.8	-1.5
Photocopiers and related equipment	3.4	-0.9	-4.3
Autos (nonresidential use)	6.9	1.9	-5.0

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

Table 7. United States: Summary of Industries with Excessive Changes in the Capital-Output Ratio and Rapid Capital Accumulation 1/ 2/

Industry	Output (in billions of \$)	Types of Capital	Stock of Capital (in billions of \$)
Agricultural services, forestry, and fishing	57	Trucks, buses, and truck trailers	17
Auto repair, services, and parking	94	Trucks, buses, and truck trailers	47
Holding and other investment offices	15	Communication equipment; construction machinery, except tractors; custom software; trucks, buses, and truck trailers	7
Insurance agents, brokers, and service	67	Trucks, buses, and truck trailers	4
Local and interurban passenger transit	19	Communication equipment; trucks, buses, and truck trailers	4
Miscellaneous repair services	27	Communication equipment; trucks, buses, and truck trailers	4
Motion pictures	35	Communication equipment	6
Nondepository institutions	59	Communication equipment; construction machinery, except tractors; custom software; mainframe computers; trucks, buses, and truck trailers	102
Radio and television	72	Communication equipment; trucks, buses, and truck trailers	55
Security and commodity brokers	144	Communication equipment; trucks, buses, and truck trailers	16
Telephone and telegraph	209	Communication equipment; wire and cable structures	226
Transportation by air	93	Communication equipment	26
Transportation services	32	Communication equipment	11
Trucking and warehousing	126	Trucks, buses, and truck trailers	56
Total	1,049		581
Private total output (in 2000)	8,642	Total fixed nonresidential capital stock (of all types of capital, end 2000):	10,694
percent share	12		5

Sources: U.S. Department of Commerce, Bureau of Economic Analysis; and staff calculations.

1/ The analysis is based on the following types of capital: mainframe computers; integrated systems; personal computers; computer storage devices; computer terminals; mining and oilfield machinery; computer printers; construction tractors; trucks, buses, and truck trailers; direct access storage devices; wire and cable structures; communication equipment; construction machinery, except tractors.

2/ In each of the cases, the real capital stock grew at least 5 percent faster during 1995-2000 than 1990-1994.

Figure 1. United States: Gross Private Nonresidential Investment (Fixed)

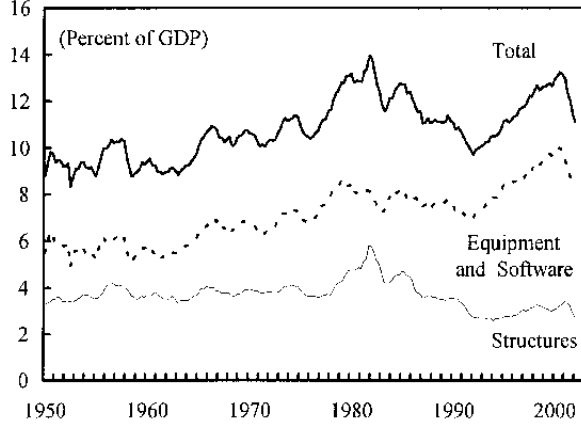


Figure 2. United States: Net Private Nonresidential Investment (Fixed)

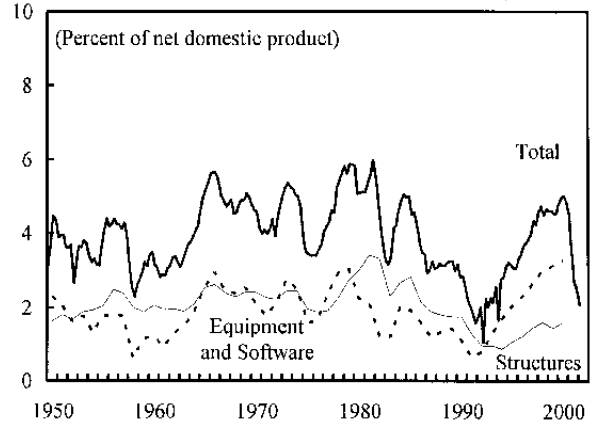


Figure 3. United States: Depreciation

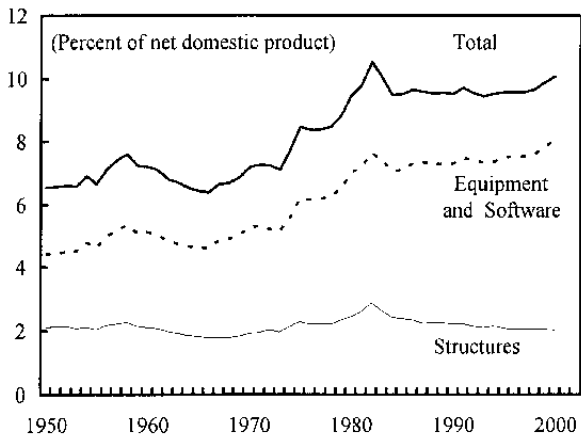
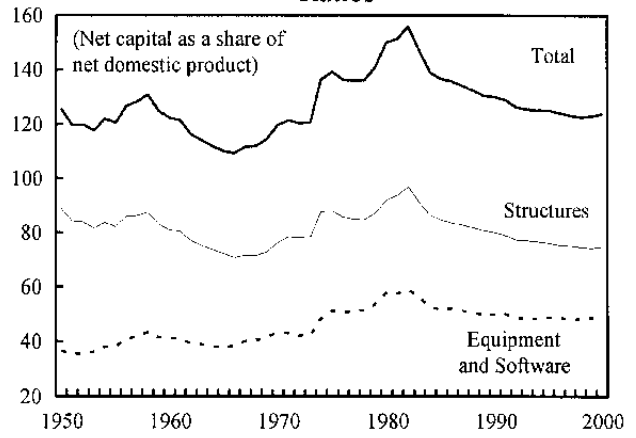
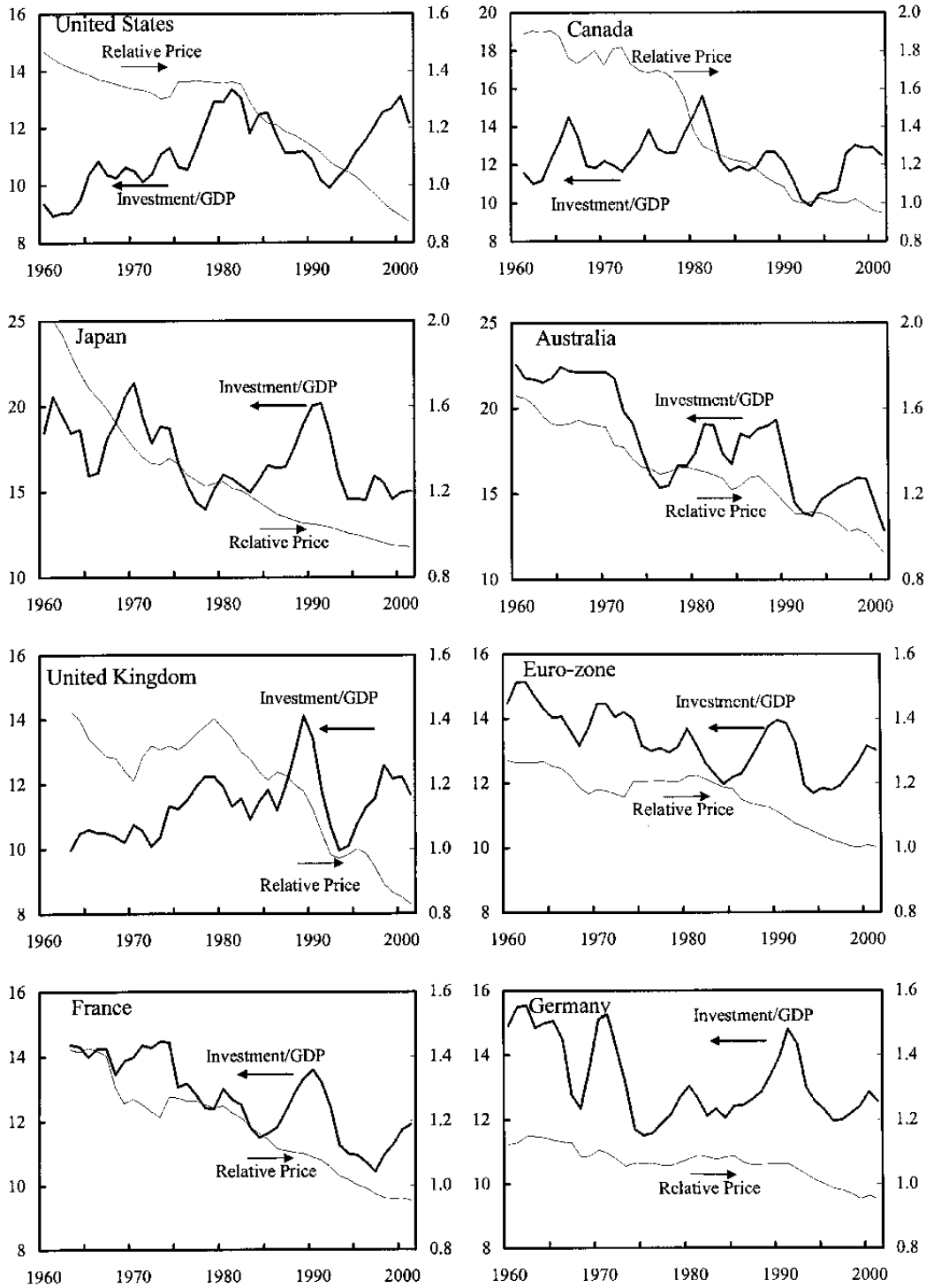


Figure 4. United States: Capital-Output Ratios



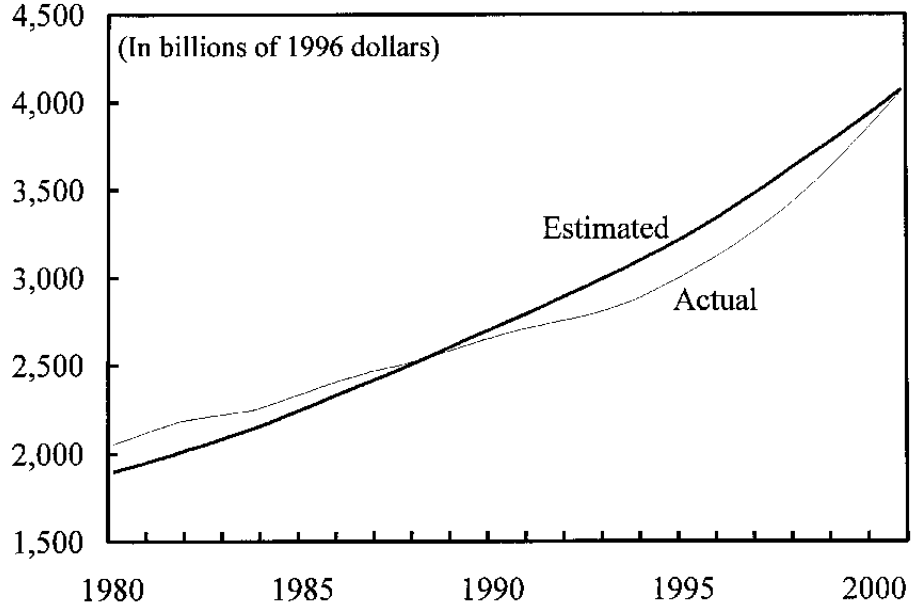
Sources: U.S. Department of Commerce, Bureau of Economic Analysis; and staff estimates. All data are nominal; investment data are for private, fixed nonresidential investment. In Figures 2 and 3, annual data for net investment and capital are not yet available (total, net investment is from staff estimates).

Figure 5. International Comparisons: Rates and Relative Prices of Investment



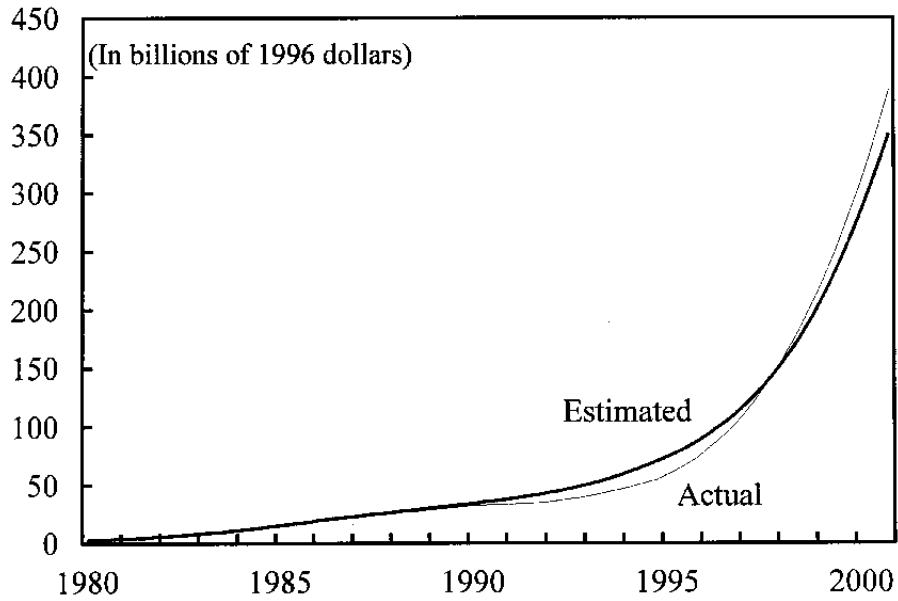
Sources: OECD; and staff calculations. Private fixed nonresidential investment as a percent of GDP. The relative price of investment is measured as the ratio of the investment deflator to the GDP deflator, normalized to 1970=1.

Figure 6. United States: Stock of Noncomputer Equipment and Software



Sources: U.S. Department of Commerce, Bureau of Economic Analysis; and staff estimates.

Figure 7. United States: Stock of Computer Equipment



Sources: U.S. Department of Commerce, Bureau of Economic Analysis; and staff estimates.

III. CORPORATE BALANCE SHEETS AND ECONOMIC SLOWDOWNS ¹

“... moderate leverage undoubtedly boosts the capital stock and the level of output... the greater the degree of leverage in any economy, the greater its vulnerability to unexpected shortfalls in demand and mistakes.”

Greenspan (2002)

1. The rapid accumulation of corporate debt in the United States during the 1990s and recent high profile bankruptcies raise questions about the vulnerability of the corporate sector and whether corporate balance sheet fragilities could hinder the recovery. This paper presents empirical evidence that corporate indebtedness in conjunction with other fundamentals, such as future growth prospects and current macroeconomic conditions, can explain the likelihood and severity of economic downturns. A Corporate Vulnerability Index is constructed to take into account these fundamentals. The index successfully predicts U.S. economic slowdowns, including the 2001 recession, and their severity.

A. Recent Developments

2. Since late 1994, nonfinancial corporate debt has increased at an average annual rate of 7 percent in real terms (Table 1). Even during the recent recession, debt accumulation continued at about 3 percent—well above the average rate of other post-war recessions. As a result, nonfinancial corporate debt reached an unprecedented 48 percent of GDP by the end of 2001 (Figure 1).

3. Several factors contributed to the rapid increase in debt. First, corporations stepped up their borrowing in order to finance new investments—in response to strong growth expectations as evidenced by strong capital expenditure and rich equity valuations (Figure 2). Second, beginning in 1995, U.S. corporations increased the frequency and magnitude of equity buybacks—these amounted to a cumulative net \$3.65 trillion during 1995–2000—which were largely financed through issuing debt (Figure 3).² Third, increased financial intermediation over the last decade may have also facilitated debt expansion. The growth of nonbank intermediaries, the developments of the high-yield and asset-backed bond markets, and the growth of pension funds and money market mutual funds opened up new sources of borrowing for companies that previously depended on internally generated funds or bank loans (Figure 4).

¹ Prepared by Iryna Ivaschenko.

² The reasons for this trend are not well understood. However, corporate finance theory argues that firms generally prefer issuing debt to equity because debt reduces information asymmetry and thus reduces firms' borrowing costs. See Myers and Majluf (1984). However, some observers suggest that corporations increasingly substituted debt for equity in order to boost stock prices. See, for example, Cookson (2001).

4. The rapid buildup of debt has been suggested to reflect a weakening of corporate balance sheets. However, alternative measures of leverage provide a mixed picture (Figure 5).³

- The ratio of debt to tangible assets increased rapidly in the late 1990s and reached a historical peak of 54 percent by the end of 2001.⁴
- In contrast, the ratio of debt to total assets increased much more modestly and stayed below 30 percent, reflecting the rapid growth in the value of financial assets during 1995–2001 (Table 1).
- The ratio of market debt to the sum of debt and equity (market value) also began to increase only in early 2000, after declining throughout the 1990s because of soaring equity prices. Thereafter, the stock market correction coupled with continued strength in corporate borrowing raised this measure of leverage, but still left it well below its 1970–90 average.

5. With a substantially higher level of debt, the corporate debt-service burden has increased (Figure 6). Gross interest on debt reached 106 percent of pre-tax corporate profits in the last quarter of 2001, but stayed well below the historical peak of 245 percent that it reached in the last quarter of 1981.⁵ Net interest on debt—adjusted for receivables—increased almost two-fold during 1997–2001 to nearly 40 percent of profits, but also remained well below its previous peak. Debt-service burdens also started to decline in late 2001 as a result of lower interest rates.

6. A broader index of total leverage—a sum of the debt-service burden and balance sheet leverage (debt as a share of debt plus equity)—trended up since 1995, as an increase in the debt burden outpaced a decline in balance sheet leverage (Figure 7).⁶ However, after peaking in the first quarter of 2001, total leverage declined by almost 30 percent as corporations slowed their pace of borrowing and interest rates declined. Leverage is expected

³ Influential work by Merton (1974) suggests balance sheet leverage—defined as a ratio of debt to the firm's value—as an indicator of a firm's financial vulnerability. The true value of a firm is usually unknown and is approximated by firms' assets or a sum of debt and equity.

⁴ Standard measures of debt derived from the balance-sheet data understate the true amount of leverage in the economy as they do not fully account for off-balance-sheet liabilities. Nevertheless, these measures, calculated from the officially reported balance-sheet data, have proved to be useful even when measuring the performance of such major derivative players as Enron and LTCM.

⁵ Gross debt payments are calculated for each component of aggregate corporate liabilities, using appropriate interest rates. Corporate profits are adjusted for inventory valuation and capital consumption.

⁶ In order to combine the flow value of the debt-service burden with the stock value of balance-sheet leverage the debt burden is converted into a stock using a present value technique. Alternatively, the debt-service burden can be rescaled so that its mean/standard deviation ratio is comparable to that of balance-sheet leverage. See Anderson and Sundaresan (2000).

to stay at this lower level for some time as corporations have locked in lower borrowing costs by swapping short-term debt for longer-term financing (Figure 8).

B. Corporate Debt and the Macroeconomy

7. The financial conditions of the private sector have long been recognized as exerting a powerful effect on the macroeconomy. For example, the structural theory of corporate debt directly links an increase in leverage with higher corporate default risk and thus higher costs of external financing, which, in turn, tend to reduce investment, depress future cash flows and output, and thus may trigger a slowdown.⁷ Empirical evidence also suggests that leverage and other balance-sheet indicators have a major influence on investment spending, inventories, and employment.⁸ Moreover, the financial accelerator theory as in Bernanke, Gertler, and Gilchrist (1996) and Bernanke and Gertler (1995) suggests that high corporate leverage can worsen slowdowns by amplifying and propagating initial adverse shocks and by increasing the effects of monetary policy on the real economy. In addition, a high debt burden may inhibit economic recovery by creating liquidity problems that, combined with weak profits, may crowd out productive investments and push up default rates.

8. Recent developments appear to confirm that highly leveraged corporations are seen as more risky and face higher premiums on borrowed funds. Corporate spreads have increased in tandem with total leverage since the mid-1990s, even though the strength of equity prices pointed to optimistic expectations about future earnings growth (see Figures 2 and 9). In addition, rising corporate defaults in both investment grade and high-yield sectors (Figure 10) and declining recovery rates have accompanied the increase in corporate leverage.⁹ Finally, the data clearly indicate that total corporate leverage tends to increase before and during recessions—on average, its level is about 35 percent higher during recessions than during expansions (see Figure 7).

9. But how much leverage is too much? According to the structural theory of corporate debt, the cost of external funds is not very sensitive to an increase in leverage if the value of corporate assets is well above the default barrier, which in turn depends on the condition of

⁷ See, for example, Merton (1974). There are a number of other theories which model the costs of external financing as a function of a firm's balance sheet. See, for example, Kiyotaki and Moore (1997); and Carlstrom and Fuerst (1997). In addition, high leverage may lead to credit rationing that limits the sources of funding for corporations, depressing investment and output. However, with the development of alternative sources of funding for corporations, full-blown credit rationing has become less of an issue, at least for the corporate sector as a whole. Indeed, while some segments of the economy—such as high-yield bond issuers in late 2000—felt credit squeezes in the recent times, overall, the corporate sector has appeared to retain access to funding.

⁸ See, for example, Hoshi, Kashyap, and Scharfstein (1991), Kashyap, Lamont, and Stein (1994), and Sharpe (1994). Bernanke and Gertler (1986, 1990) also argue that the strength of balance sheets determines the quality of investment projects undertaken.

⁹ In 2001, the recovery rate fell to a 20-year low of 21 percent. See Moody's (2002).

the balance sheet, market structure, and macroeconomic variables.¹⁰ Moreover, an increase in leverage may not raise the probability of a corporation going bankrupt if it is offset by improved growth expectations, more favorable debt contract terms, and more accommodative monetary policy. This suggests that the vulnerability of the corporate sector to economic shocks and thus the probability of recessions should be related to a combination of variables, rather than corporate leverage alone. The next section explores this issue in detail.

C. Corporate Vulnerability and Recessions¹¹

10. In order to examine whether corporate leverage itself provides meaningful information about the business cycle, a model was estimated that related the probability of recession to corporate leverage and a range of other macroeconomic variables. Specifically, a probit model was used with a recession index (R_t) as a dependent variable.¹² In addition to total leverage, the independent variables included average weekly hours worked, the Conference Board vendor performance index, housing starts, the slope of the Treasury yield curve, and stock returns.¹³ The estimation results indicated that corporate leverage was not statistically significant in predicting the probability of recession when controlling for other leading indicators.¹⁴

11. However, these results left open the possibility that a broader measure of corporate vulnerability could be relevant in explaining the probability and severity of recessions. In particular, the discussion above suggested that corporate debt represented an incomplete index and that it is also important to take into account a range of other factors in assessing the strength of the corporate sector. Accordingly, a Corporate Vulnerability Index (CVI), which includes a broader range of factors, was constructed using the structural model of perpetual corporate debt by Anderson, Sundaresan, and Tychon (1996) (AST) to estimate the default probability for the entire corporate sector.¹⁵ In this model, corporate bond yields depend on

¹⁰ See Anderson and Sundaresan (1996) and Anderson, Sundaresan, and Tychon (1996) who derive the default barrier in a game-theoretic framework of a bankruptcy process; or Mella-Barral and Perraudin (1997), who derive the default barrier along the lines of the real options theory of investment that treats the liquidation process as an option.

¹¹ For a more detailed discussion, see Ivaschenko (2002).

¹² This approach to predicting the probability of recession follows Estrella and Hardouvelis (1991), Stock and Watson (1993), Estrella and Mishkin (1997), Dueker (1997), and Dotsey (1998). The recession index equals one if the economy is in a recession—as defined by the NBER—during the given quarter, and zero otherwise.

¹³ The choice of variables was guided by their proven ability to predict U.S. business cycles.

¹⁴ The estimation results are uniformly insignificant and are not reported here for the sake of brevity, but are available from the author.

¹⁵ The choice of the model was guided by the following considerations. First, modeling aggregate corporate debt as a perpetuity with time-varying coupon payments seems to be the most natural as individual firms continuously roll over their existing debts or issue new ones. Second, the AST model better reflects bond market realities in that it allows for costly bankruptcy, deviations from absolute claim priority, strategic debt service, and less-than-complete recovery of liability claims. The point at which a firm defaults—the default

(continued)

leverage, the risk-free interest rate, bankruptcy costs, the recovery rate, and the probability that a corporation will default on its debt obligations. The corporate default probability, in turn, is a nonlinear function of leverage, volatility of the firm's value, the risk-free interest rate, bankruptcy costs, the recovery rate, and the dividend payout rate.¹⁶

12. The theoretical corporate bond yield was fitted using nonlinear least squares to actual yields on the aggregate Baa-rated long-maturity corporate bond index over the period 1969Q1 to 2001Q4.¹⁷ The model fits both nominal and real yields well (Figures 11 and 12), with squared errors being less than 10 percent for nominal yields, and less than 14 percent for real yields.¹⁸ While parameters of both nominal and real models are similar, the cost of bankruptcy and the recovery rate are somewhat higher when expressed in real terms (Table 2).

13. The CVI was constructed by substituting the estimated parameters into an analytical expression for the probability of default. The resulting CVI is a nonlinear function, increasing in leverage and the risk-free interest rate, and non-monotonic in asset volatility. Since its peak in the early 1980s, which was caused by a combination of high interest rates and leverage, the CVI has generally trended down during most of the 1990s, driven by either declining leverage or lower interest rates (Figure 13). The CVI increased modestly at the end of the 1990s, reflecting a rise in debt levels and an increase in asset volatility, which were partially offset by lower interest rates.

barrier—is not given exogenously but is derived as a result of the strategic interaction between creditors and shareholders. Finally, the theoretical bond prices produced by the model fit actual bond price data better than those of other structural models. See Anderson and Sundaresan (2000) for details.

¹⁶ $PD_t = \left(1 / \left(\frac{LEV_t}{r_t \theta_t (1 - 1/\gamma_t)} + \frac{BCOST_t}{\theta_t (1 - 1/\gamma_t)} \right) \right)^{\gamma_t}$, where PD_t is the probability of the firm's defaulting on

its debt obligations, LEV_t is total leverage, r_t is a risk-free interest rate, $BCOST_t$ is bankruptcy costs, θ_t is a recovery rate, and γ_t is a nonlinear function of the risk-free interest rate, r_t , dividend payout rate, $BBETA_t$, and volatility of the firm value, σ_t .

¹⁷ The choice of the bond index is guided by the fact that an average rating of a company listed in S&P 500 composite index is Baa. Leverage is approximated by total leverage, described above. The risk-free interest rate is approximated by the yield on the long maturity composite Treasury bond index, and volatility of the firm value is approximated by equity volatility multiplied by a constant scaling factor. The bankruptcy costs, the recovery value, and the dividend payout rate are expressed as a percentage of the firm's value and are treated as constant model parameters. Together with the equity-scaling factor, they are inferred from the estimation.

¹⁸ The model is estimated in real terms as a robustness check, since in periods of high inflation firms tend to switch to different accounting methods. Moreover, fixed assets tend to be understated and long-term debt levels overstated. Since all balance sheet and flow data are estimated as ratios, only interest rates are adjusted for inflation. Inflation was proxied by the chain-type GDP deflator. Expected inflation rates are estimated by fitting an ARIMA(7,1,3) model to quarterly inflation data over 1947Q2 to 2001Q4.

Predicting the probability of recession

14. In order to test the relevance of the CVI as an indicator of macroeconomic conditions, it was used as an explanatory variable in the previously described probit model of the probability of a recession. In contrast to the leverage variable, the CVI is a significant predictor of the probability of recession four to six quarters ahead (Table 3). For example, a 10 percent increase in the CVI is associated with a 2.7 percent increase in the probability of recession four quarters in the future. The fact that the CVI is significant in signaling the probability of recession only at longer horizons suggests that as markets recognize an increase in corporate vulnerability, the cost of external funding rises and corporations are forced to work on improving their balance-sheet positions. By the time the economy slips into a recession, corporate balance sheets have typically already begun to improve, thereby lowering the CVI.

15. The model using the CVI outperforms other specifications in predicting the probability of a recession. A high probability of recession was predicted four quarters in advance of the 1990–1991 recession, while other widely used leading indicators failed to do so. For example, the probit model including the CVI predicted an 86 percent probability that the economy would slip into recession in 1990, while the Estrella and Mishkin (1997) model, which uses the Treasury yield curve and stock prices, implied only a 25 percent probability.¹⁹

16. The model using the CVI and other leading indicators correctly predicted the recent slowdown four quarters in advance and forecasted a recession in the first quarter of 2001 with 53 percent probability (Figure 14). In contrast, without the CVI, the model did not predict a slowdown and implied only 6 percent probability of a recession in the first quarter of 2001 (Figure 15).

17. It is noteworthy that after edging up since 1999, the CVI declined in the fourth quarter of 2001 by 23 percent compared to the first quarter of 2001, indicating a decrease in recessionary risks.²⁰

Predicting the severity of recession

18. The CVI can also be used to assess whether the health of the corporate sector is related to the severity of recession. A Severity of Recession Index (SRI) is constructed as follows. First, the magnitude of a cumulative decline of real GDP between the pre-recession quarter and the last quarter of the recession, normalized by the length of the recession, is calculated. Second, recessions are then ranked, with a smaller rank representing a less severe recession or a group of less severe recessions (Table 4). The SRI is zero during expansion periods.

¹⁹ See Estrella and Mishkin (1997), Dotsey (1998), and Stock and Watson (2000) for a detailed discussion.

²⁰ The evidence of improved corporate sector health is reflected in a decline in the corporate default rate (to 3.9 percent) in December 2001—the first decline since 1999. See Moody's (2002).

19. The SRI is then used as a dependent variable in an ordered probit equation, which includes the CVI and other leading indicators that were used in the previous section in predicting the probability of recession as explanatory variables. The estimation results indicate that an increase in the CVI is associated with an increase in the probability of a more severe recession three to six quarters ahead (Table 5). When recessions are ranked according to their length (as opposed to depth), the estimation results indicate that a higher CVI also raises the probability of a longer recession (Table 5, bottom panel).

List of References

- Anderson, R., and S. Sundaresan, 1996, "Design and Valuation of Debt Contracts," *Review of Financial Studies*, 9, pp. 37–68.
- _____, _____, and P. Tychon, 1996, "Strategic Analysis of Contingent Claims," *European Economic Review*, 40, pp. 871–81.
- _____, and _____, 2000, "A Comparative Study of Structural Models of Corporate Bond Yields: An Exploratory Investigation," *Journal of Banking and Finance*, 24, pp. 255–269.
- Bernanke, B., and M. Gertler, 1986, "Agency Costs, Collateral, and Business Fluctuations," NBER Working Paper No. 2015 (Cambridge, Massachusetts: National Bureau of Economic Research).
- _____, and _____, 1990, "Financial Fragility and Economic Performance," *Quarterly Journal of Economics*, 105, pp. 87–114.
- _____, and _____, 1995, "Inside the Black Box: The Credit Channel of Monetary Policy Transmission," *Journal of Economic Perspectives*, 9, pp. 27–48.
- _____, _____, and S. Gilchrist, 1996, "The Financial Accelerator and the Flight to Quality," *Review of Economics and Statistics*, 78, pp. 1–15.
- Carlstrom, C.T., and T.S. Fuerst, 1997, "Agency Costs, Net Worth And Business Fluctuations: A Computable General Equilibrium Analysis," *American Economic Review* 87, pp. 893–910.
- Cookson, R., 2001, "Corporate Finance," *Economist*, January 27.
- Dotsey, M., 1998, "The Predictive Content of the Interest rate Term Spread for Future Economic Growth," Federal Reserve Bank of Richmond, *Economic Quarterly*, 84, pp. 31–51.
- Dueker, M., 1997, "Strengthening the Case for the Yield Curve as a Predictor of U.S. Recessions," Federal Bank of St. Louis, *Review*, March/April, pp. 41–51.
- Estrella, A., and G. Hardouvelis, 1991, "The Term Structure as a Predictor of Real Economic Activity," *Journal of Finance*, 46, pp. 555–576.
- _____, and F. Mishkin, 1997, "Predicting U.S. Recessions: Financial Variables as Leading Indicators," *Review of Economics and Statistics*, 80, pp. 45–61.

- Greenspan, A., 2002, Testimony of Chairman Alan Greenspan *Federal Reserve Board's Semiannual Monetary Policy Report to The Congress*, Before the Committee on Financial Services, U.S. House of Representatives, February 27.
- Hoshi, T., A. Kashyap, and D. Scharfstein, 1991, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups," *Quarterly Journal of Economics*, 106, pp. 33–60.
- Ivaschenko, I., 2002, "How Much Leverage is Too Much, or Does Corporate Risk Determine the Severity of a Recession?" IMF Working Paper, forthcoming.
- Kashyap, A., O. Lamont, and J. Stein, 1994, "Credit Conditions and the Cyclical Behavior of Inventories," *Quarterly Journal of Economics*, 109, pp. 565–92.
- Kiyotaki, N., and J. Moore, 1997, "Credit Cycles," *Journal of Political Economy*, 105, pp. 211–48.
- Mella-Barral, P., and W. Perraudin, 1997, "Strategic Debt Service," *Journal of Finance* 52, pp. 531–56.
- Merton, R.C., 1974, "On The Pricing of Corporate Debt: The Risk Structure of Interest Rates," *Journal of Finance*, 29, pp. 449–70.
- Myers, S.C., and N. Majluf, 1984, "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial* 13, pp. 187–221.
- Moody's Investors Service, 2002, *Default & Recovery Rates of Corporate Bond Issuers. A Statistical Review of Moody's Rating Performance 1970–2001*, February.
- Sharpe, S., 1994, "Financial Market Imperfections, Firm Leverage, and the Cyclicity of Employment," *American Economic Review* 84, pp. 1060–74.
- Stock, J., and M. Watson, 1993, "A Procedure for Predicting Recessions With Leading Indicators: Econometric Issues And Recent Performance," in James Stock and Mark Watson (eds.), *Business Cycles, Indicators, and Forecasting* (Chicago: University of Chicago Press).
- _____, and _____, 2001, "Forecasting Output and Inflation: The Role of Asset Prices," NBER Working Paper No. 8180 (Cambridge, Massachusetts: National Bureau of Economic Research).

Table 1. United States: Average Annual Growth of Corporate Assets and Debt 1/
(In percent)

	Financial Assets	Tangible Assets	Total Assets	Market Debt 2/
1952-2001 average	9.3	3.8	6.1	7.2
1952-1994 average	5.5	2.9	3.6	4.6
1995-2000 average	10.7	4.7	7.3	7.8
2001 average	0.4	-1.5	-0.6	3.4

Source: Board of Governors of the Federal Reserve, Flow of Funds Accounts of the United States.

1/ In real terms. Nominal figures were deflated by the chain-type GDP deflator.

2/ Market debt is defined as a sum of corporate bonds, commercial paper, bank loans, nonbank loans, and commercial mortgages.

Table 2. United States: Estimation Results of Fitting the Model to Corporate Yields 1/

	Nominal Yields		Real Yields	
	Coefficient	Standard Error	Coefficient	Standard Error
CONST	14.352*	0.204	10.944*	0.188
THETA	2.004*	0.103	4.134*	0.188
BCOST	6.982*	0.414	10.699*	0.568
A	0.099*	0.000	0.178*	0.001
BBETA	27.599*	0.018	20.044*	0.037
	Adj. R-squared = 0.823		Adj. R-squared = 0.849	

* Coefficient significant at a 1 percent level.

1/ The model estimated is: $y_t = CONST + y_t(LEVER_t, r_t, A, SIGMA_t, BCOST, THETA, BBETA) + u_t$, where y_t is the yield on a long-maturity Corporate Bond Index; $y_t(\cdot)$ is a theoretical corporate bond yield, derived in Anderson, Sundaresan, and Tycon (1996); $LEVER_t$ is a measure of total leverage, r_t is the yield on a long-maturity Treasury Composite Bond Index, and $SIGMA_t$ is equity volatility. $CONST$, a recovery rate $THETA$, a volatility scaling factor A , a bankruptcy cost $BCOST$, and a dividend rate $BBETA$ are constant model parameters. u_t is a residual. The model is estimated by nonlinear least squares over the sample from 1969Q1 to 2001Q4.

Table 3. United States: Predicting the Probability of Recession, Probit Estimations

	k = 0		k = 1		k = 2		k = 3		k = 4		k = 5		k = 6	
	Coef- ficient	Standard Error	Coef- ficient	Standard Error	Coef- ficient	Standard Error	Coef- ficient	Standard Error	Coef- ficient	Standard Error	Coef- ficient	Standard Error	Coef- ficient	Standard Error
c_1	-1.216	0.911	-1.060	1.173	0.716	1.398	1.649 ***	1.017	3.034 *	1.066	1.616 ***	0.895	2.165 **	1.022
c_2	-1.539 *	0.341	-0.900 *	0.308	0.102	0.314	0.278	0.273	0.535 *	0.289	1.609 **	0.726	0.276	0.375
c_3	-0.001	0.021	-0.005	0.020	0.022	0.022	0.027	0.017	0.034	0.021	-0.041	0.028	-0.003	0.018
c_4	-0.002 *	0.001	-0.002 *	0.001	-0.002 **	0.001	-0.001	0.001	0.001	0.001	0.000	0.001	0.003 *	0.001
c_5	0.007	0.071	-0.242 ***	0.109	-0.441 *	0.108	-0.501 *	0.125	-0.613 *	0.131	0.309 **	0.121	-0.671 *	0.137
c_6	-6.799	2.976	-17.201 *	4.545	-11.513 *	4.159	-5.796	4.093	-2.998	3.628	-2.458	2.647	3.981	3.703
c_0	63.697 *	13.537	39.099 *	12.392	-4.061	13.271	-13.74	11.118	-27.16 **	12.026	-0.443	1.151	-17.646	16.134
<i>Pseudo R2</i>	0.476		0.602		0.567		0.478		0.466		0.208		0.282	

* Coefficient significant at a 1 percent level; ** at a 5 percent level; *** at a 10 percent level.

The model estimated is: $Prob(R_{t+k} = 1) = N(c_0 + c_1 CVI_t + c_2 AVGHSR_t + c_3 VENDOR_t + c_4 HOUSING_t + c_5 TRY_STR_t + c_6 SPRET_t)$ where R_{t+k} is the NBER recession index; the CVI_t is the Corporate Vulnerability Index; $AVGHSR_t$ is average weekly hours worked; $VENDOR_t$ is the vendor performance index; $HOUSING_t$ is housing starts; TRY_STR_t is the Treasury yield curve; and $SPRET_t$ is stock returns. $N(.)$ is a cumulative normal distribution function. k is a forecasting horizon, in quarters.

Table 4. United States: The Severity of Recession Indices

Recessions	Real GDP Decline, Cumulative (percent)	Length, Quarter	Real GDP Decline Per Quarter (percent)	Rating: Individual *	Rating/ Grouped, Decline per Quarter	Rating Grouped		Rating: Recession Length
						No. 1**	No. 2***	
Q3 1953 - Q2 1954	2.6	4	0.6	5	3	3	2	3
Q4 1957 - Q2 1958	4.2	3	1.4	7	4	4	3	2
Q3 1960 - Q2 1961	0.7	3	0.2	2	2	2	1	2
Q1 1970 - Q4 1970	0.1	4	0.0	1	1	1	1	3
Q1 1974 - Q1 1975	2.7	5	0.5	4	3	3	2	4
Q2 1980 - Q3 1980	4.3	2	2.2	8	5	5	3	1
Q4 1981 - Q4 1982	2.2	5	0.4	3	3	2	2	4
Q4 1990 - Q1 1991	2.6	2	1.3	6	4	4	2	1
Q2 2001 - Q4 2001 (?)	0.3	3	0.1	1	1	1	1	2

* Rated according to a decline per quarter.

** Grouped according to a total cumulative real decline during a recession:

Rating	1	2	3	4	5
Cumulative decline, percent	0-0.1	0.1-0.5	0.5-1.0	1.0-1.5	>1.5

*** Grouped according to a cumulative real decline: 1- light; 2 - average; 3 - severe.

Table 5. United States: Predicting the Severity of Recessions, Ordered Probit Estimations 1/

	k = 3		k = 4		k = 6	
	Coef- ficient	Standard Error	Coef- ficient	Standard Error	Coef- ficient	Standard Error
SRI, Rating: Individual						
C ₁	1.248 **	0.665	1.939 *	0.731	1.598 *	0.696
C ₂	0.122	0.223	0.160	0.255	0.170	0.293
C ₃	0.015	0.014	0.022	0.017	0.000	0.016
C ₄	-0.000	0.001	0.001 **	0.001	0.003 *	0.001
C ₅	-0.447 *	0.098	-0.489 *	0.098	-0.571 *	0.091
C ₆	-4.630	3.324	-2.359	2.715	3.595	3.523
Pseudo R2	0.282		0.271		0.236	
SRI, Rating: Group No. 1						
C ₁	1.323 **	0.655	1.970 *	0.728	1.798 *	0.673
C ₂	0.084	0.223	0.142	0.258	0.182	0.290
C ₃	0.016	0.014	0.022	0.017	0.000	0.016
C ₄	0.000	0.001	0.001 *	0.001	0.003 *	0.001
C ₅	-0.440 *	0.097	-0.482 *	0.098	-0.566 *	0.089
C ₆	-4.485	3.278	-2.459	2.709	3.230	3.531
Pseudo R2	0.286		0.271		0.237	
SRI, Rating: Group No. 2						
C ₁	1.904 *	0.774	2.576 *	0.833	2.223 *	0.733
C ₂	0.080	0.245	0.150	0.286	0.157	0.313
C ₃	0.016	0.014	0.026	0.015	-0.002	0.017
C ₄	0.000	0.001	0.001 **	0.001	0.003 *	0.001
C ₅	-0.487 *	0.105	-0.536 *	0.113	-0.605 *	0.108
C ₆	-4.686	3.401	-1.813	2.720	2.778	3.670
Pseudo R2	0.365		0.374		0.295	
SRI, Rating: Recession Length						
C ₁	3.040 *	0.932	4.516 *	0.978	2.720	1.017
C ₂	0.245	0.295	0.691 *	0.295	0.151	0.375
C ₃	0.054 *	0.017	0.056 *	0.020	-0.001	0.019
C ₄	0.000	0.001	0.001	0.001	0.003	0.001
C ₅	-0.492 *	0.125	-0.652 *	0.152	-0.694	0.145
C ₆	-5.795	4.181	-2.702	3.520	3.612	3.767
Pseudo R2	0.416		0.403		0.308	

* Coefficient significant at a 1 percent level; ** at a 5 percent level; *** at a 10 percent level

1/ The model estimated is: $Prob(R_{t+k} = M) = N(c_0 + c_1 CVI_t + c_2 AVGHRSt + c_3 VENDOR_t + c_4 HOUSING_t + c_5 TRY_STR_t + c_6 SPRET_t)$, where R_{t+k} is the NBER recession index, M is one of the Severity of Recession Index (SRI) modifications from Table 4; the CVI_t is the Corporate Vulnerability Index, $AVGHRSt$ is average weekly hours worked, $VENDOR_t$ is the vendor performance index, $HOUSING_t$ is housing starts, TRY_STR_t is the Treasury yield curve, and $SPRET_t$ is stock returns. $N(.)$ is a cumulative normal distribution function. k is a forecasting horizon, in quarters.

Figure 1. United States: Market Debt of U.S. Nonfarm Nonfinancial Corporate Sector

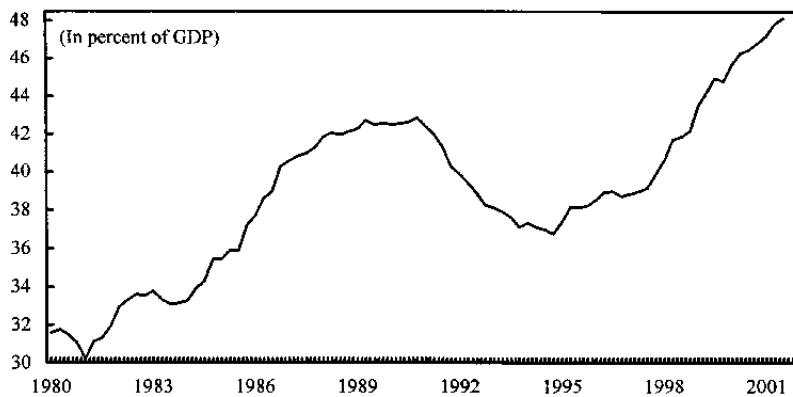


Figure 2. United States: Capital Expenditures and P/E Ratios of S&P 500 Composite Stock Index

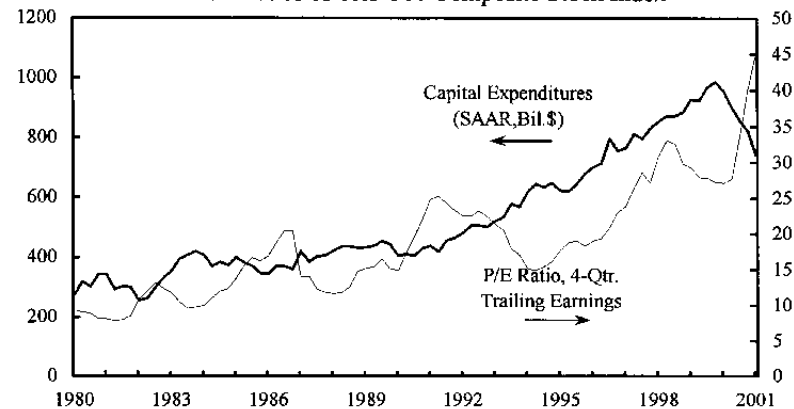


Figure 3. United States: Nonfarm Nonfinancial Corporate Sector: Funds Raised

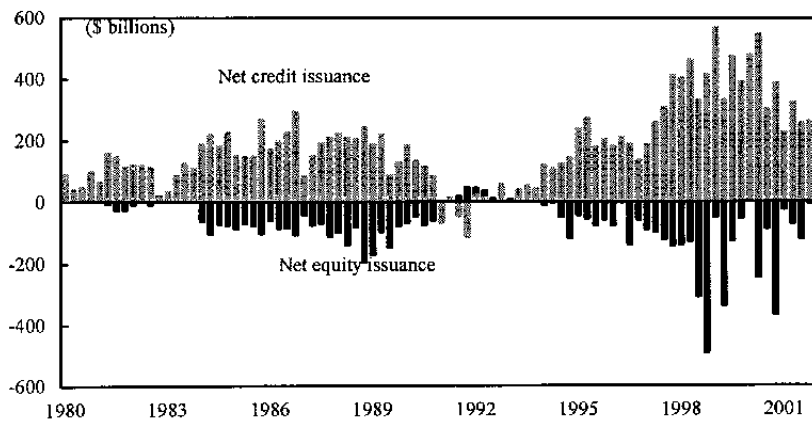
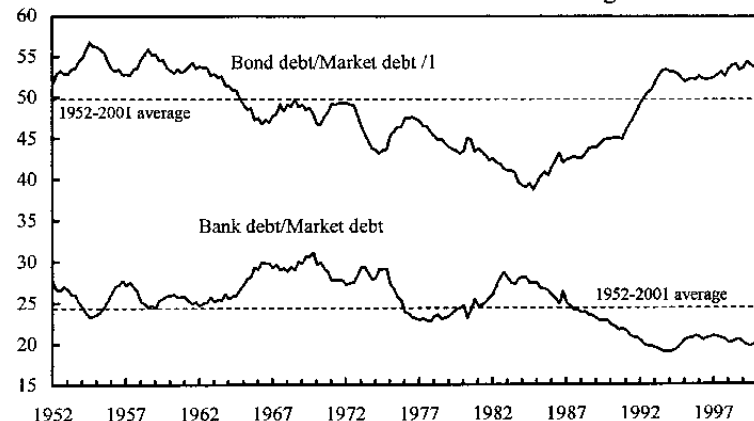


Figure 4. United States: Nonfarm Nonfinancial Corporate Sector: Bank Versus Bond Financing



Sources: Haver Analytics; and Board of Governors of the Federal Reserve, Flow of Funds Accounts of the United States.

1/ Market debt is defined as the sum of corporate bonds, commercial paper, bank loans, nonbank loans, and commercial mortgages.

Figure 5. United States: Corporate Sector:
Leverage Ratios 1/

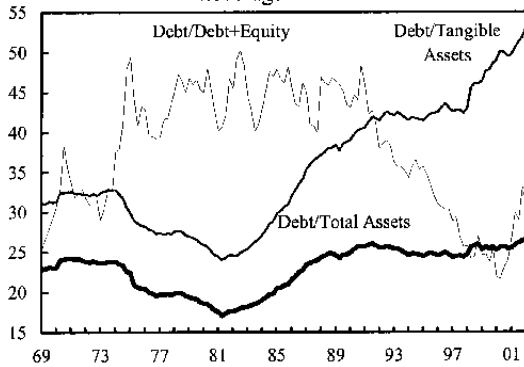


Figure 6. United States: Corporate Sector:
Gross and Net Debt-Service Burden

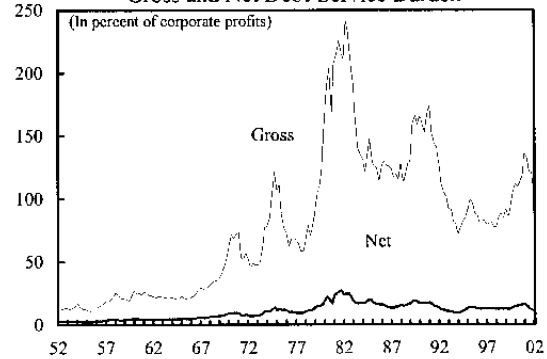


Figure 7. United States: Corporate Sector:
Total Leverage 2/

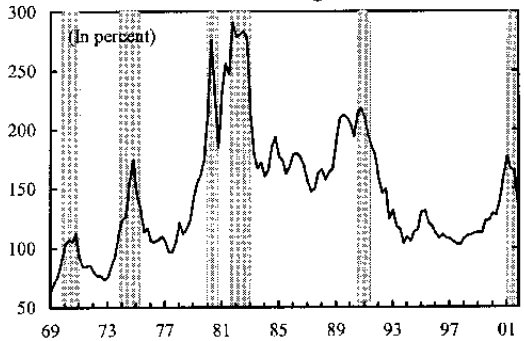


Figure 8. United States: Corporate Sector:
Maturity Composition of Market Debt

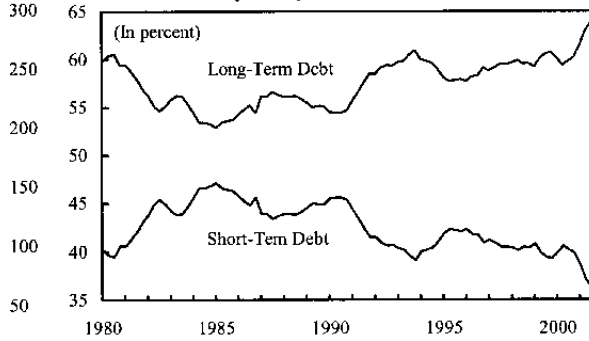


Figure 9. United States: Corporate Sector:
Total Leverage and Corporate Bond Spreads

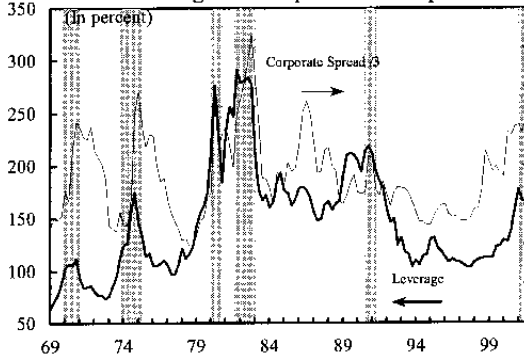
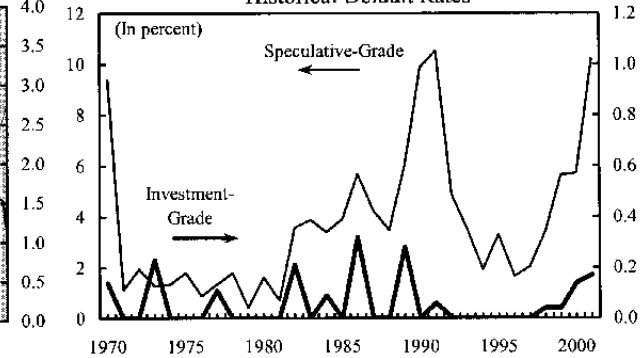


Figure 10. United States: Corporate Sector:
Historical Default Rates



Sources: Board of Governors of the Federal Reserve, Flow of Funds Accounts of the United States; Moody's; and staff estimates.

1/ Debt is measured at book value, and equities are measured at market value.

2/ Total Leverage is defined as a sum of balance sheet leverage and a stock measure of gross debt burden, converted from flows using a present value technique. Shaded areas indicate recession periods.

3/ The spread between yields on the Baa-rated Corporate Bond Index and the Composite Treasury Bond Index. Shaded areas indicate recession periods.

Figure 11. United States: Nominal Corporate Bond Yields: Actual and Fitted

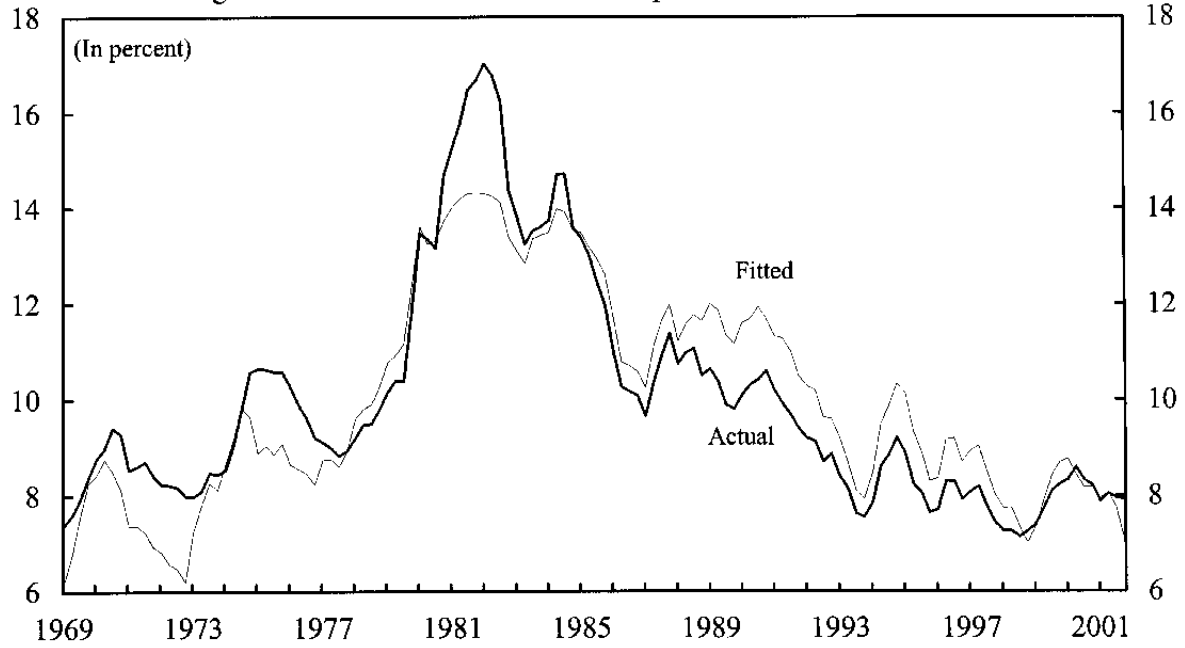
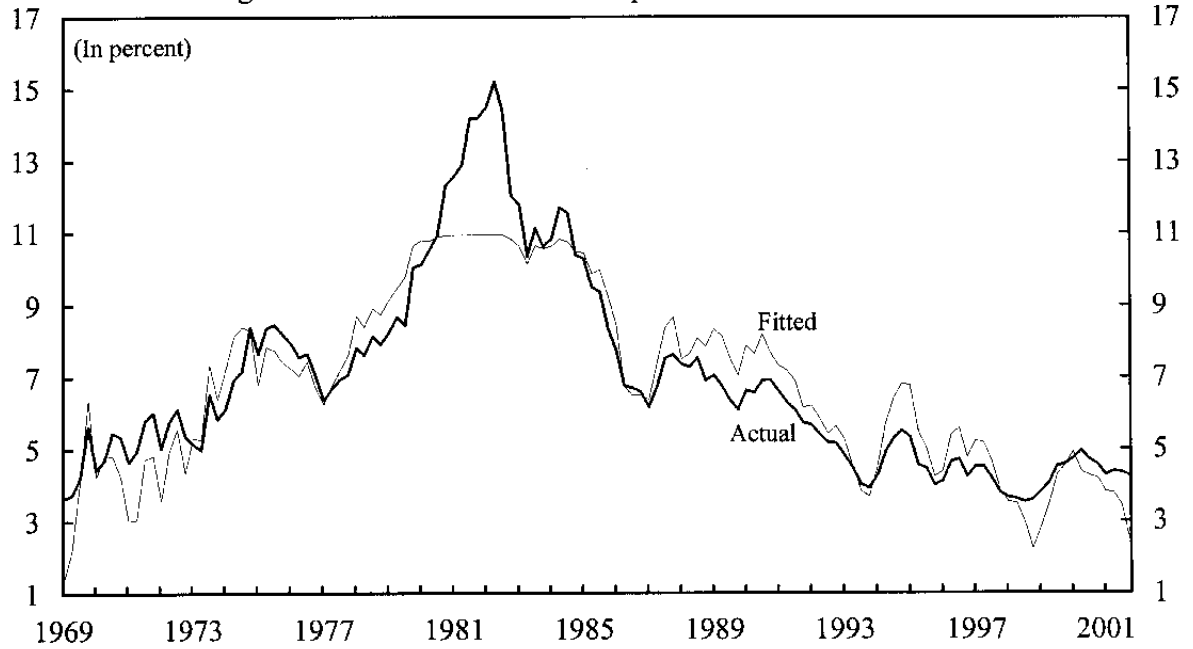


Figure 12. United States: Real Corporate Bond Yields: Actual and Fitted



Source: Moody's Investors Service, and staff estimates.

Figure 13. United States: Corporate Vulnerability Index /1

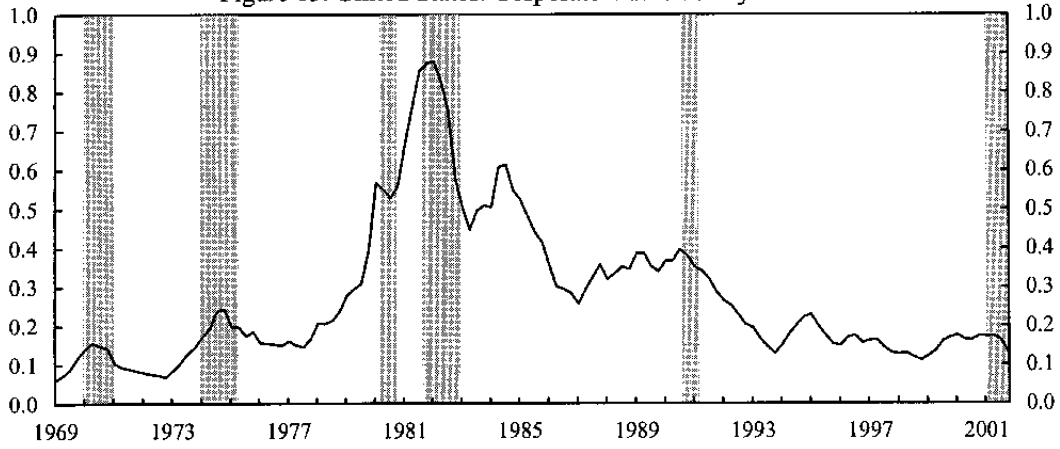


Figure 14. United States: Probability of Recession, Predicted with the Corporate Vulnerability Index /1

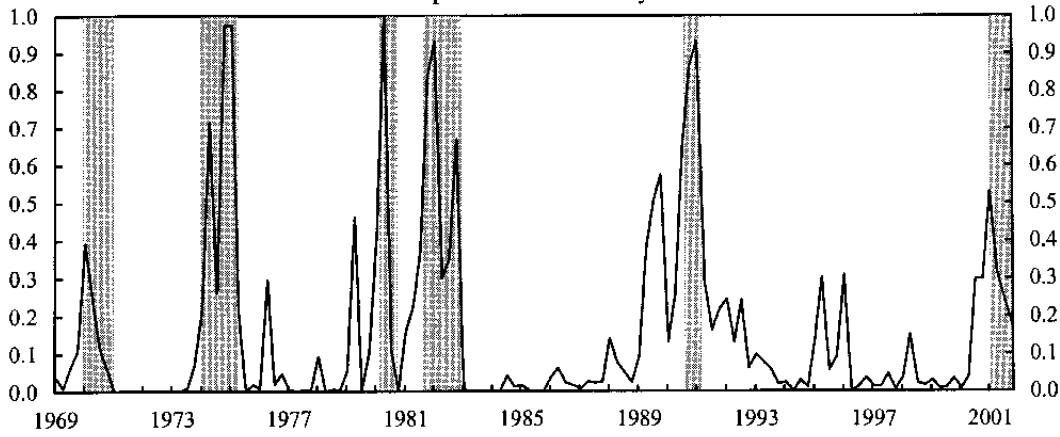
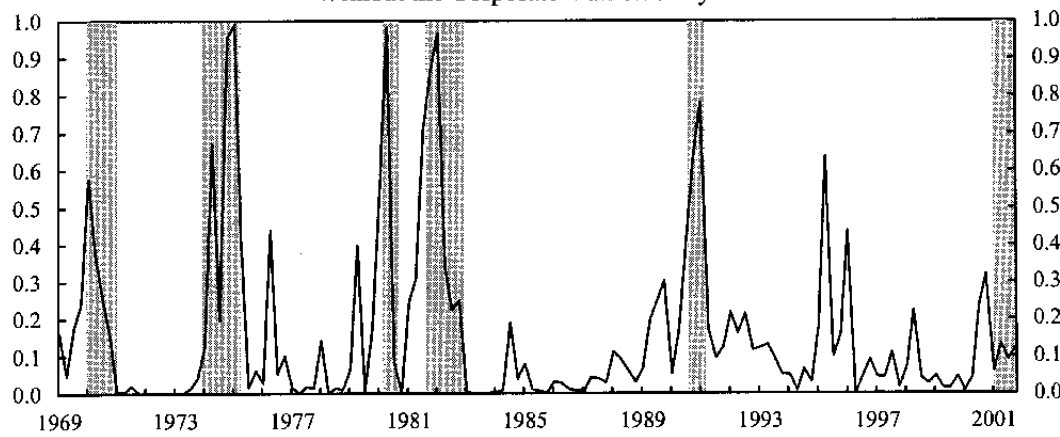


Figure 15. United States: Probability of Recession, Predicted Without the Corporate Vulnerability Index /1



Source: Staff estimates.

1/ Shaded areas indicate recession episodes.

IV. U.S. PRODUCTIVITY GROWTH, INVESTOR SENTIMENT, AND THE CURRENT ACCOUNT DEFICIT—MULTILATERAL IMPLICATIONS¹

1. The U.S. current account deficit reached 4 percent of GDP in 2001 taking the net international investment position of the United States to 19 percent of GDP. Based on a constant real exchange rate assumption, current account deficits are projected to remain around 4½ percent over the medium term, implying that foreign indebtedness would rise to around 36 percent of GDP by 2007. These developments and prospects have raised questions about the sustainability of the U.S. external position, when and how an adjustment in the current account deficit might take place, and the implications for exchange rates and the U.S. and global economies.²

2. This chapter uses the Fund's multi-country simulation model (MULTIMOD) to analyze the recent widening of the current account deficit and possible adjustment scenarios.³ A base-case simulation illustrates that the strength of the U.S. dollar in recent years, the widening current account deficit, and robust GDP growth can be explained by an increase in total factor productivity growth in the United States, coupled with a similarly temporary, but persistent, reduction of the risk premium demanded on U.S. assets.⁴ Alternative scenarios that illustrate how current account adjustment may take place are then explored: a pickup in productivity growth in other industrial countries; a realization that expectations of future U.S. productivity growth were overly optimistic; and an increase in household savings induced by a realization of the looming liabilities associated with the Social Security and Medicare systems.⁵

A. The Base Case

3. The base case simulates the effects of a series of positive U.S. supply shocks. In the first year of the simulation, annual productivity growth accelerates in the United States by 25 basis points above baseline and the risk premium on U.S. financial assets declines by

¹ Prepared by Benjamin Hunt.

² For a discussion of these issues, see Mann (2002).

³ A modified Mark IIIB version of MULTIMOD is used, in which the uncovered interest parity condition that determines exchange rate behavior is amended so that agents' expectations of the one-period-ahead exchange rate is modeled as a weighted combination of the previous period's exchange rate (weight of 0.45) and the model-consistent one-period-ahead exchange rate (weight of 0.55). Further, an additional term is added to the parity condition to capture some of the impact of changes in the marginal product of capital. For a detailed presentation of the structure of MULTIMOD Mark III see Laxton and others (1998).

⁴ The recent performance of the U.S. economy is almost certainly the result of a far more complex set of factors than those considered here. Even if relative productivity growth and the risk premium have played an important part, there are undoubtedly many other factors that have contributed and these simulations should be evaluated in this light.

⁵ Other MULTIMOD simulations of current account adjustment are discussed in Arora, Dunaway, and Faruquee (2001); and IMF (2001).

25 basis points, with both effects expected by private sector agents to last for ten years. At the start of the second year, however, U.S. productivity performance improves further, with productivity growth now expected to accelerate by a further 25 basis points and the risk premium to decline by a further 25 basis points for the next nine years, before falling back to baseline. Similar increases in productivity growth, and decreases in the risk premium, continue until the fourth year of the simulation, at which time annual productivity growth has accelerated to 1 percent above baseline and the risk premium has declined by 100 basis points. Beyond this point, there are no further changes to productivity growth or the risk premium, and expectations formed in the fourth year are fully realized.

4. Key macroeconomic variables generated from this simulation mimic many of the economic developments recently observed in the United States (Figure 1). Real GDP growth accelerates—even faster than the underlying growth in productivity—as households boost consumption to smooth their lifetime consumption paths and firms accumulate capital to maximize returns arising from improved productivity growth. The share of consumption in GDP increases by roughly 3 percentage points, and the share of investment in GDP increases by 1 percentage point. However, the external position worsens, with the current account deficit deteriorating by almost 2 percentage points of GDP, as imports rise owing to strong domestic demand, and exports fall owing to the effects of a 17 percent appreciation in the real effective exchange rate. The appreciation of the U.S. dollar is accompanied by increased capital inflows, which respond to higher productivity growth and higher U.S. interest rates. The dollar's strength helps reduce import prices in dollar terms, which partially offsets demand pressures and keeps core inflation subdued.

5. This simulation illustrates that the unwinding of the substantial current account deficit that arises from a temporary, but persistent, improvement in productivity growth and a shift in investor sentiment could be quite smooth and gradual. The real effective exchange rate begins to depreciate after the completion of the upward adjustment to productivity growth, and gradually falls over the subsequent ten years. This depreciation leads to increases in the prices of investment and consumption goods, which in turn eases domestic demand pressures and slows import demand. The depreciation also stimulates export demand, generating a turnaround in net exports' share of GDP, which after the eighth year allows the current account deficit to gradually improve and eventually move back close to its baseline long-run position.

6. However, alternative scenarios in which expectations are not fully realized, and in which more rapid adjustment occurs, are also possible. Three such alternative scenarios are considered below.

B. Productivity Catch-Up Abroad

7. In this scenario, the technological innovation underlying the improved productivity growth in the United States is assumed to be diffused across all industrial countries starting in the sixth year of the simulation. As a result, the reduction in the risk premium on U.S. assets is assumed to gradually dissipate as productivity growth accelerates in other industrial countries.⁶ In this case the U.S. currency depreciates more rapidly than in the base case, reflecting the shift in investor sentiment and the relative increase in real returns in other industrial countries (Figure 2).

8. Output growth in the United States initially falls below the base-case rate as domestic demand softens—this reflects a tightening of monetary policy, which responds to the impact of the depreciation on domestic price inflation, the effect of higher consumption prices on household wealth, and the effect of higher investment prices on the cost of capital. Softer U.S. domestic demand and stronger export demand in other industrial countries leads to the rapid improvement in the U.S. current account deficit.

9. Although the U.S. dollar depreciates more quickly than in the base case, the magnitude of the depreciation is milder and the duration is shorter. With demand for U.S. exports rising in response to the increase in growth in other industrial countries, the required long-run depreciation of the currency in the base case changes sign to a mild long-run appreciation. The relative price effect of the long-run appreciation also leads U.S. households to reduce their long-run net foreign asset position relative to the base case and this implies that a smaller depreciation in the exchange rate is required to equilibrate asset stocks. Although growth in the United States is somewhat weaker relative to the base case, this is more than offset by faster growth in other industrial countries and world growth exceeds that in the base case.

C. Lower-Than-Expected Future U.S. Productivity Growth

10. In this scenario, it is assumed that expectations of productivity growth in the United States are not fully realized and productivity growth returns to baseline in the sixth year as does the risk premium on U.S. assets. Although this scenario assumes that the increases in the level of productivity in the U.S. accruing up to the end of the fifth year are permanent, the long-run increase in productivity relative to other industrial countries is smaller than expected in the base case (Figure 2).

⁶ In the sixth year productivity growth increases by 25 basis points in other industrial countries. The acceleration increases by 25 basis points in each of the subsequent three years until productivity growth has accelerated to 1 percent above baseline. With each 25 basis point increase in productivity growth outside the United States, the initial decline in the risk premium demanded on U.S. assets is reversed by 25 basis points. Once productivity growth is equal in the United States and other industrial countries, the risk premiums demanded on assets are identical for all industrial countries. In the long run, the increase in the level of productivity is identical for all industrial countries.

11. The initial response of both the exchange rate and the current account is very similar to the previous scenario. The immediate shift in investor sentiment and the relative decline in returns in the United States generate a sharper depreciation of the exchange rate than contained in the base case and the current account recovers much more quickly. However, unlike the previous scenario, the current account adjustment comes more through a decline of import demand in the United States than through an increase in demand from the rest of the world. In the United States, both households and firms respond to both the sharp increase in consumption and investment prices arising from the depreciation and to substantially lower expectations about future growth and wealth. Relative to the base-case scenario, the weaker U.S. currency stimulates exports which contribute to the faster current account recovery.

12. The sharper appreciations of the currencies of the other industrial countries reduce inflationary pressures allowing monetary policy to be more supportive of domestic demand and real activity increases. However, the net impact on world growth is negative as the sharply slower growth in the United States adversely affects GDP growth in developing countries, which more than offset the mild acceleration in growth coming from other industrial countries.

D. Fiscal Shock

13. A final scenario considers the effect of an adverse fiscal shock that is related to the funding problems of Social Security and Medicare (Figure 3). These programs are well known to be running large actuarial deficits, which will eventually require cuts in benefits or increases in taxes. The base case implicitly assumed that the government puts in place reforms to these systems that addresses their large unfunded liability and allows taxes net of transfers to remain constant. In this alternative scenario, however, it is assumed that these reforms are delayed, requiring an increase in labor income taxes in the future. In particular, it is assumed that in the sixth year of the simulations, households suddenly recognize that labor income taxes will need to be higher over a lengthy interval in the future (starting in the fifteenth year and lasting for 30 years).

14. Once households recognize the implications for future taxes, their saving rate increases sharply, consumption declines relative to the base case, and real activity initially declines. The weakening of consumption demand leads to an easing in monetary policy and a sharper depreciation in the exchange rate. The lower exchange rate increases export demand and weaker domestic demand suppresses imports and the current account deficit shifts to a surplus after eight years. For the remaining industrial countries, the sharper appreciation of exchange rates allows for short-term interest rates below those in the base case. The acceleration in domestic demand resulting from the easing in monetary policy more than offsets the decline in net exports and real activity increases.

List of References

- Arora, V., S. Dunaway, and H. Faruqee, 2001, "Sustainability of the U.S. Current Account Deficit," *IMF Country Report* 01/149, August.
- IMF, 2001, *World Economic Outlook* (Washington, D.C.: IMF).
- Laxton, D., Isard, P., Faruqee, H., Prasad, E. and Turtelboom, B. 1998, "MULTIMOD Mark III: The Core Dynamic and Steady-State Models," IMF Occasional Paper No. 164.
- Mann, C., 2002, "Perspectives on the U.S. Current Account Deficit and Sustainability," *Journal of Economic Perspectives*, forthcoming.

Figure 1. Increase in U.S. Productivity and Reduction in Risk Premium
(deviations from baseline)

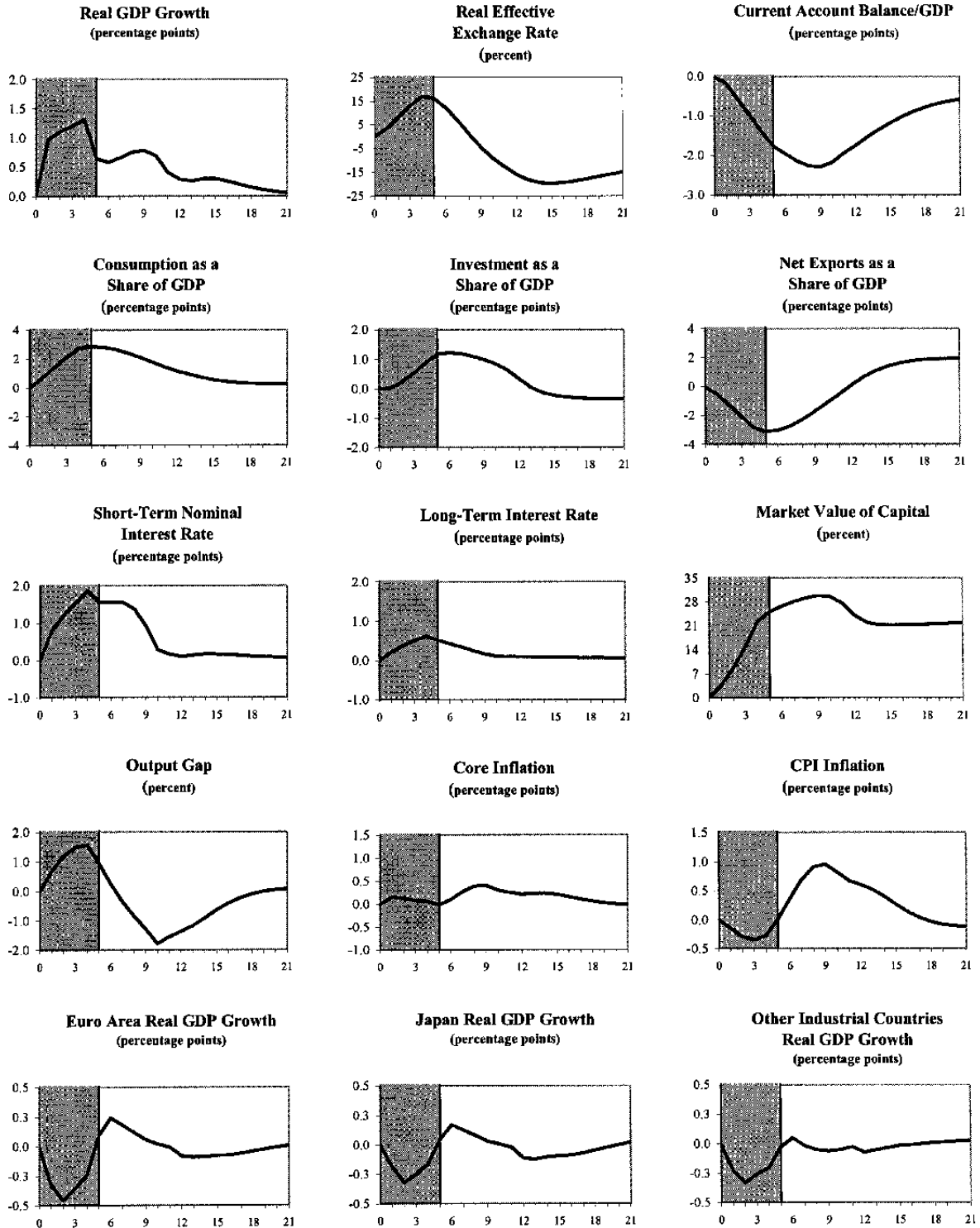


Figure 2: United States: Alternative Productivity Scenarios
(deviations from baseline)

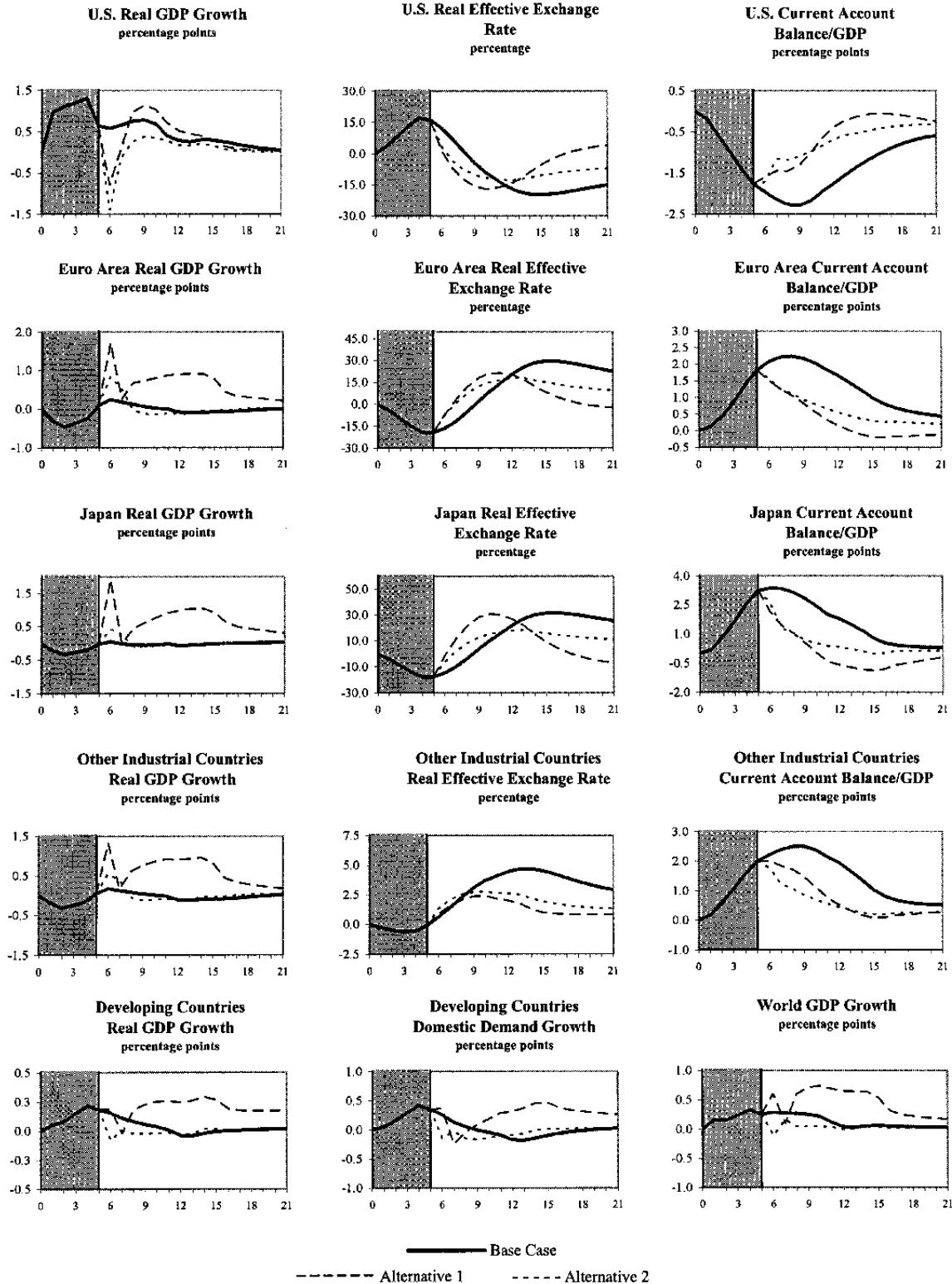
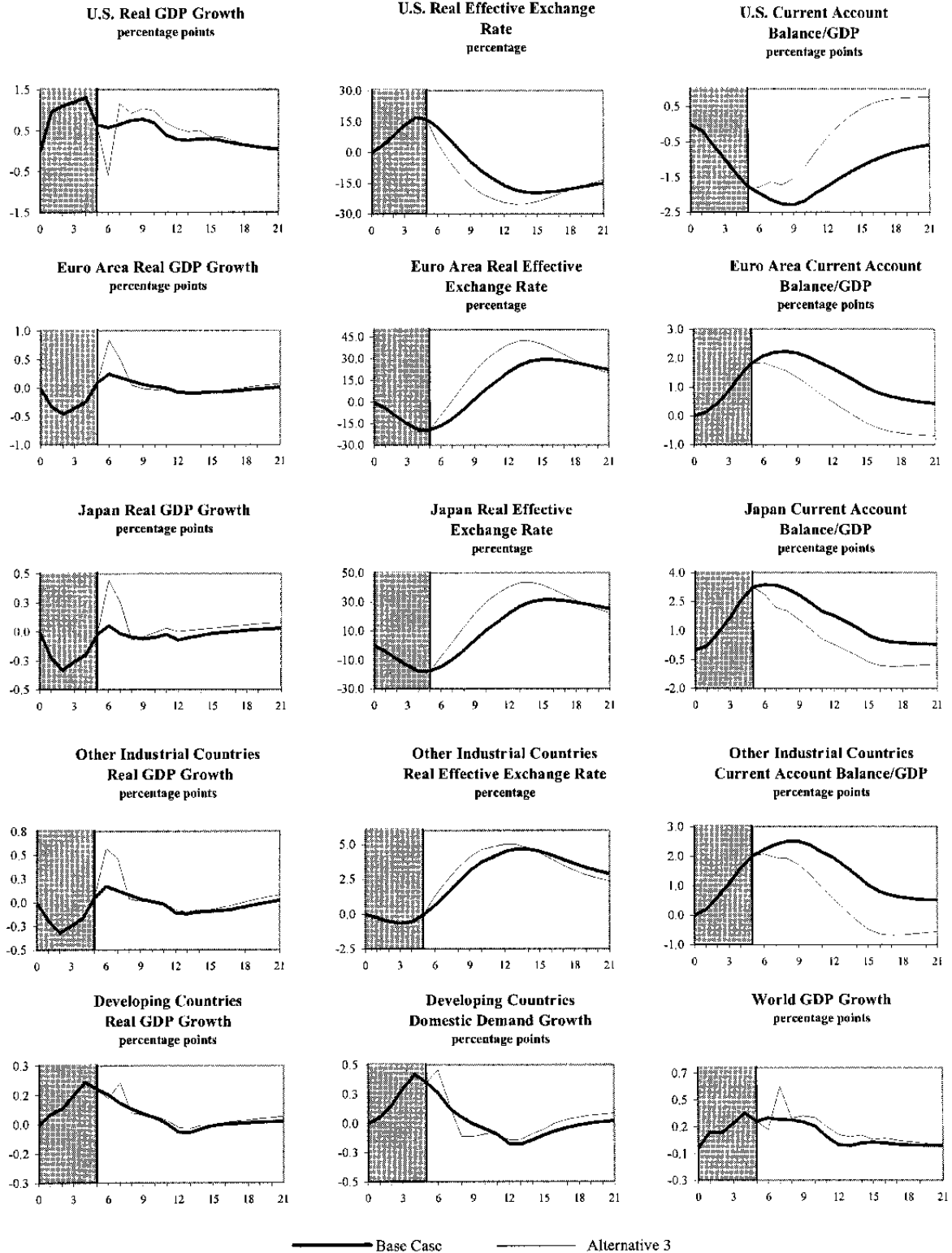


Figure 3: Social Security Scenario
(deviations from baseline)



V. RECENT U.S. TRADE AND AGRICULTURAL POLICIES AND THEIR INTERNATIONAL IMPLICATIONS¹

1. During the past year, U.S. trade policy has moved in apparently conflicting directions (Box 1). The United States has promoted trade liberalization in the context of the 2001 Doha Ministerial Round, as well as in work toward regional and bilateral free-trade agreements. At the same time, however, recent U.S. tariffs on steel imports and hikes in agricultural subsidies have triggered threats of retaliation from trading partners and have raised questions regarding the momentum for progress under the Doha Round. Legislation to grant Trade Promotion Authority (TPA) also remains under debate in Congress and risks being encumbered by amendments that would restrict the authority to liberalize trade in textiles and the rules governing anti-dumping and countervailing duties (AD/CVD).²

2. This chapter focuses on the narrow issue of the impact of U.S. steel tariffs and agricultural subsidies to illustrate the costs that these recent U.S. trade actions impose, both domestically and abroad. The estimates described below suggest that recent U.S. initiatives in these areas will have an adverse effect on U.S. welfare and impose a substantial burden on the rest of the world, especially among developing country exporters. This illustrates the potential additional costs that could arise if recent U.S. steel and agricultural policies worsen trade relations and hinder progress toward multilateral liberalization agenda.

A. Global Impact of the U.S. Steel Safeguard Tariffs

3. In October 2001, the U.S. International Trade Commission (ITC) ruled that steel imports during January 1996–June 2001 had injured the domestic industry, and in March 2002 the Administration imposed safeguard tariffs. Duties ranging from 8–30 percent were applied in the first year, and the rates are scheduled to fall to 7–24 percent and 6–18 percent, respectively, in the subsequent two years. A broad range of products were exempted, as were all imports from Canada, Mexico, and many developing nations. As a result, tariffs applied to around half of the imports covered by the original investigation.³

¹ Prepared by Chris MacDonagh-Dumler (WHD), Yongzheng Yang (PDR), and Geoffrey Bannister (PDR).

² TPA, or “fast-track,” allows the U.S. President to negotiate trade deals that Congress may either reject or accept, but cannot change. Without TPA, partner countries may be hesitant to negotiate trade agreements with the United States, since the U.S. Congress could seek to alter the negotiated agreement.

³ The analysis in this section accounts for only the original exemptions when the duties were announced in March 2002. The Administration has invited firms to submit requests for exclusion, and it has received over 1,200 applications, of which 224 had been approved by end-June 2002.

Box 1. Recent U.S. Trade Policy Developments¹

Trade Promotion Authority (TPA): TPA would allow the Administration to bring negotiated trade agreements for ratification by Congress without the possibility for amendments. So far, the House and Senate have passed different versions of the bill, which must be reconciled in conference committee and voted on again by the House and Senate. The House version identified over 200 products (mainly agricultural goods and textiles) where Congress sought additional consultation and information from the Administration in order to help set the U.S. negotiating position. The Senate version would exempt agreements that altered U.S. trade remedies from TPA.

Trade Adjustment Assistance (TAA): TAA provides assistance to workers who lose their jobs from trade. It is expected to be expanded and reformed as part of the TPA legislation.

Doha Round: The United States has played a key role in advancing the Doha Round, broadly endorsing the Doha Declaration, proposing the liberalization of 11 services sectors, and advancing a proposal for the liberalization of the movement of labor. On Trade Related Intellectual Property Rights (TRIPS), the United States has called for developing economies to address their concerns about drug patenting by using existing exemptions in treaties and a limited waiver program, rather than more fundamental changes in the agreement.² The United States has also emphasized that it would seek to preserve the effectiveness of existing mechanisms in anti-dumping and countervailing duty laws.

Regional and bilateral trade arrangements: Efforts are under way toward free trade agreements with Chile and Singapore and toward completing the Free Trade Agreement of the Americas (FTAA). At the April 2001 summit in Quebec, participating nations agreed on the goal of completing FTAA negotiations by 2005.

WTO dispute settlement: U.S. trade policy has been challenged on a number of fronts, including the consistency of U.S. AD/CVD laws and safeguard measures with WTO rules. Among the issues at various stages of the WTO dispute resolution process are: (i) the Antidumping Act of 1916 that allows private lawsuits in U.S. courts to stop alleged cases of dumping; (ii) the methodologies used to calculate dumping margins; (iii) the injury standards in safeguards cases (iv) the Byrd Amendment—the Continued Dumping and Subsidy Offset Act—which specifies that anti-dumping duties collected from violators are to be redistributed to the firms that originally petitioned for anti-dumping relief. Disputes over U.S. duties in lumber and steel are also now under consideration by WTO panels.³

Unresolved trade disputes: Other contentious issues include disputes with: (i) the EU over the Foreign Sales Corporation (FSC) tax subsidy and beef hormones; (ii) Canada on CVDs on softwood lumber; and (iii) Mexico on AD duties on high-fructose corn syrup (HFCS) and U.S. barriers to Mexican trucks.

(i) A WTO panel has ruled that the FSC is a WTO-inconsistent export subsidy. Delays in U.S. implementation have allowed the EU to impose \$900 million in duties, which the EU threatened to apply if EU concerns about the steel safeguards were not resolved. New legislation to change the FSC is currently under consideration in the U.S. Congress. U.S. retaliation is possible on EU goods because of WTO-inconsistent barriers to hormone-treated beef.

(ii) In March 2002, U.S. CVDs were imposed on Canadian softwood lumber after nearly a decade of trade disputes over Canadian timber practices, which the U.S. Commerce Department found to act as an export subsidy.

(continued)

(iii) Trade disputes also tarnish relations with the United States' other NAFTA partner. Despite losing a WTO case, Mexico has continued to impose AD duties on U.S. exports of HFCS. The United States has continued to impose limits on Mexican trucking services (through new regulations announced in June 2002) despite a NAFTA commitment to open U.S. borders.

Preferential access: Enhanced access to the U.S. market is provided to developing countries under the Generalized System of Preferences (GSP), the Andean Trade Preferences Act (ATPA), the Caribbean Basin Trade Partnership Act (CTPA), and the African Growth and Opportunity Act (AGOA). The CTPA and the AGOA offer enhanced duty-free access to the U.S. market for countries in these regions for a number of products, particularly textiles and apparel. The ATPA and GSP both expired near the end of 2001 (after 10 and 26 years in operation, respectively), but they are expected to be reauthorized in the context of the legislation governing Trade Promotion Authority.

Labor and environmental issues: The current Administration has generally not sought to require specific changes to partner country labor laws in trade agreements.⁴ However, it has adopted other methods of promoting labor and environmental policy objectives. For example, the Administration has recently granted trade preferences under the GSP and bilateral agreements to provide an incentive for the reform of labor laws in Guatemala and Cambodia. In addition, the Administration is conducting environmental reviews of regional free trade agreements with Chile, Singapore, and the FTAA.

¹ For additional detail on the U.S. agenda, see USTR (2002).

² See, for example, para. 4 of the Doha Round declaration in WTO (2001a). The United States has also indicated that it would be willing to support a limited waiver program that would allow compulsory licensing of drugs, to permit countries to produce their own versions of drugs. However, it is much more limited (with stricter export controls) than proposals from developing countries.

³ WTO (2002c) details the status of the following cases: (i) WT/DS136 and WT/DS162 (1916 law); (ii) WT/DS247 (dumping margins in Canadian softwood lumber); (iii) WT/DS177 and WT/DS178 (injury test used in the lamb safeguards); and (iv) WT/DS217 (rebate of AD duties in a steel case). The steel case is challenged in WT/DS248, DS249, DS251-254, DS258-259.

⁴ See Ambassador Zoellick's testimony to the House Ways and Means Committee on October 9, 2001.

4. U.S. trading partners are challenging the WTO consistency of the steel safeguard action. According to WTO rules, a member may impose temporary trade barriers when an import surge causes, or threatens to cause, serious injury to a domestic industry. However, the barriers must: (i) apply to imports from WTO members in a proportionate manner, (ii) be liberalized after the first year, and (iii) be eliminated by the end of three years unless compensation is offered. A developing country is also exempt from a safeguard action if it accounts for less than 3 percent of imports of that product and if all developing countries with less than 3 percent import shares (collectively) account for less than 9 percent of total imports of that product. It will take some time before the dispute settlement panel reaches its final decision; however, previous U.S. safeguard cases have run into problems at the WTO.⁴

⁴ Specifically, the United States lost a case to Australia and New Zealand on the "injury test" used by the ITC under U.S. law. (See WTO (2002c), WTO cases: WT/DS177 and WT/DS178.) However, WTO decisions are not based on U.S.-style "common" law—where precedent helps shape the implementation and judicial interpretation of the law—so the impact of such decisions on future WTO cases may be limited.

5. The U.S. safeguard tariffs on steel appear likely to cause important welfare losses, both domestically and abroad (Table 1). For example, illustrative estimates based on a general equilibrium model of the international economy suggest that U.S. steel imports would fall by nearly 12½ percent, leading to welfare losses to the United States of around \$1.2 billion (in 1997 dollars, equal to around \$1.3 billion in 2001), and roughly equal net losses overseas.⁵ Losses abroad would be concentrated in the countries of the EU, the former Soviet Union (FSU), and Japan. Some countries—e.g., Canada, Mexico, Brazil, and South Africa—would benefit from the effects of trade diversion and increased exports to the United States. While employment in the U.S. steel sector would increase by 2¾ percent, the net welfare cost would be up to \$250,000 per job.⁶

6. These estimates are similar to those reported elsewhere. Hufbauer and Goodrich (2002) calculate that welfare losses arising from the ITC's initial recommendations, which covered a broader range of items and tariff rates—would range from \$300 million to \$1.1 billion for the United States (\$150,000 to \$250,000 per job gained).⁷ Francois and Baughman (2001) report similar losses and suggest that employment gains in the steel sector (4,000 to 9,000 persons) would be more than offset by losses of 36,000 to 75,000 jobs in other sectors. However, these estimates—and those reported above—may overstate the effect of the actual measures imposed, which contained significant exclusions.

7. The response of U.S. trading partners to the steel tariffs could substantially increase these costs. In March 2002, the EU announced import surcharges as a temporary safeguard (in the form of a tariff rate quota on steel imports in excess of 5.7 million tons of steel) on about 40 percent of its steel imports. Most of the tariffs are concentrated on products exported by the FSU.⁸ In addition, the EU announced its intention to impose duties of between \$340 million and \$890 million on U.S. exports worth around \$2 billion. These duties would be direct retaliation for the steel safeguards announced by the U.S. Administration.⁹ China and Japan have also announced retaliatory tariffs of up to \$100 million each on U.S. exports of steel and soy products.

⁵ Global losses are estimated to be around \$1 billion. The model used was the Global Trade Analysis Project (GTAP), using 1997 policy and data baselines. See Hertel (1997) for a description.

⁶ In 1997 dollars. Following a surge of imports in 1998, U.S. trade policy sharply limited steel imports. As a result, the model uses import data that are broadly similar to 1997, except for China and Brazil, implying that the losses to China—and gains to Brazil—are significantly understated.

⁷ The range of estimates assumes tariffs could be as low as 9.2 percent for the "Joint Remedy" or as high as 20.7 percent for the remedy proposed by Commissioners Devaney and Bragg. Both cases exclude steel imports from Canada and Mexico.

⁸ See WTO (2002a).

⁹ See WTO (2002b). These duties are part of the duties that were authorized when the United States failed to meet deadlines imposed by the WTO to change its tax law as part of the FSC dispute with the EU. However, the

8. Estimates of a second scenario—in which it is assumed that the EU imposes additional duties on steel imports—suggest a further reduction of global welfare by around \$0.8 billion, less than the initial loss arising from the U.S. action. However, if retaliation spreads, total welfare losses from retaliation could exceed \$1 billion.

B. U.S. Farm Policy and the Global Impact of Agricultural Liberalization

9. The recently enacted Farm Security and Rural Investment Act of 2002 (the “Farm Bill”) locks into place for the next six years a mechanism for providing subsidies that had previously been given as emergency payments in recent years in compensation for the global downturn in commodities prices. The Congressional Budget Office (CBO) has estimated that the Farm Bill would increase subsidies over FY 2002–FY 2011 by \$58 billion—to \$146 billion—relative to the baseline implied under 1996 legislation (Box 2).

10. The Farm Bill appears to undermine 1996 reforms that sought to improve efficiency and discourage overproduction by reducing price supports in favor of income supplements. The Farm Bill maintains the existing system of fixed income supports and loan deficiency payments (LDPs), and it adds a system of counter-cyclical payments. Since most of the increased support is directed to programs (the counter-cyclical payments and LDPs) that are linked to prices, it would further reduce the sensitivity of U.S. producers to market forces. The Farm Bill also increases the number of commodities eligible for support.

11. This subsidy program comes while trade negotiators are working against a March 2003 deadline to complete negotiations on a global agreement to liberalize agriculture under the Doha Round. Indeed, the 2002 Farm Bill reflects a broader global problem of active government intervention to encourage domestic agricultural production, thereby limiting agricultural imports (Table 2). While U.S. subsidies under the Farm Bill are high (especially for cotton), subsidies in the EU remain substantially higher, and tariffs on agricultural products are especially high in Japan.¹⁰ Effective tariff rates on agricultural products are between two to eight times higher in the “Quad” economies (United States, Canada, EU, and Japan) than tariff rates for all imports.¹¹ Moreover, these tariffs tend to represent an important barrier to agricultural imports from developing countries, since Canada, United States, and the EU impose higher tariffs on agricultural imports from non-Quad countries.

EU has also agreed to delay implementation pending the outcome of negotiations with the United States. The final decision is expected in mid-July 2002.

¹⁰ There are a number of methods for calculating the level of subsidies. These data are from the GTAP database, which measures the effect of subsidies on the value added to production. As a result, the totals do not equal the budgetary expenditure on subsidies. In addition, subsidies spent to support prices are measured indirectly as tariffs, so the tariff rates in Table 2 may be higher than as reported by the authorities for 1997.

¹¹ Effective tariff rates in the GTAP database include applied tariffs and the effect of price supports (which by encouraging domestic production, discourage import consumption). These rates, however, exclude preferential access programs (such as GSP) that impose low or no duties on developing country imports. As a result, the effective tariff rates may be overstated somewhat.

Box 2. Recent U.S. Farm Policy and Levels of Support to Agriculture

The 2002 Farm Bill represented a retreat from market-oriented reforms instituted in the 1996 Federal Agricultural Improvement Act (the “FAIR Act”) and substantially increased spending on U.S. farm subsidies. The 1996 FAIR Act reformed U.S. agricultural policy by replacing price supports with a system of fixed payments to support farm incomes. Because the FAIR Act payments were independent of prices and output, they distorted production decisions less than the previous price supports. The 2002 Farm Bill—which takes full effect in FY 2003—increases spending to about \$18½ billion in the first three years, more than triple the level of spending under the FAIR Act (see table).

The decline in agricultural prices in 1998 led to sharply higher “emergency” payments to U.S. farmers. Emergency payments started at the end of FY 1998, and total support quickly rose to almost \$30 billion. Much of the emergency payments funded programs that partially restored the price-support system and provided payments based on current prices. These payments (along with favorable growing conditions) encouraged a dramatic increase in U.S. production of soybeans and cotton and exacerbated overproduction of other field crops (primarily rice, corn, and wheat).

Commodity Credit Corporation Net Outlays on Farm Subsidies (excluding conservation programs)	
Fiscal Year	Spending (billions of dollars)
1996	4.3
1997	5.4
1998	8.2
1999	16.9
2000	29.6
2001	19.0
2002	16.1
2003	19.7
2004	18.6
2005	16.9
Average, 2006–11	12.4

Sources: USDA (2002) for FY 1996 to FY 2001; and CBO (2002) for FY 2002 to FY 2011.

The 2002 Farm Bill seeks to compensate producers for low prices without returning fully to price supports and government management of farm production. As a result, while the Farm Bill maintains existing programs of fixed payments and subsidies and provides subsidies to producers of crops that had not previously received support, it also introduces a new “counter-cyclical” program that ties support to prices but not production.

Key programs under the Farm Bill are:

- **Production Flexibility Contracts (PFCs).** PFC payments are based on historic crop plantings in a base year and a fixed payment rate. Most field crops qualify for PFCs, and the 2002 Farm Bill expands coverage to oilseeds (soybeans).
- **Loan Deficiency Payments (LDPs).** LDPs (and related “marketing loan gain” payments) provide subsidies to producers when prices for their crops fall beneath a loan rate. The 2002 Farm Bill expands coverage to include peanuts, wool, mohair, chickpeas, lentils, and dry peas.
- **Counter-cyclical payments.** Producers that qualify for PFCs also can receive counter-cyclical payments, which are based on current prices (as opposed to the PFC’s fixed payment rate), but output is calculated in a similar manner as PFC payments.

Both PFCs and counter-cyclical payments provide producers considerable flexibility on what crops to grow (farmers could receive payments based on soybeans grown in 1998, but plant corn in 2003). In addition, the base acreage and crops may be updated to reflect levels in 1998–2001.

12. To illustrate the costs of agricultural protection, three liberalization scenarios were conducted using the GTAP model (Table 3):¹²

- **Scenario 1: U.S. subsidies and tariffs are cut by 50 percent.** U.S. exports would decline significantly, and the welfare benefits of unilateral U.S. liberalization would be focused on agricultural exporters, especially in developing countries. Cotton exports would increase by more than 10 percent in most regions of the world, with the largest increases occurring in Sub-Saharan Africa and the former Soviet Bloc (primarily the Ukraine). Western Hemisphere cotton exporters would post significant gains. Asian and Western Hemisphere countries would benefit from higher exports of field crops (rice from Asia, and wheat, corn, and soybeans from Brazil and Argentina). However, welfare in poor food-importing countries would fall.
- **Scenario 2: Quad subsidies and tariffs are cut by 50 percent.** Liberalization by the Quad economies magnifies the benefits and dramatically increases exports for non-Quad economies. Quad exports and production of field crops and cotton fall, resulting in higher global agricultural prices (on average 6 percent). Gains for the developing nations are less, because they are not assumed to have reduced barriers, and many are net food importers. In particular, cotton exporters achieve gains since barriers to cotton imports are low in the non-Quad economies. Field crop exports increase sizably, especially for Asian rice producers, who can export to a relatively more open Japanese market. Lower barriers to sugar imports, especially from the EU, would increase exports significantly from the Western Hemisphere and Sub-Saharan Africa. U.S. and EU exports of field crops (U.S. exports of cotton) would fall off significantly. The EU would experience a significant (near ¼ percentage point of GDP) increase in welfare because of the distortions removed in the EU economy.
- **Scenario 3: Global tariffs and subsidies are cut by 50 percent.** Global liberalization of agriculture would yield substantial gains for developing economies. Liberalization would result in a welfare gain of almost ¾ percentage point for North African and Middle Eastern countries, with smaller but still significant welfare gains among field crop exporters from Latin America, Canada, and Asia (outside of Japan). Exports of African cotton and of Latin American, Caribbean, and African sugar would also increase substantially.

13. It is important to recognize that liberalization could adversely affect farm balance sheets, which could complicate the process of reaching an agreement unless producers are compensated. The last column in Table 3 illustrates that U.S. farmland values could fall by around 40 percent if the United States were to liberalize unilaterally. Sharp declines in land

¹² This exercise updates the GTAP database with subsidies from the 2002 Farm Bill, where FY 2003 is assumed to be a representative year. Fortuitously, subsidies in 1997 were about ½ of this level, and because most of the U.S.'s effective tariff rate is comprised of market price supports, this first scenario measures the approximate effect of the 2002 Farm Bill.

prices could also arise elsewhere—including in North Africa, the Middle East, and the EU—as protection of the agricultural sector is eliminated.¹³ This illustrates the difficulties that may arise in reaching agreements in multilateral negotiations that seek to achieve significant liberalization in agriculture.

14. The challenge facing policymakers, therefore, will be to promote liberalization in agriculture in the context of programs that support farm incomes in a manner that does not distort pricing or production decisions. The 1996 FAIR Act contained income support payments that others have noted as providing support while minimizing distortions to producer behavior.¹⁴ This suggests that there would be merit in the United States returning to the original goals of the 1996 FAIR Act, and its use by other nations as a model for income-support for producers.

¹³ This result is similar to previous staff estimates and other research that suggests that recent emergency payments through 2000 elevated land prices by at least 25 percent. See MacDonagh-Dumler (2001) and Morehart, Ryan, and Green (2001).

¹⁴ The Production Flexibility Contracts in the FAIR Act were an example of “decoupled” income support programs that do not appear to significantly distort producer behavior because they are based on *historical* (and not current) production. Simulations by the OECD that compared the impact of agricultural policies show such historically based payments had the smallest impact on prices, output, and welfare. At the same time, they were just as effective in providing income support to agricultural producers as other more traditional—and more distortionary—programs. See OECD (2001).

List of References

- CBO, 2002, "Cost Estimates of H.R. 2646, Farm Security and Rural Investment Act of 2002, relative to CBO's March 2002 Baseline," unpublished estimates, May.
- Francois, J. and L. Baughman, 2001, "Estimated Economic Effects of Proposed Import Relief Remedies for Steel," December (Washington, D.C.: The Consuming Industries Trade Action Coalition). Available at www.citac-trade.org.
- Hertel, T., 1997, *Global Trade Analysis: Modeling and Applications* (Cambridge: Cambridge University Press).
- Hufbauer, G. and B. Goodrich, 2002, "Time for a Grand Bargain in Steel?" *IIE International Economics Policy Briefs*. (Washington, D.C.: Institute for International Economics) No. 02-1, January.
- Leibowitz, L., 2001, "Safety Valve or Flash Point? The Worsening Conflict between U.S. Trade Laws and WTO Rules," *Center for Trade Policy Studies—Trade Policy Analysis* (Washington, D.C.: Cato Institute) No. 17, November 6.
- MacDonagh-Dumler, C., 2001, "Recent Changes in U.S. Agricultural Support Policies and their Impact on Other Countries" in *United States—Selected Issues*, IMF Staff Country Report No. 01/145.
- Morehart, M., J. Ryan, and R. Green, 2001, "Farm Income and Finance: the Importance of Government Payments," *Agricultural Outlook Forum 2001* (Washington, D.C.: ERS, USDA), February 22.
- OECD, 2001, *Market Effects of Crop Support Measures* (Paris: OECD).
- USDA, 2002, *Agricultural Outlook*, (Washington, D.C.: ERS, USDA), May, Table 35.
- USTR, 2002, *2002 Trade Policy Agenda*, (Washington, D.C.: USTR).
- WTO, 2001, "Declaration on the TRIPS Agreement and Public Health," *World Trade Organization—Doha WTO Ministerial 2001*, WT/MIN(01)/DEC/2, 20 November.
- WTO, 2002a, "European Commission Notification Under Article 12.1(A) of the Agreement on Safeguards," *World Trade Organization—Committee on Safeguards*, G/SG/N/6/EEC/1, April 2.
- WTO, 2002b, "European Commission Immediate Notification under Article 12.5 of the Agreement on Safeguards," *World Trade Organization—Committee on Safeguards*, G/C/10, May 15.
- WTO, 2002c, "Update of WTO Dispute Settlement Cases," *World Trade Organization—Dispute Settlement Body*, WT/DS/OV/7, 21 June.

Table 1. United States: Effects of U.S. Safeguard Action

	Welfare Losses (Millions of 1997 dollars)	Steel Employment (Percent change)	Volume of Steel Trade	
			Exports (Percent change)	Imports (Percent change)
United States	-1,165	3	0	-12
Canada and Mexico	425	5	19	2
EU	-645	-1	-3	0
Japan	-270	-1	-4	0
Korea	-117	-1	-5	-1
China	-8	0	-2	0
Former Soviet Union	-901	-4	-6	-2
Brazil	199	1	4	0
RSA and Namibia	84	1	3	0
Rest of the world	333	0	1	0
Total	-2,064			

Source: Staff estimates from the GTAP model.

Table 2. United States: International Comparisons of Government Policies Aimed at Protecting Agriculture

	Tariffs on Imports of 1/				Agricultural Subsidies (Billions of U.S. 1997 dollars)			
	All Goods and Services		Agricultural Goods		Crops	Cotton	Sugar	Other 2/
	From: Quad	Non-Quad	From: Quad	Non-Quad				
Quad economies:								
United States	2	3	9	13	18.0	4.7	0.1	0.9
Canada	2	4	16	13	0.7	0.0	0.0	0.3
European Union	3	4	19	20	49.2	0.0	0.2	20.4
Japan	7	7	57	44	1.0	0.0	0.0	0.2
Non-Quad economies:								
Rest of Asia 3/	6	6	24	21	0.3	0.0	0.0	0.4
Western Hemisphere	8	11	18	14	2.3	0.0	0.0	0.3
Former Soviet Bloc 4/	9	8	21	16	0.1	0.0	0.0	0.1
Sub-Saharan Africa	11	10	22	23	0.0	0.0	0.0	0.0
N. Africa and Middle East	12	13	51	46	0.0	0.0	0.0	0.0
India and China	14	16	43	26	0.0	0.0	0.0	0.0

Source: GTAP and CBO (2002). U.S. subsidy data are updated from CBO estimates of 2003 expenditures on all subsidy programs (including dairy). The GTAP database then computes the value-added impact of the subsidies on farm production.

1/ Tariffs are effective rates; that is, they are a weighted average (by import value) of rates and include an imputed value of the subsidies spent on price supports.

2/ "Other" agricultural subsidies primarily reflect subsidies to the livestock industry.

3/ Includes: Australia, Hong Kong S.A.R., Indonesia, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan Province of China, Thailand, Vietnam, Bangladesh, Sri Lanka, and the rest of South Asia.

4/ Includes: Hungary, Poland, and the rest of Central Europe.

Table 3. United States: Impact of Agricultural Liberalization
(Change from 1997 baseline)

	Agricultural Exports (In millions of 1997 dollars; percent change in parentheses)			Welfare (Percent of GDP)	Land Values 2/ (Percent change)
	Field Crops 1/	Cotton	Sugar		
Scenario I: U.S. Liberalization					
Quad economies:					
United States	-4,149 (-22)	-1,112 (-40)	28 (35)	0.03	-44
Canada	422 (8)	-	42 (44)	0.03	10
European Union 3/	210 (7)	24 (7)	-	-0.01	5
Japan	-	-	-	-0.01	1
Non-Quad economies:					
Rest of Asia 4/	409 (8)	126 (10)	102 (5)	-0.01	2
Western Hemisphere	612 (9)	135 (22)	404 (10)	0.01	3
Former Soviet Bloc 5/	96 (5)	202 (10)	8 (2)	0.00	2
Sub-Saharan Africa	71 (11)	204 (13)	54 (6)	0.02	2
N. Africa and Middle East	46 (9)	83 (13)	6 (5)	-0.03	2
India and China	354 (12)	73 (18)	8 (2)	-0.02	1
Scenario II: Quad Liberalization					
Quad economies:					
United States	-3,441 (-18)	-1,134 (-41)	61 (77)	0.03	-39
Canada	1,112 (20)	-	-	0.25	-3
European Union 3/	-2,030 (-68)	200 (59)	-1,620 (-63)	0.24	-76
Japan	199 (7)	-	-	0.18	-19
Non-Quad economies:					
Rest of Asia 4/	3,040 (62)	28 (2)	354 (18)	0.09	11
Western Hemisphere	1,435 (21)	144 (23)	1,507 (38)	0.09	9
Former Soviet Bloc 5/	313 (17)	182 (9)	144 (26)	0.01	17
Sub-Saharan Africa	146 (23)	218 (14)	944 (103)	0.11	8
N. Africa and Middle East	302 (60)	93 (14)	73 (69)	-0.13	9
India and China	1,948 (64)	87 (22)	185 (50)	-0.04	4
Scenario III: Global Liberalization					
Quad economies:					
United States	-1,791 (-9)	-1,438 (-52)	69 (87)	0.05	-37
Canada	1,891 (34)	-	-	0.27	10
European Union 3/	-1,755 (-59)	161 (47)	-1,593 (-62)	0.29	-76
Japan	171 (6)	-	-	0.22	-21
Non-Quad economies:					
Rest of Asia 4/	4,301 (87)	43 (3)	530 (27)	0.39	3
Western Hemisphere	2,861 (41)	105 (17)	3,248 (82)	0.14	8
Former Soviet Bloc 5/	596 (32)	109 (5)	411 (73)	0.18	2
Sub-Saharan Africa	388 (60)	337 (22)	1,038 (114)	0.21	4
N. Africa and Middle East	322 (64)	1,211 (185)	125 (118)	0.72	-14
India and China	6,326 (209)	-14 (-4)	281 (76)	0.28	3

Source: Staff estimates from GTAP model. A dash (-) denotes an insignificant change or change from a small base.

1/ Field crops include: rice, wheat, grains, and oilseeds.

2/ The percentage change in land values is an approximation of the effect of liberalization on agricultural land assets.

3/ Exports from the EU are to non-EU economies.

4/ Includes: Australia, Hong Kong S.A.R., Indonesia, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan Province of China, Thailand, Vietnam, Bangladesh, Sri Lanka, and the rest of South Asia.

5/ Includes: Hungary, Poland, and the rest of Central Europe.

VI. SOME IMPLICATIONS OF ENRON'S FAILURE FOR MARKET RULES AND INSTITUTIONS¹

1. On December 2, 2001, the Enron Corporation, an energy-trading firm, filed for bankruptcy. With a reported \$40 billion in liabilities, including nearly \$10 billion in bond debt and \$4 billion in bank loans, it was one of the largest corporate bankruptcies in history. The plunge in its share prices from \$90 to near zero erased over \$60 billion of market value, including a significant portion of its employees' pension assets. Initial reports have suggested management abuses, as well as lapses in auditing and disclosure, while ratings agencies and stock market analysts have come under criticism for substandard analysis or recommendations allegedly biased by conflicts of interest.

2. Enron's failure—and subsequent instances of accounting irregularities by WorldCom and other large U.S. corporations—have triggered intense scrutiny of corporate disclosure, accounting practices, and corporate governance in the United States, both by financial markets and by policymakers. A wide range of calls for reform have emerged on a number of fronts (the Administration's proposals are summarized in Box 1). Most proposals rely on strengthening market-based rules and institutions to bolster market discipline, rather than on direct government regulation. This paper briefly reviews the major areas of emphasis as regards public disclosure of corporate information; accounting rules and the oversight of auditors; corporate governance; and conflicts of interest in market research.

A. Public Disclosure

3. Lack of proper disclosure was an important factor in the Enron case—the Powers Committee report (2002) states that Enron disguised key risks in its business from both its investors and its Board through a complex structure of partnerships and off-balance-sheet activities.² This observation has raised concern regarding the adequacy of disclosure by other corporations, especially those with complex structures.

4. In recognition of the need for more transparent disclosure of risk, the Securities and Exchange Commission (SEC) has proposed new requirements for clearer language in the "Management's Discussion and Analysis" section of financial statements, greater disclosure of critical accounting policies, and tighter disclosure rules for off-balance-sheet activities. To ensure timeliness of information, the SEC is considering requiring that annual reports be filed within 60 days after the end of a fiscal year, rather than the current 90-day requirement, and quarterly reports would have to be filed 30 days after the quarter's end, compared with 45 days presently.

¹ Prepared by Calvin Schnure.

² For example, see Powers (2002), p. 17.

Box 1. President's Ten-Point Plan for Improving Corporate Responsibility

Each investor should have quarterly access to the information needed to judge a firm's financial performance, condition, and risks.

Each investor should have prompt access to critical information.

CEOs should personally vouch for the veracity, timeliness, and fairness of their companies' public disclosures, including their financial statements.

CEOs or other officers should not be allowed to profit from erroneous financial statements.

CEOs or other officers who clearly abuse their power should lose their right to serve in any corporate leadership positions.

Corporate leaders should be required to tell the public promptly whenever they buy or sell company stock for personal gain.

Investors should have complete confidence in the independence and integrity of companies' auditors.

An independent regulatory board should ensure that the accounting profession is held to the highest ethical standards.

The authors of accounting standards must be responsive to the needs of investors.

Firms' accounting systems should be compared with best practices, not simply against minimum standards.

Source: <http://www.whitehouse.gov/infocus/corporateresponsibility>.

5. Disclosure of other relevant information would also be accelerated under the SEC's proposals. Certain stock transactions by insiders would have to be disclosed immediately, rather than by the tenth day of the month following the month in which the trading occurred. Companies would be required to report immediately "material events" such as: ratings changes; defaults or other events that could trigger obligations; offerings of equity securities not included in a prospectus filed with the SEC; and waivers of corporate ethics and conduct rules for officers, directors, and other key employees. Currently, many such events are not disclosed until the subsequent regular quarterly filing, if at all.

6. Efforts have also been launched at ensuring that outside parties play their proper role in interpreting and disseminating analysis of accounting information. A New York State investigation and SEC inquiry have examined brokerage practices and potential conflicts of interest between analysts and investment bankers. The New York State investigation resulted in a settlement with a major investment bank that involved a \$100 million fine and commitments to disclose any fees received from companies being analyzed. The SEC inquiry will help determine the necessity of additional rulemaking and whether any laws have been violated.

7. In early May 2002, the SEC approved new rules, developed by the NYSE and NASD, which would manage and improve disclosure of conflicts of interest in cases where research

analysts recommend securities in public communications. These included prohibiting analysts from being supervised by investment banking departments, disallowing analysts' compensation from being tied to investment banking transactions, requiring securities firms to disclose compensation from investment banking clients, imposing "black outs" on trading by analysts around the time they issue their research, and requiring that analysts and securities firms disclose financial interests.

B. Weaknesses in the Accounting System

Oversight of accountants and auditors

8. The Enron case has highlighted the possible **conflicts of interest** that arise when accounting firms provide consulting services to firms they audit. Presently, consulting fees represent a significant portion of the revenues of accounting firms, and revenues generated from the cross-selling of non-audit business are often an important factor in the determination of employee compensation at accounting firms.

9. In response to these concerns, the SEC is considering proposals regarding the prohibition of compensation for cross-selling of non-audit-related services and stiff penalties for firms with substandard audit performance. However, the proposals currently contemplated would not require the separation of audit and consulting business, or the mandatory rotation of auditors, on the grounds that these measures would reduce the quality of audits.

10. Questions have also arisen regarding the effectiveness of the **oversight of the accounting profession**. Presently, the accounting profession is overseen by the American Institute of Certified Public Accountants (AICPA). The AICPA establishes auditing standards and ethics rules for the profession, but has very limited power to gather evidence or impose disciplinary actions.

11. In response, proposals have been made to establish an independent Board to supervise the accounting profession, with the SEC having primary responsibility for its composition and oversight. The SEC has proposed a new, part-time Public Accountability Board (PAB), whose nine members would be drawn mainly from the corporate and investor community. The PAB would have the authority to bar accountants from auditing public companies, a power that the present Public Oversight Board lacks. A maximum of three members would be drawn from the accounting profession and, to ensure its independence, the Board would be funded by mandatory fees on the accounting profession.

12. Two bills in Congress also address reform of accounting and corporate disclosure. The Senate began debate on July 8th of legislation introduced by Senate Banking Committee Chairman Paul Sarbanes. The Senate bill would establish an accounting oversight board which, like the SEC proposal, would have a majority of members drawn from outside the accounting profession. The board would be overseen by the SEC, and would set accounting standards. Some changes, though, would be mandated by the legislation, like a prohibition on providing certain consulting services to audit clients, and requiring disclosure of off-balance-

sheet transactions. The bill would require CEOs and CFOs to vouch for the accuracy of financial statements. The House passed a version of a similar reform bill in April.

Weaknesses in specific accounting rules

13. Enron's failure has highlighted several areas where accounting rules may need to be strengthened in order to ensure confidence in corporate financial statements, including earnings management, accounting for employee grants of stock options, and rules for consolidation of off-balance-sheet activity.

14. **Earnings management** occurs when firms manipulate the time at which revenues or expenses are recognized to alter the pattern of reported earnings. Academic studies suggest that firms may seek to shift forward revenues in order to avoid falling short of consensus forecasts of earnings, reporting a decline in earnings from the previous year, or posting a loss.³ In addition, firms tend to alter discretionary accruals to boost reported earnings just prior to an initial public equity offering (IPO) or a seasoned equity offering.⁴ Firms may also seek to smooth their earnings over time, since stocks with a more volatile earnings stream are considered riskier and receive lower valuations.⁵

15. There are concerns that several techniques have been used to inflate earnings. For example, firms may book revenues for goods shipped to a distributor but for which a sale to a final customer has not been made ("channel stuffing"). Firms that sell receivables through securitizations may book as current income the "gain on sale" of the receivables. Firms may also boost earnings by booking expected capital gains on securitized assets as current income and engage in sales of nontraded securities among subsidiaries.

16. In order to address this issue, the SEC has tightened its scrutiny of financial statements in an attempt to weed out these abuses, and initiated a record number of investigations during the first quarter of 2002. The Financial Accounting Standards Board (FASB) is examining the issue of the timing of revenue recognition. In addition, investors have become more critical of accounting practices, and heightened market scrutiny has depressed stock valuations of firms perceived to manipulate their earnings.

17. The accounting treatment of **stock options** granted to employees has generated significant controversy. Grants of stock options by firms to their employees do not require cash outlays, and are not deducted from income under current accounting treatment. Stock options do, however, dilute shareholders' claims on the firm, and many observers—including

³ See, for example, Burgstahler and Dichev (1997), and Degeorge, Patel, and Zeckhauser (1999).

⁴ See Teoh, Welch, and Wong, 1998a and 1998b.

⁵ See Chang and Lewis (1998), Barth (1999).

investor Warren Buffett and Federal Reserve Chairman Alan Greenspan—have argued that employee stock options are a form of compensation and should be deducted from income.⁶

18. Opponents of changing the accounting treatment of options raise concerns that rules requiring expensing would adversely affect high-tech industries, which use options extensively to attract and retain employees. However, proponents note that the rules would not restrict the ability of firms to grant options, or increase their cost, but would only make the impact on earnings more explicit. Research suggests that stock valuations react to fully diluted earnings per share (that is, after adjusting for stock options outstanding), thus suggesting stock prices may have already incorporated information on stock options grants.

19. Concerns have also been raised about how stock options grants would be valued. Supporters of the expensing of stock options make the case that option-pricing models could provide a reasonable estimate that would be perhaps no more uncertain than estimates of depreciation of plant and equipment, which are already deducted from income.

20. Currently, FASB is considering a rule that would require stock option grants to be deducted from income. In addition, the International Accounting Standards Board (IASB) plans to develop rules for accounting for grants of stock options to employees.

21. Enron's extensive use of **limited partnerships (LPs)** and **special-purpose entities (SPEs)** to shift losses and debt off its own balance sheet has led to scrutiny of the rules for consolidation of off-balance-sheet activities back onto the sponsor's books. Off-balance-sheet entities are used for a wide range of legitimate activities, from securitization vehicles used to finance receivables and "synthetic" leases holding commercial properties, to subsidiaries responsible for research and development projects at pharmaceutical companies.

22. U.S. regulatory and accounting experts have emphasized that a main determinant of whether an entity should receive off-balance-sheet status or should be consolidated is whether the risks and rewards of the activity have been transferred to investors in the entity. If no such transfer of risk and reward has been accomplished, then the set of transactions should be consolidated in the accounts of the party that retains the risks and rewards.⁷ As a backstop, U.S. accounting standards have required a minimum of 3 percent of the entity's total capital structure be funded with outside equity.

23. In response to concerns that these requirements are too lenient and may have contributed to Enron's abuses, FASB is considering a rule that would require a 10 percent outside equity stake to retain off-balance-sheet treatment and avoid consolidation.⁸ Market

⁶ Currently, the granting of options is only reported in financial statements, but not deducted from income.

⁷ An important factor in making this judgment is whether the sponsor exerts control over the SPE. Control is not an issue in many SPEs, where permitted activities are narrowly limited in the vehicle's charter.

⁸ Enron was in violation of the 3 percent rule from 1997 to 2001. For a discussion, see Powers (2002).

forces have also begun to discipline the use of off-balance-sheet accounting. During early 2002, the stock prices of firms with complex financial structures have fallen relative to the broader market, which has encouraged many firms to simplify their off-balance-sheet activity and improve disclosure of these transactions.

Accounting framework: rules versus general principles

24. The overall framework for U.S. accounting rules, or Generally Accepted Accounting Practices (GAAP), has been characterized as overly complex and rules driven. While U.S. standards are based on principles, the body of requirements has evolved to a rules-based approach. It has been argued that this results in a “check the boxes” approach in verifying a company’s financial statements, and that auditors focus on simply ensuring that the accounting treatment fulfills the letter of the law. As a result, firms are provided with incentives to tailor transactions in order to meet these narrow rules.

25. The accounting framework under the International Accounting Standards Board (IASB), in contrast, emphasizes general accounting principles. Company officials and their auditors are expected to apply a greater amount of professional judgment to determine what treatment is appropriate for any specific set of circumstances. This emphasis on judgment is intended to ensure the focus of auditors and companies is on adherence to the spirit, rather than the letter, of the rules.

26. Both the SEC and FASB have endorsed an evolution of U.S. accounting standards to a principles-based code such as that under the IASB. It is likely, however, that a transition to this type of system would be gradual, and would be focused mainly in areas where there were obvious advantages of the principles-based system.

Corporate governance

27. Enron’s failure also illustrated significant weakness in corporate governance. The Powers Committee suggested that Enron’s board of directors failed to grasp the nature of the risks the firm faced, and allowed employees to manage partnerships that generated significant conflicts of interest. The audit committee of Enron’s board also overlooked the company’s increasingly aggressive accounting practices, and the compensation committee neglected to review properly the compensation awarded to management.

28. This experience has triggered a range of reform proposals aimed at improving standards of corporate governance. These include: strengthening the boards of directors, especially the role of outside directors; enhancing the independence of audit and compensation committees; and emphasizing the accountability of senior management and directors in their fiduciary responsibility to shareholders. Since corporate law has been the

responsibility of the states within the U.S. federal system, any changes to corporate governance issues would rest with the states.⁹

29. Nonetheless, market institutions have begun to take a lead in strengthening corporate governance. For example, the major stock exchanges (NYSE and Nasdaq), which include standards for corporate governance in their listing standards, have announced plans to tighten these requirements. The proposals would involve rules to enhance the role of outside directors; to set stricter requirements for the definition of “outside” directors; and introduce requirements that stock-option grants in compensation packages be subject to shareholder approval.¹⁰ Firms that failed to meet these standards would be denied the right to list their shares on public exchanges.

⁹ Nonetheless, the SEC has proposed a rule that would require the Chief Executive Officer and Chief Financial Officer to certify the accuracy of their companies’ financial statements.

¹⁰ The NYSE proposals are currently posted for public comments and are scheduled for consideration by NYSE’s Board of Directors on August 1, 2002.

List of References

- Barth, M.E., J.A. Elliott, and M.W. Finn, 1999, "Market Rewards Associated with Patterns of Increasing Earnings," *Journal of Accounting Research*, 37 (Autumn), pp. 387-413.
- Burghstahler, D., and I. Dichev, 1997, "Earnings Management to Avoid Earnings Decreases and Losses," *Journal of Accounting and Economics*, 24, pp. 99-126.
- Chaney, P. K., and C. M. Lewis, 1998, "Income Smoothing and Underperformance in Initial Public Offerings," *Journal of Corporate Finance*, 4, pp. 1-29.
- Degeorge, F., J. Patel, and R. Zeckhauser, 1999, "Earnings Management to Exceed Thresholds," *Journal of Business*, 72, pp.1-33.
- Pitt, H. L., 2002, *Written Testimony Concerning Accounting and Investor Protection Issues Raised by Enron and Other Public Companies*, Testimony before the Committee on Banking, Housing and Urban Affairs, United States Senate, March 21.
- Powers, W. Jr., 2002, *Report of Investigation by the Special Investigative Committee of the Board of Directors of Enron Corp.*, February 1.
- Teoh, S. H., I. Welch and T.J. Wong, 1998a, "Earnings Management and the Underperformance of Seasoned Equity Offerings," *Journal of Financial Economics*, 50, pp. 63-99.
- Teoh, S. H., I. Welch and T.J. Wong, 1998b, "Earnings Management And The Long-Run Performance of Initial Public Offerings," *Journal of Finance*, 53, pp. 1935-1974.

VII. MONETARY POLICY AND THE 2001 RECESSION¹

1. The Federal Reserve cut interest rates 11 times over the course of 2001, lowering the federal funds rate target from 6½ percent at the end of 2000 to 1¾ percent on December 7, 2001. Despite this aggressive easing, continued weak activity gave rise to growing questions about whether interest rate cuts were less effective than in the past at countering recessionary forces. This concern was exacerbated by the contraction of output in the third quarter of 2001—six months after the Federal Reserve had begun to ease and within a period in which monetary stimulus would have been expected to have had an effect.

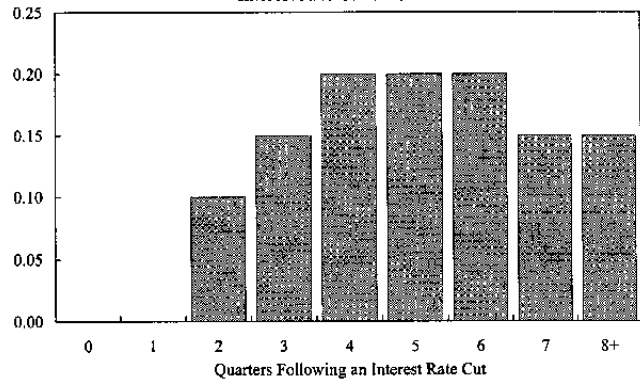
2. There remains considerable uncertainty among academic and other researchers regarding these questions. This chapter briefly reviews a number of the explanations that have been put forward to explain the apparent weak response of the economy to the interest rate cuts of 2001, including: the usual transmission lags for monetary policy and the effects of the earlier monetary tightening in 1999–2000; structural changes in the response of the economy to interest rates; and the possible offsetting effects on financial conditions of lower stock prices, the strong dollar, and tighter credit conditions.

A. Transmission Lags

3. Recent empirical work by Bernanke and Mihov (1998) illustrates that there is a considerable transmission lag between the time that a change in monetary policy occurs and its subsequent effect on the economy. As shown in Figure 1, their analysis suggests that there is a two-quarter lag before monetary policy begins to affect output—the impact on GDP of a 1 percentage point cut in the federal funds rates would peak at 0.2 percentage point four to six quarters after the interest rate change and then decline thereafter.²

4. Using these results, two simulations were performed to illustrate the effects of the recent U.S. interest rate policy actions.³ The first simulation starts

Figure 1. United States: Percent Impact of 1 Percentage Point Interest Rate Cut on GDP



¹ Prepared by Phillip Swagel.

² This is based on the results of the “just-identified” model displayed in Bernanke and Mihov (1998, p. 893). In this framework, the growth rate returns to the baseline while the level of GDP is permanently changed, since the identification scheme does not impose long-run restrictions such as super-neutrality of money. The April 2002 World Economic Outlook contains an analysis of the effects of monetary policy using a related framework.

³ The results are obtained by applying the level effects to the sequence of interest rate cuts, with the impact on output equal to the cumulative effect of past interest rate changes. For the purpose of this exercise, the federal funds rate is assumed to rise gradually starting in the third quarter of 2002 to 5½ percent by the end of 2003.

with the interest rate cuts of 2001 and thus does not take into account the effects of the previous interest rate hikes. The second simulation starts in 1999 and incorporates the effects of the Fed's tightening action in 1999 and 2000.

5. In the first case, the transmission lags mean that the 2001 policy actions would not have their full effect until around the middle of 2002 (middle panel of Figure 2). By mid-2002, the policy easing of 2001 would be expected to raise the level of (quarterly) GDP by 3½ percent over the baseline, while GDP growth would be nearly 3½ percentage points higher at an annual rate. These results suggest that even the quite aggressive monetary easing that occurred in 2001 would not be expected to have full impact until the middle of 2002.

6. The second simulation illustrates that the 1999–2000 interest rate hikes likely acted to depress activity into 2001. Although growth would be somewhat higher in mid-2001 than in the first simulation, as output bounces back from the earlier interest rate hikes, the level of GDP is considerably lower. This illustrates that the earlier interest rate hikes could have acted as a headwind and partly offset the 2001 stimulus.⁴

B. Structural Changes in the Response of GDP and its Components to Interest Rates

7. Some analysts have suggested that the apparent unresponsiveness of activity to the 2001 monetary stimulus has reflected a diminution of the response of activity to interest rates. Using the framework suggested by Kuttner and Moser (2002), this section considers this possibility by examining correlation between changes in the nominal federal funds rate and the growth rates of GDP and its components over two time periods, 1970–2001 and 1984–2001. The latter period is chosen to correspond with the shift by the Federal Reserve away from monetary targets. Figure 3 shows the correlation between real GDP growth and its components with changes in the federal funds rate from 8 quarters before an interest rate change to 12 quarters after.⁵

8. For overall GDP growth, the correlations for the full sample suggest that there is a two-quarter lag before the impact of interest rates is felt, with the effect on activity evident for some 10 to 12 quarters. In the period since 1984, the negative correlation between interest rate movements and the subsequent change in activity is smaller, but the positive relationship between GDP growth and *future* interest rate hikes is stronger, possibly reflecting a change in the intensity of the counter-cyclical action by policymakers.

⁴ These results must be interpreted with caution, as the simulations are based on the impulse-response function estimated by Bernanke and Mihov, and do not take into account the endogenous response of interest rates to output related to the policy-response function assumed in their estimation framework.

⁵ Note that unlike impulse responses described above, the correlations do not imply causality or the magnitude of the relationship between interest rates and output. Kumar and Sgherri (2002) offer estimates of these latter effects for the United States and other G7 countries.

9. The relationship between monetary policy and activity differs substantially across the components of demand, with durables consumption and residential investment exhibiting a relatively significant response to interest rate changes.

- The correlation between interest rate changes and total **personal consumption** growth is similar to that for GDP growth. However, durables consumption growth is related nearly contemporaneously to interest rate changes, while the growth rate of nondurables changes with a lag of one or two quarters. The responsiveness of durables remains nearly as strong in the 1984–2001 sample as in the entire period, while that of nondurables is smaller.
- **Residential investment** shows a strong negative correlation with interest rate changes within the quarter and for the subsequent two quarters for the full sample, and a relatively weaker correlation in the 1984–2001 period.
- By contrast, the correlation between interest rate changes and **business fixed investment** growth (nonresidential) becomes negative only after four to six quarters, reflecting the relative fixity of business investment and the time needed for firms to change investment plans.⁶ The correlation is considerably weaker in the latter period.

10. The apparent decline in the correlation between GDP growth (and its components) and interest rate changes since 1983 has been ascribed to several structural factors. For example, the wider holding of nonresidential financial assets by households may have increased the importance of changes in equity wealth rather than interest rates for determining consumption. The potency of interest rates may also have been affected by financial sector developments, including the deregulation of bank interest rates in the 1980s, the increased access of firms to capital markets, including through securitization, which may have reduced the importance of banks in providing credit. Similarly, new sources of mortgage finance for residential housing could also have lessened the effect of changes in interest rates on housing.⁷

11. Several authors have also suggested that changes in the behavior of the Federal Reserve could also have affected how monetary policy has worked. For example, Galí, López-Salido, and Vallés (2002) and Ball and Tchaidze (2002) have shown that the Federal Reserve has reacted less aggressively to changes in output growth and unemployment since the mid-1980s. This meant an increased willingness to accommodate positive supply shocks, including a decline of the U.S. unemployment rate to under 4 percent—well below most estimates of the non-accelerating inflation rate of unemployment (NAIRU)—in the latter half of the 1990s.

⁶ In results not shown, essentially no pattern is found in the correlations between interest rates and leads and lags of changes in business inventories.

⁷ See Sellon (2002) for a discussion of implications of changes in the U.S. financial system.

12. Boivin and Giannoni (2002) offer similar conclusions. They show that the monetary transmission mechanism has been relatively stable over time, but that the Federal Reserve has become more effective in countering the impact of shocks on the real economy. Thus, while monetary policy remained potent, the need for unexpected interest rate movements has declined over time because of an improvement in the systematic response of the Fed to economic developments. Kuttner and Moser (2002) conclude that this is consistent with the observation of a smaller correlation between interest rate changes and output growth in recent years, since there would be zero correlation between interest rate changes and growth were monetary policy to become fully effective at stabilizing output.

C. Alternative Measures of Monetary and Financial Conditions

13. By conventional standards, policy interest rates were set at highly accommodative levels during this period. For example, the federal funds rate target of 1¾ percent at end-2001 was more than 2 percentage points below the rate indicated by a Taylor rule (Figure 4).⁸ This suggests that the Federal Reserve had set short-term interest rates well below the levels that would normally have been suggested by prevailing levels of inflation and the output gap. Moreover, the rapid growth of the monetary aggregates also suggested a highly accommodative policy stance.

14. At the same time, however, other financial variables—such as longer-term bond yields, stock market valuations, and the exchange rate—appeared less stimulative and may have worked to offset the stimulus provided by short-term interest rates. Indeed, an index along the lines of the Goldman Sachs Financial Conditions Index (FCI), which takes these factors into account, suggested overall financial market conditions tightened in 2001 despite the policy easing (Figure 5). The FCI is a weighted average of real three-month interest rates, real interest rates on corporate bonds, real effective exchange rates, and stock market valuation (with a minus sign so that lower equities prices correspond to tighter conditions). An increase in the index corresponds to tighter (less stimulative) financial market conditions.⁹

⁸ A Taylor rule indicates the appropriate level of the federal funds rate for a combination of GDP growth, potential GDP growth, and inflation. The rule used here is:

$$\text{Federal Funds Rate} = 3 + 1.5 \text{ GDP Inflation} + 0.8 (\text{Gap between Output and Potential}).$$

This is based on Taylor (1993), modified as discussed in Taylor (2000), in which coefficients for the response to the output of between 0.5 and 1.0 are seen as equally reasonable. Potential GDP is derived by applying a Hodrick-Prescott filter to the log of real GDP.

⁹ The index is constructed along the lines of the Goldman Sachs index, and includes the real three-month LIBOR interest rate with a weight of 0.35, the real yield on A-rated corporate bonds with a weight of 0.55, the real exchange value of the dollar with a weight of 0.05, and the ratio of stock-market capitalization to GDP (the sum of the NYSE and Nasdaq) with a weight of 0.05. These are each measured relative to the average values over the period 1987 to 1995, a period for which the value of the index is set to 100.

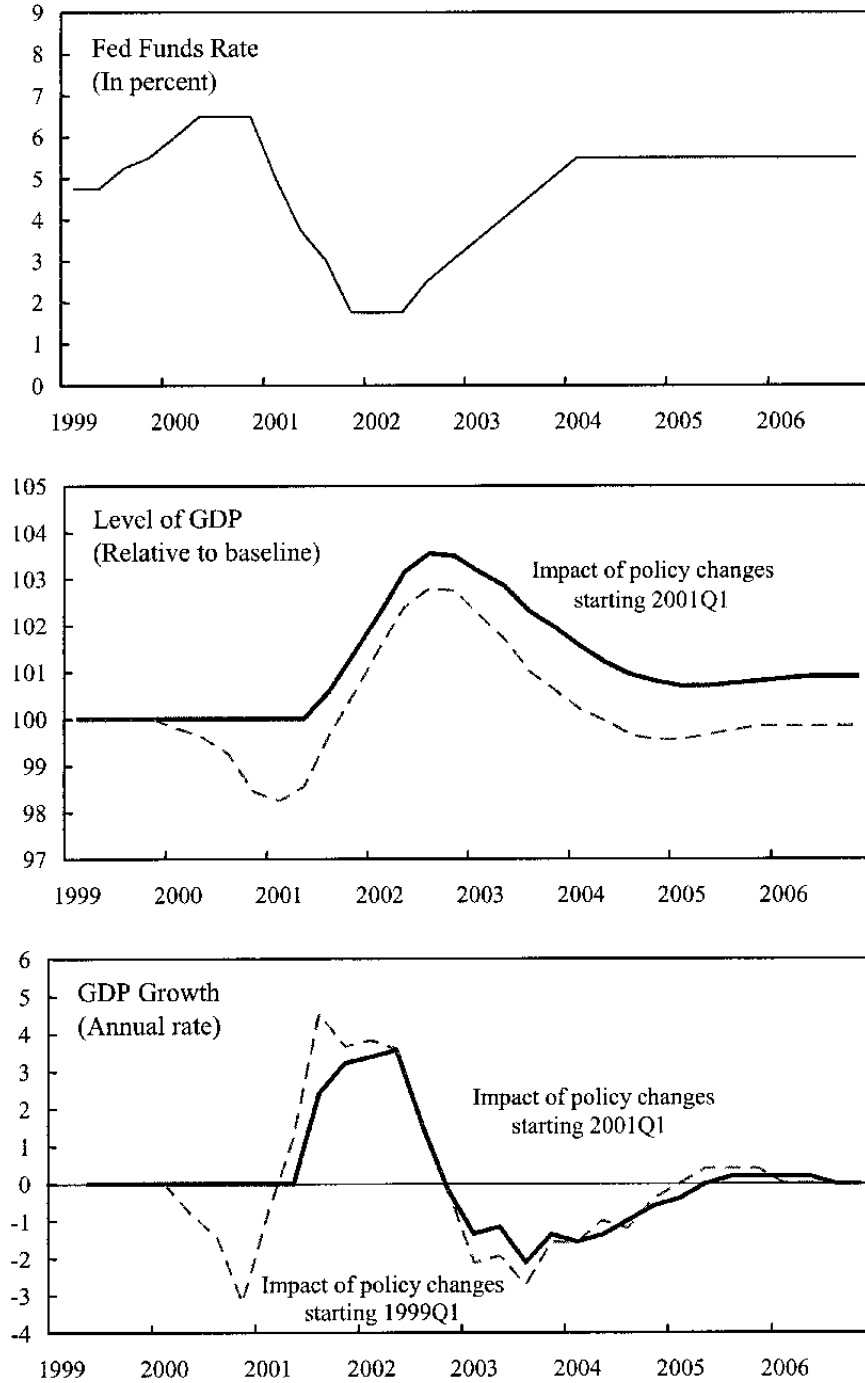
15. The FCI index illustrates that the effect on demand of the decline in interest rates may have been offset by a strengthening of the dollar, equity price declines, and higher interest rates on corporate bonds even while short-term interest rates fell. However, care is needed in drawing too strong a conclusion from these types of summary indicators, as it is unclear whether these have significant predictive power for GDP growth.¹⁰

¹⁰ For example, neither the residuals from the Taylor equation nor the level of the FCI were significantly correlated with GDP growth, especially during the 1984–2001 period. Simple vector auto regressions also did not demonstrate a significant relationship between the FCI and GDP growth.

List of References

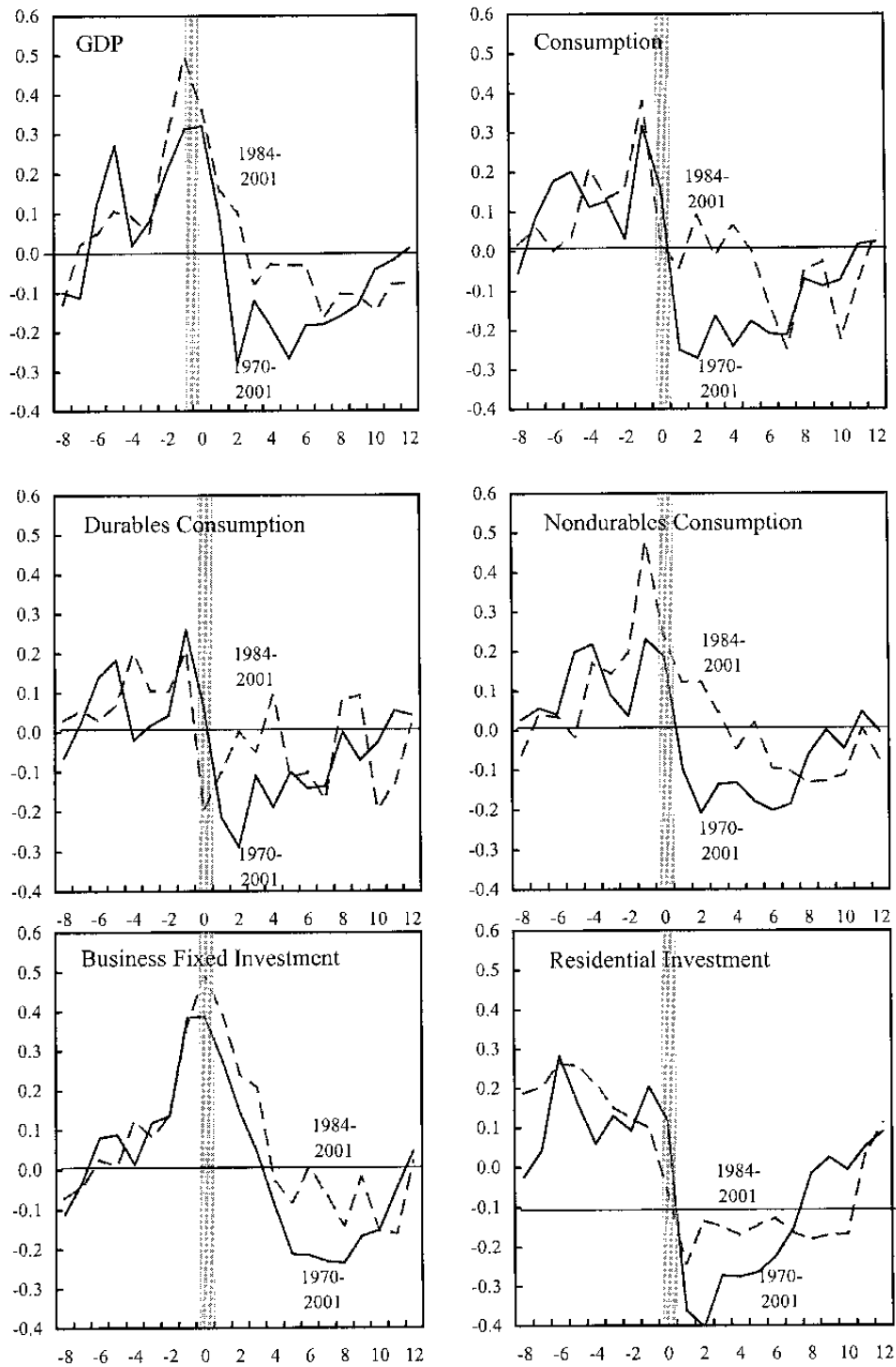
- Ball, L., and R. Tchaidze, 2002, "The Fed and the New Economy," NBER Working Paper No. 8785, February.
- Bernanke, B., and I. Mihov, 1998, "Measuring Monetary Policy," *Quarterly Journal of Economics*, Vol. 113, August, pp. 869–902.
- Boivin, J., and M. Giannoni, 2002, "Has Monetary Policy Become Less Powerful?" Federal Reserve Bank of New York mimeo, January.
- Galí, J., J. López-Salido, and J. Vallés, 2002, "Technology Shocks and Monetary Policy: Assessing the Fed's Performance," NBER Working Paper No. 8768, February.
- International Monetary Fund, 2002, *World Economic Outlook*, April.
- Kumar, M., and S. Sgherri, 2002, "Monetary Policy Transmission in the G-7," IMF mimeo, May.
- Kuttner, K., and P. Moser, 2002, "The Monetary Transmission Mechanism: Some Answers and Further Questions," Federal Reserve Bank of New York mimeo, January.
- Sellon, G., 2002, "The Changing U.S. Financial System: Some Implications for the Monetary Transmission Mechanism," *Federal Reserve Bank of Kansas City Economic Review*, First Quarter, pp. 5–35.
- Taylor, J., 1993, "Discretion Versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy*, Vol. 39, p. 195–214.
- Taylor, J., 1995, "The Monetary Transmission Mechanism: An Empirical Framework," *Journal of Economic Perspectives*, Autumn, pp. 11–26.
- Taylor, J., 1999, "The Monetary Transmission Mechanism and the Evaluation of Monetary Policy Rules" Stanford University mimeo, September.

Figure 2. United States: Simulated Impact of the Monetary Policy Easing on Output



Source: Staff calculations.

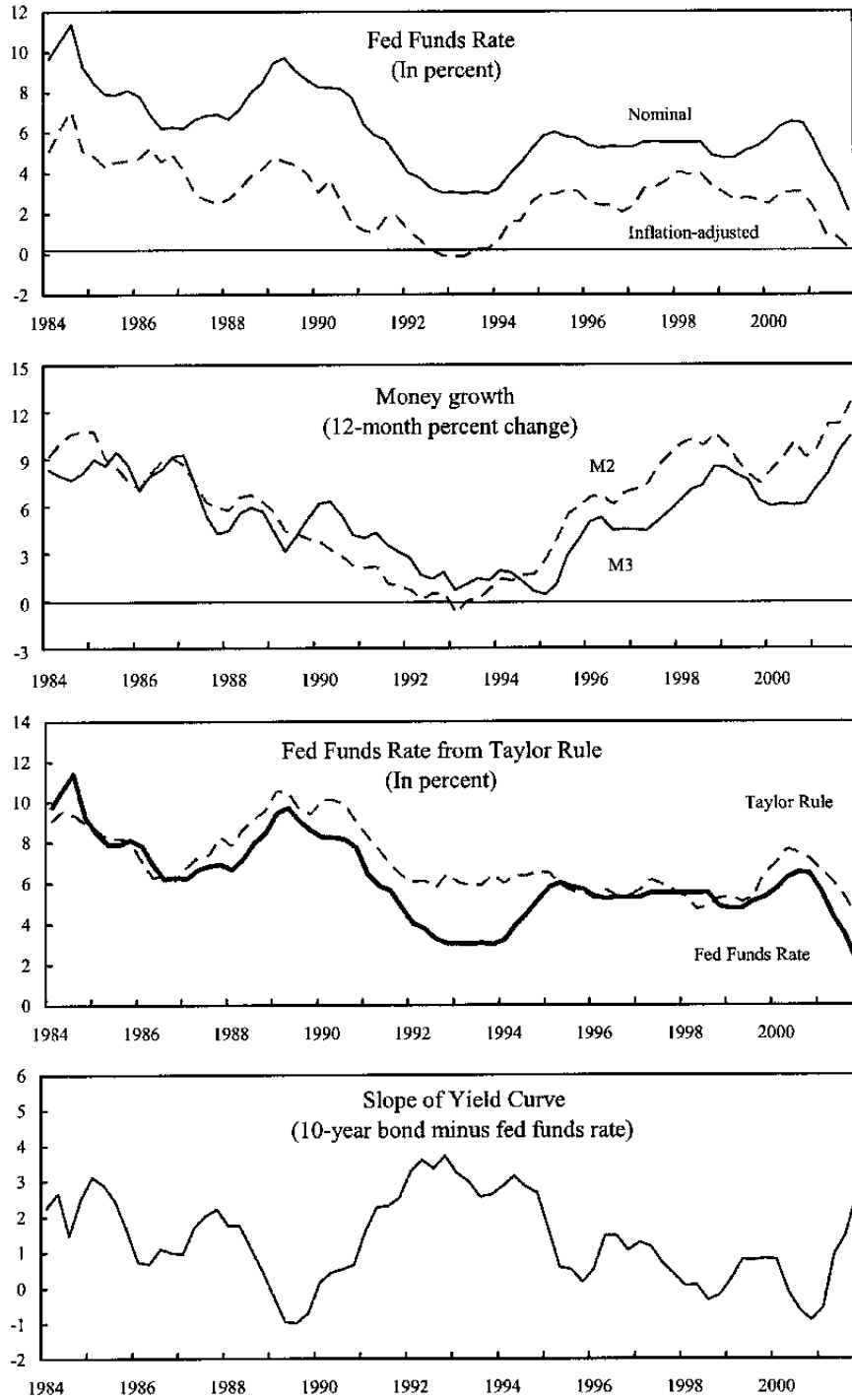
Figure 3. United States: Correlations Between Federal Fund Rate Changes and Growth of Aggregate Demand



Sources: Haver Analytics; and staff calculations.

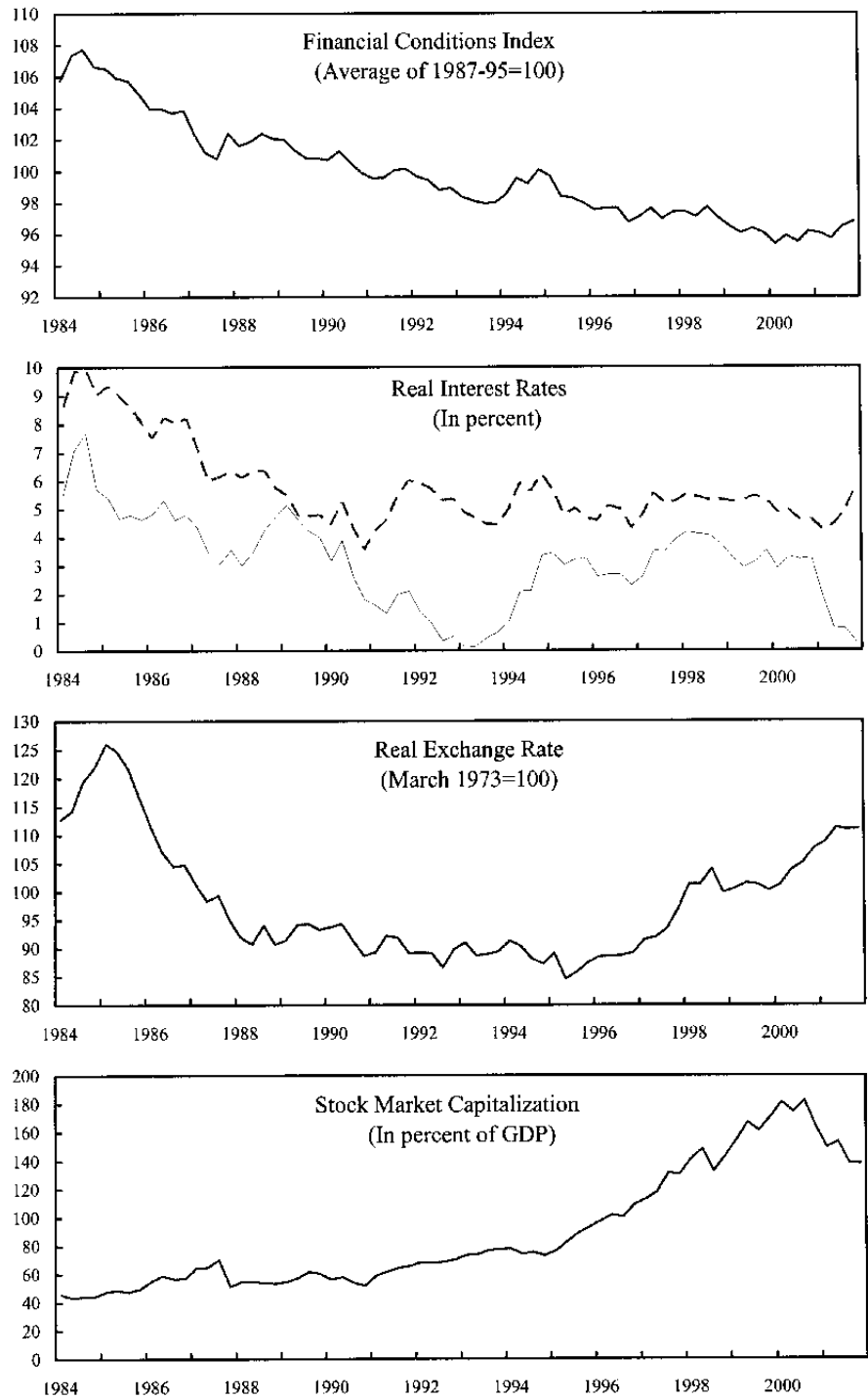
Note: The panels show the correlation between the quarter-on-quarter growth of real GDP and its components with changes in the nominal federal funds rate eight quarters before the change in the interest rate to 12 quarters following.

Figure 4. United States: Alternative Indicators of the Stance of Monetary Policy



Sources: Haver Analytics; and staff calculations.

Figure 5. United States: Alternative Indicators of Financial Conditions

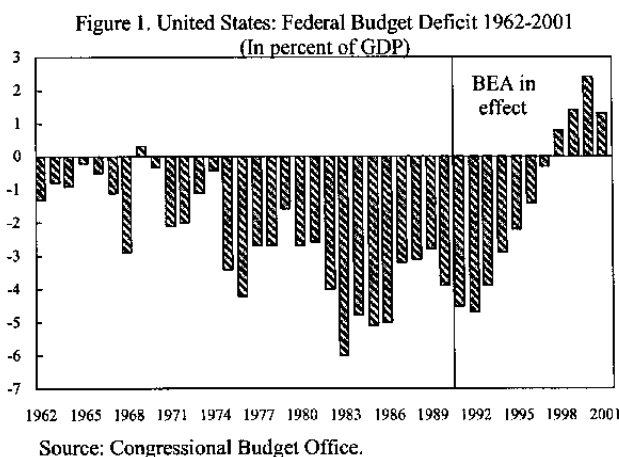


Sources: Haver Analytics; and staff calculations.

VIII. THE EFFECTIVENESS OF THE FISCAL RULES UNDER THE BUDGET ENFORCEMENT ACT AND OPTIONS FOR REFORM¹

A. Introduction

1. Eliminating the U.S. federal budget deficit during the 1990s marked a significant fiscal milestone. The unified budget surplus in FY 1998 was the first in nearly 30 years, and the surplus in the following year was the largest relative to GDP since 1951 (Figure 1). Although the prolonged period of economic growth and legislative initiatives during the 1990s undoubtedly played important roles in achieving this fiscal turnaround, a key factor was also the Budget Enforcement Act of 1990 (BEA) which introduced caps on discretionary spending and a “pay-as-you-go” (PAYGO) requirement for new legislation affecting mandatory spending and tax receipts.



2. More recently, however, there has been a deterioration in the fiscal position, which appears to have partly reflected an erosion in the effectiveness of the BEA mechanisms. The apparent weakening of budget discipline and the expiration of the BEA rules at the end of FY 2002 raises the issue of how, or whether, to reform its enforcement procedures. This chapter reviews evidence on the effectiveness of the BEA mechanisms, and briefly discusses some of the principal options.

B. Background

3. Rising deficits during the 1980s prompted a series of reforms to budgetary legislation and procedures. Of these, the most significant were:

- The Balanced Budget and Emergency Deficit Control Act of 1985—widely known as Gramm-Rudman-Hollings (GRH)—specified declining nominal targets for the deficit, culminating in a balanced budget in FY 1991. Uniform percentage cuts were supposed to be triggered in selected mandatory and most discretionary spending programs if the projected (rather than actual) deficits exceeded the targets.
- Faced with the prospect of huge spending cuts in 1987, the President and the Congress amended GRH, relaxing the deficit target and postponing a balanced budget

¹ Prepared by Michael Kell.

until FY 1993. These revised targets were never met, in part because of the financial burden associated with resolving the savings and loan crisis.

- The Budget Enforcement Act of 1990 took a different approach by replacing the deficit targets of GRH with mechanisms to enforce agreed levels of discretionary spending, and to ensure the budget neutrality of new spending and taxation laws (Box 1). The original Act covered FY 1991–FY 1995, but the Act was extended in 1993 and 1997 and currently applies through the end of FY 2002.²

Box 1. The Main Provisions of the BEA

The BEA has three main features:

Caps on discretionary spending: Discretionary spending consists of outlays not covered by permanent law and represents roughly one-third of total federal outlays, including almost all defense expenditure, salaries and other operating expenses of government, and many grant programs. The BEA defines limits (or “caps”) in nominal terms for specific discretionary spending categories for each fiscal year over a five-year period, with separate caps set for budget authority and actual outlays. Presently, there is a cap for overall discretionary spending, as well as separate caps for highway, mass transit, and conservation spending, but at different times during the 1990s, either a single cap for all discretionary spending or separate caps for different spending categories have applied. The legislation allows for breaches of the caps in the case of “emergencies.”

Pay-as-you-go (PAYGO): The PAYGO requirement covers tax receipts and mandatory (or direct) spending. Mandatory spending is controlled by permanent laws, and includes Medicare, Medicaid, unemployment benefits, and farm price supports. Under PAYGO, any legislation that increases mandatory spending or reduces revenues must be accompanied by legislation that specifies offsetting mandatory spending reductions or tax increases over a five-year period. PAYGO rules do not apply to changes in mandatory spending and receipts that are not the result of new laws, such as the effects of cost-of-living increases, interest rate changes, or demographic changes. PAYGO does not apply to Social Security.

Sequestration: Sequestration procedures are used to enforce the BEA. For discretionary spending, if the amount of budget authority specified in an appropriation act, or the outlays in a particular year, exceed the corresponding caps, the BEA requires a reduction in spending in the relevant category by a uniform percentage. Special rules are specified for reducing some programs, and others are exempt from sequestration entirely. For mandatory spending and revenues, the Office of Management and Budget is required to estimate whether the new laws enacted meet the PAYGO requirements. If they do not, a uniform reduction is required across all mandatory spending programs that are not exempt or subject to special rules. These latter categories cover Social Security, interest on public debt, Medicaid, and Medicare, leaving only 3 percent of mandatory spending subject to sequestration. Sequestration procedures have been enacted only once, in 1991.

² The fiscal year runs from October 1 to September 30.

C. Assessing the BEA Rules

4. Deficit reduction during the 1990s was the result of both rising tax revenues and falling expenditures (Figure 2). It is impossible to say with certainty how much the BEA rules contributed to this fiscal consolidation, not least because the counterfactual—that is, what the deficit would have been in the absence of these rules—is not known. Nonetheless, this section reviews the effectiveness of the BEA rules from a variety of different perspectives: the design of the BEA’s rules compared to those of the GRH; trends in spending; accounting for the role of economic growth in reducing the deficit; and enforcement and budget transparency issues.

BEA design improvements

5. The design of the BEA enforcement mechanisms are widely viewed as a significant improvement over the GRH procedures, in at least three respects.³ First, the BEA rules apply to outturns, while the GRH provisions applied only to deficit targets and thereby encouraged budgets to be based on overly optimistic macroeconomic assumptions. Second, the BEA applies to spending and tax laws, over which the government has direct control, and thus it has held lawmakers accountable for the costs of the laws they enact. In contrast, the deficit targets under GRH were subject to many factors beyond government control. Third, the combination of overoptimistic assumptions and a focus on the deficit made the amounts subject to sequestration under GRH so large as to lose credibility. Sequestration under the BEA, although only applied once in 1991, has been a more credible deterrent—at least until the late 1990s when it was circumvented by large emergency appropriations and adjustments to the caps, as discussed below.

Trends in discretionary and mandatory spending

6. During FY 1991–FY 1998, discretionary spending outlays were within the BEA ceilings (with only minor adjustments to the original caps), and discretionary spending fell as a share of GDP (Table 1 and Figure 3). However, substantial reductions in defense spending over this period made room for additional nondefense discretionary spending (after separate defense and nondefense caps expired at the end of FY 1993). Moreover, seen in a longer-term perspective, nondefense discretionary spending as a share of GDP increased steadily during the 1960s and 1970s, fell in the 1980s, and remained broadly constant during the 1990s. This suggests that the BEA discretionary spending ceilings served to lock in spending reductions achieved in the 1980s rather than precipitate a major reduction in discretionary expenditure. Since FY 1999, with the emergence of actual and prospective budget surpluses, spending caps were exceeded by classifying large amounts of expenditure as emergency spending, and by adjusting upward the 1997 ceilings for 2001 and 2002 (see Table 1).

³ See Reischauer (1997), Davis (1997), Blinder and Yellen (2001), GAO (2002), and Penner (2002).

7. Mandatory spending has fallen slightly as a share of GDP since 1991 (Figure 4). Although PAYGO did not completely halt the enactment of new spending initiatives—e.g., the children’s health insurance program enacted in the late 1990s—several studies have argued that the PAYGO requirement was effective in discouraging new mandatory spending initiatives and tax cuts. Elmendorf, Liebman, and Wilcox (2001), for example, emphasize the relative *lack* of tax cuts and spending increases in the face of large surpluses at the end of the 1990s.⁴ In addition, Schick (2000) argues that the PAYGO rules may have encouraged some reforms of the welfare system, such as converting Aid to Families with Dependent Children from an open-ended entitlement to a fixed block grant.

The role of economic growth

8. In achieving fiscal consolidation, the importance of the BEA relative to strong economic growth during the 1990s remains an open question. Anderson (1999) notes that while discretionary spending outturns were close to the BEA limits between FY 1993 and FY 1998, outturns for mandatory spending and revenues were very different from the projections made in January 1993. He argues, therefore, that the effects of unexpectedly strong growth on revenues and mandatory spending were more important than the limits on discretionary spending in achieving deficit reduction. This is illustrated in Figure 5, which shows the CBO’s one-year-ahead forecast errors for revenues and expenditure that can be ascribed to economic factors. Significant and prolonged underprediction of the effect of economic growth on revenues and on some mandatory spending programs apparently played an important role in assisting deficit reduction.

9. In contrast, comparisons of structural and actual budget balances suggest that economic growth played a more limited role in fiscal consolidation. Removing the impact of cyclical factors from changes in the budget balance indicates the extent to which structural factors—including the budget rules—contributed to consolidation. Table 2 shows three different estimates of the contribution of cyclical factors to fiscal consolidation between FY 1992 and FY 2000. These estimates suggest that structural factors played a more important role in the overall improvement in the budget balance.⁵ By implication, the BEA enforcement mechanisms, as well as other structural factors, including the tax increases of 1990 and 1993 and lower defense expenditures following the end of the Cold War, contributed to the improvement in the fiscal position.

⁴ See also Joyce (1996) and CBO (2002).

⁵ See also Leidy (1998) and Blinder and Yellen (2001).

Enforcement and budget transparency

10. With the emergence of fiscal surpluses beginning in FY 1998, the spending caps and PAYGO were routinely circumvented using a range of devices.⁶

- **Emergency appropriations** are exempt from BEA rules, and the specific criteria for defining an emergency have not been codified. This exemption was used infrequently between FY 1991 and FY 1998, when annual adjustments to the caps for emergency requirements averaged less than \$7 billion. However, during FY 1999 and FY 2000 annual emergency appropriations increased to over \$30 billion, including appropriations for the long-anticipated 2000 census and for farm subsidies.
- **Advance appropriations** occur when Congress appropriates funds for spending in a future year. Under BEA scoring, these appropriations are scored against the caps in the later year. Advance appropriations were increasingly used from FY 1999 as a means of increasing pressure on subsequent budgets to either raise the ceilings or engage in other accounting mechanisms to augment spending.
- **Rescissions** of previous appropriations can also be used to make room for additional spending under the caps. For example, Congress cancelled dormant funds for weapons systems that had not been spent for technical reasons, and used the room to appropriate additional spending under the caps.
- **Structuring measures to reduce costs during the budget period that is subject to scoring.** Examples include: (i) extensions to Medicaid in the late 1980s and early 1990s that were phased in so that the first year of spending increases occurred beyond the scoring period; by the time that year was incorporated into the baseline, the increase was already authorized by law; (ii) the 2001 tax reforms included a “sunset” provision to repeal all measures at the end of 2010, and thereby reduced the cost of the measures during the FY 2002–FY 2011 budget window.
- **Repeatedly extending an expiring tax.** The federal tax on airline tickets expired in 1996 but was renewed in 1997 and 1998, allowing revenue gains to be scored as offsets to other measures. In contrast, a permanent tax increase can only be scored once.
- **Resetting the PAYGO scorecard balance to zero.** The CBO and OMB maintain a “scorecard” of the cumulative effect on the budget balance of legislated changes during a congressional year. Under normal application of the PAYGO rules, if the calculated net change is negative, then offsets have to be made elsewhere. However, this requirement has been circumvented by setting the PAYGO scorecard to zero. For example, although legislation enacted by the 107th Congress—including the June 2001 tax cuts—reduced the

⁶ For further discussion, see Schick (2000).

overall budget surplus, offsetting actions were not required because Congress enacted other legislation that instructed the OMB to change the PAYGO balances for 2001 and 2002 to zero.

11. More generally, the BEA enforcement mechanisms, and the subsequent devices used to circumvent them, have added complexity to the federal budget process. It has also been suggested that the BEA rules have encouraged increased recourse to extra-budgetary devices including regulatory instruments and unfunded mandates. Nonetheless, the BEA has improved fiscal transparency in many respects, including by requiring full listings, cost estimates, and intensified scrutiny of all tax expenditures. In addition, the scorekeeping guidelines were codified and published in the 1997 Balanced Budget Act, and the scorekeeping period was extended from five to ten years, in an attempt to reduce the scope for timing shifts. Finally, where all budget rules and processes are subject to abuse, several studies have concluded that the BEA has resulted in less gimmickry than occurred under GRH.⁷

D. Options for Reform

12. Given the recent erosion of the U.S. fiscal position and the longer-term fiscal pressures that demographic trends are likely to imply, there is an evident need for strengthened budget discipline. International experience clearly suggests that fiscal rules cannot substitute for an underlying political commitment to fiscal discipline and longer-term fiscal sustainability, and the revenue and expenditure policies that would be required.⁸ If the political commitment is present, the U.S. experience between 1990 and 1998 suggests that BEA-type rules can play a useful role in bolstering budget discipline.

13. At the same time, however, the erosion of the effectiveness of the BEA's rules during the more recent period indicates the need for reform. Some of the specific options under discussion include the following:⁹

- **Limit discretionary spending caps to budget authority only.** Some argue that separate caps on budget authority and outlays created incentives for delaying obligations, and favor slower spend-out programs over those with faster spend-out rates. Focusing the caps simply on appropriations would also improve accountability

⁷ See for example, Auerbach (1994) and Joyce (1996).

⁸ Hemming and Kell (2002).

⁹ See GAO (2002) and other recent submissions to the House Committee on the Budget. Note, however, that the Administration's FY 2003 Budget includes some proposals besides refining the caps and PAYGO provisions, such as replacing the Congress's Concurrent Resolution with a Joint Budget Resolution, approved by the Congress and signed by the President that would have the force of law; correcting the constitutional flaw in the Line Item Veto Act, and linking the caps to debt reduction; and introducing biennial budgeting.

given that Congress has more control in a given year over budget appropriations as opposed to outlays.

- **Clarify and codify into law the criteria for emergency spending.** For example, the House Budget Resolution for FY 2002 defines an emergency as a situation (other than a threat to national security) that requires new budget authority to prevent the imminent loss of life or property, and is sudden, urgent, unforeseen, and temporary. This more stringent definition could be combined with the introduction of a **contingency reserve for emergencies**, which would be included in the spending cap, possibly calculated as an average of emergency/disaster spending over the past five or ten years.
- **Redesign PAYGO to trigger examination of the “base.”** Under the current rules, cost increases of existing mandatory programs are exempt from the PAYGO requirement. This provision favors existing policies over possible new programs and constrains the budget from reflecting current priorities. Recent suggestions have included the introduction of a “look back” procedures: Congress would specify targets for mandatory programs several years into the future; if these targets seem likely (or turn out) to be exceeded, the President could recommend in his budget that some or all of the overage be recouped.
- **Make the PAYGO requirement contingent on a level or forecast of the debt-to-GDP ratio.** Under this approach, additional spending or tax cuts would be permitted without offsetting measures if the debt ratio is below some key level, or projected to decline by a certain amount. This would help prevent PAYGO from becoming overly restrictive if fiscal outturns are better than expected.
- **Clarify and refine the scorekeeping guidelines.** One option would be to require all tax and spending programs be scored as fully phased in within, say, five years, preventing the use of a gradual phasing of measures to reduce their scorecard cost below the true long-term cost. A second possibility would be to codify criteria for deciding which receipts are classified as revenue (and therefore subject to PAYGO requirements) and which as user fees (which can be used to offset discretionary spending).

List of References

- Anderson, B., 1999, "Budgeting in a Surplus Environment," paper prepared for the 1999 Annual Meeting of Senior Budget Officials, OECD.
- Auerbach, A., 1994, "The U.S. Fiscal Problem" in S. Fischer and J. Rotemberg, eds., *NBER Macroeconomics Manual*, Vol. 9 (Cambridge, MA: MIT Press).
- Blinder, A., and J. Yellen, 2001, *The Fabulous Decade: Macroeconomic Lessons from the 1990s* (Washington, D.C.: A Century Foundation Report).
- Congressional Budget Office, 2002, *Budget and Economic Outlook, Fiscal Years 2003–12* (Washington, D.C.: CBO).
- Elmendorf, D., J. Liebman, and D. Wilcox, 2001, "Fiscal and Social Security Policy during the 1990s," NBER Working Paper No. 8488.
- General Accounting Office, 2002, "Budget Process: Extending Budget Controls," Testimony before the Committee on the Budget, Washington, D.C., April 25.
- Hemming, R., and M. Kell, 2001, "Promoting Fiscal Responsibility: Transparency, Rules, and Independent Fiscal Authorities" in *Fiscal Rules* (Rome: Banca d'Italia).
- IMF, 2002, *World Economic Outlook*, April (Washington, D.C.: IMF)
- Joyce, P., 1996, "Congressional Budget Reform: The Unanticipated Implications for Federal Policy Making," *Public Administration Review*, Vol. 56 (July/August) pp. 316–342.
- Leidy, M., 1998, "A Postmortem on the Achievement of Federal Fiscal Balance," *United States—Selected Issues*, SM/98/188 (Washington, D.C.: IMF).
- OECD, 2001, *Economic Outlook*, December (Paris: OECD).
- Penner, R., 2002, *Repairing the Congressional Budget Process* (Washington, D.C.: The Urban Institute).
- Reischauer, R., 1997, "The Unfulfillable Promise" in *Setting National Priorities*, ed. by R. Reischauer (Washington, D.C.: The Brookings Institution Press).
- Reischauer, R., 2002, "Framing the Budget Debate for the Future," Testimony before the Committee on the Budget, Washington, D.C., January 29.
- Schick, A., 2000, *The Federal Budget: Politics, Policy, Process* (Washington, D.C.: The Brookings Institution Press).

Table 1. United States: Adjustments to Discretionary Spending Caps
(In billions of dollars)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Statutory caps set in BEA 1/	514.4	524.9	534	534.8	540.8	547.3	547.3	547.9	559.3	564.3	564.4	560.8
Adjustments for changes in:												
Concepts/definitions		1	2.4	2.3	3	-0.5	-2.6	-2.8	-0.3	0.1	-0.1	-3.3
Inflation		-0.3	-2.5	-5.8	-8.8	1.8	2.3	0.9				
Emergency requirements	1.1	1.8	5.4	9	10.1	6.4	8.1	7	22.9	35.8	20.5	31.7
Desert Shield/Desert Storm	33.3	14.9	7.6	2.8	1.1	0						
Amendments to caps for FY 2001											58.6	
Amendments to caps for FY 2002												133.1
Revised spending limits 2/	551.6	545.7	550.4	547.6	548.7	552.7	553.6	560.2	584.2	604.2	652.2	731.3
Outlays 3/	533.3	533.8	539.4	541.4	544.9	532.7	547.2	552.1	572	614.8	657.4	740.5

Source: Office of Management and Budget.

1/ As amended in 1993 and 1997.

2/ Numerous smaller adjustments not shown.

3/ 2002 figure is an estimate, as of January 2002.

Table 2. United States: Cyclical Contribution to Fiscal Consolidation
(In percent of GDP)

	1992	2000	Change
OECD 1/			
Actual deficit 1/	-5.9	1.7	7.6
Structural deficit	-5.3	1.3	<u>6.6</u>
Cyclical component			1.0
IMF			
Actual deficit 2/	-4.4	1.5	5.9
Structural deficit	-3.1	1.0	<u>4.1</u>
Cyclical component			1.8
Congressional Budget Office			
Actual deficit 3/	-4.7	2.4	7.1
Standardized deficit 4/	-2.9	1.3	<u>4.2</u>
Cyclical component			1.9
Other factors 5/			1.0

Sources: OECD (2001); IMF (2002); and CBO (2002).

1/ General government financial balance.

2/ General government fiscal balance.

3/ Federal government.

4/ Adjusted for cyclical and other factors.

5/ Includes deposit insurance, receipts from spectrum licenses, timing adjustments, and contributions for Desert Storm.

Figure 2. United States: Federal Outlays and Revenues
(In percent of GDP)

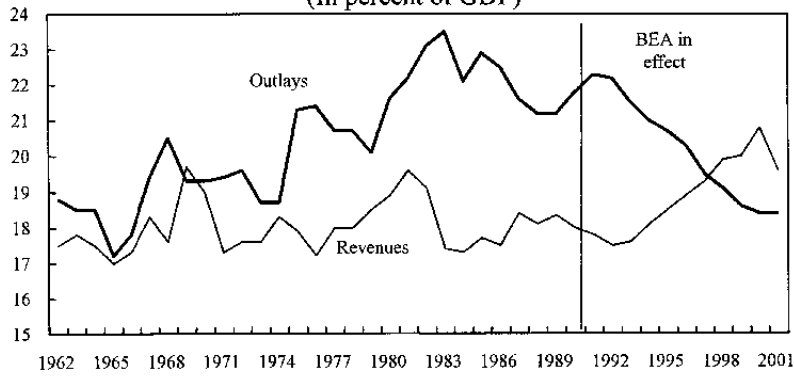


Figure 3. United States: Discretionary Spending
(In percent of GDP)

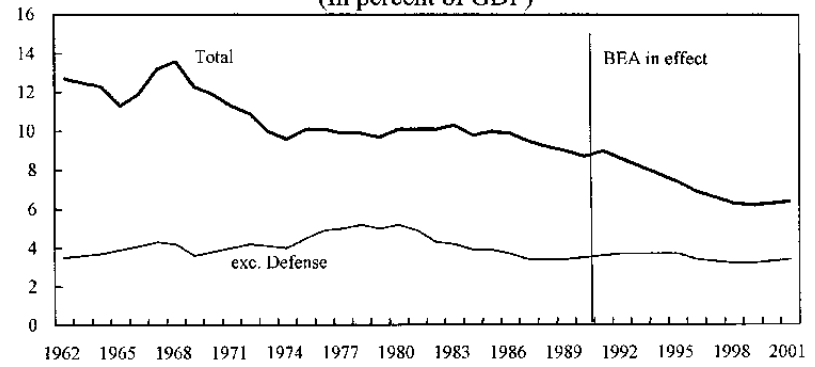


Figure 4. United States: Mandatory Spending
(In percent of GDP)

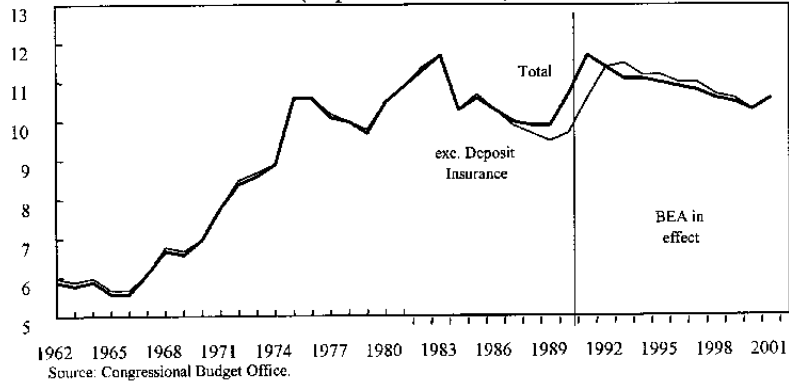
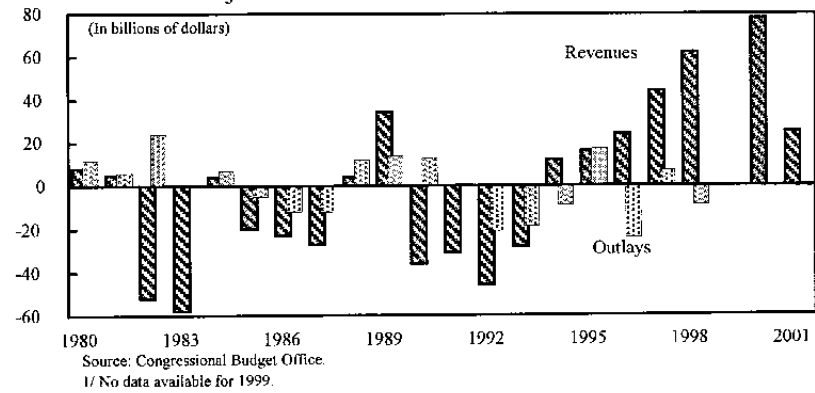


Figure 5. United States:
Projection Errors Due to Economic Factors 1/



IX. SOCIAL SECURITY, MEDICARE, AND LONG-TERM U.S. FISCAL PROSPECTS¹

1. The re-emergence of U.S. budget deficits has revived concern regarding the implications of demographic trends for the longer-term fiscal position. Substantial progress had been made in addressing fiscal imbalances during the 1990s, and by 2001 projections were for large surpluses and the elimination of public debt by 2009. However, the fiscal situation has eroded significantly since that time and while unified budget surpluses are expected to re-emerge by FY 2005, these are now projected to be smaller than the surpluses of the Social Security system. Moreover, the Trustees of the Social Security and Medicare trust funds continue to stress the actuarial deficits of these systems in the face of the impending retirement of the baby-boom generation and pressures on health care costs.

2. This chapter briefly reviews these issues. Section A describes the Social Security and Medicare systems, and their longer-term fiscal implications. Section B discusses the reforms to Social Security that have recently been put forward by a presidential commission, and reviews Medicare reform initiatives. Section C offers a few concluding remarks.

A. Social Security, Medicare, and the Long-Term Fiscal Situation

3. There are two principal federal programs in the United States that offer support for the elderly (Box 1). Social Security provides retirement income to the aged, and is funded from payroll taxes on the working-age population. The Medicare system provides the elderly with medical insurance. This latter program is only partly funded by payroll taxes and premium payments by retirees, with the balance of its resources coming from the general revenues of the federal government.

4. Demographic and other pressures on these systems are expected to increase significantly in coming decades. In particular, the retirement of the baby-boom generation, declines in the fertility rate, and increases in longevity are projected to cause the dependency rate—the ratio of retirees to the working-age population—to rise from around 2:10 presently to nearly 4:10 by the middle of the century, significantly reducing the tax base relative to the numbers of beneficiaries. Moreover, rapid increases in medical care costs are also expected to place additional pressures on the Medicare system.

¹ Prepared by Paula De Masi and Christopher Towe.

Box 1. The Social Security and Medicare Systems

Old-Age and Survivors Insurance and Disability Insurance (OASDI)

- Participation in the OASDI system is mandatory and near-universal. The programs are funded by a 12.4 percent payroll tax on labor income up to an inflation-adjusted ceiling—\$80,400 in 2001. Although retirement benefits may be drawn as early as age 62, an unreduced pension is provided at the normal retirement age—presently 65 and scheduled to increase to 67 by 2022.
- Benefits are based on the average of monthly earnings of a worker's 35 highest-earning years prior to eligibility up to a maximum—\$1,500 per month in 2001. In setting post-retirement benefits, pre-retirement earnings are indexed to average wage growth, and post-retirement benefits are indexed to CPI inflation. Significant disability and survivor benefits also apply.
- Both contributions and benefits are subject to tax. The employee's portion of the payroll tax—6.2 percentage points—is included in earned income for tax purposes. Benefits are included in taxable income according to a graduated formula—they are 100 percent excluded below a certain income threshold, with the exclusion rate falling to a minimum 15 percent at higher incomes. Taxes paid on up to 50 percent of benefits are returned to the OASDI system.
- The cash surpluses of the OASDI system are held in trust funds, and are invested in nonmarketable, interest-bearing government securities.

Medicare

- The Medicare program provides health insurance coverage for the elderly and disabled.
- Part A provides hospital insurance (HI) and is funded by a 2.9 percent payroll tax—which in this case applies to income without a ceiling.
- Part B provides supplemental medical insurance (SMI) that covers the cost of physician and other services, and is funded in part by premiums paid by retirees. These cover only around 25 percent of SMI costs, with the balance coming from general government revenues.
- The cash surpluses of the HI system are also held in a trust fund, and are invested in nonmarketable, interest-bearing government securities.

5. Despite their present cash surpluses, these systems are estimated to be in significant deficit on an actuarial basis. For example, the combined OASDI and Medicare surplus was estimated at nearly 1 percent of GDP in FY 2002 (excluding interest receipts), and the balances in their trust funds totaled roughly 14 percent of GDP. However, the programs are expected to begin running deficits within the next two decades, and over a 75-year projection period their combined unfunded liability is estimated at roughly 80 percent of GDP.²

² These estimates are staff calculations based on the actuarial estimates contained in the 2002 trustees' reports for the OASDI and Medicare systems.

- The **OASDI system** is projected to fall into deficit (excluding interest receipts) by 2020, with deficits rising to over 2 percent of GDP by the end of the 75-year projection horizon. The assets held by the OASDI trust funds are expected to be exhausted in 2041, and the system has an unfunded liability estimated at around 35 percent of GDP, equivalent to an increase in the payroll tax of 1.87 percentage points.
- The situation of the **Medicare HI system** is worse, since its current surplus is more modest, the assets in its trust fund total only around 2 percent of GDP, and health care costs are rising rapidly. The system is projected to run deficits by 2020, which grow to over 3½ percent of GDP by the end of the 75-year projection period. As a result, its unfunded liability is estimated at around 50 percent of GDP, equivalent to a 2.02 percentage point increase in the contribution rate.
- The position of the **Medicare SMI system** is even more worrisome. The SMI system is run purely on a pay-as-you-go basis—i.e., there are no trust fund assets that have been accrued—and premium payments cover only a part of its outlays. The Administration's FY 2003 budget estimated that the unfunded liability of the SMI system would be roughly an additional 80 percent of GDP, equivalent to 3.37 percentages points of the payroll tax.

6. Figure 1 illustrates the longer-term pressures on the system. For example, in the baseline scenario, both the OASDI and HI systems begin to run significant primary deficits in the next 20 years, with a substantial buildup of liabilities resulting thereafter. An immediate 1.87 percentage point increase in payroll taxes to meet the actuarial deficit would improve the situation but—despite a significant increase in tax rates—the systems would still be left with substantial cash flow deficits in the longer run. By contrast, more modest cuts in benefit growth—e.g., reducing the growth of OASDI benefits by ½ percentage point beginning in 2010, and slowing the pace of HI benefits by 1½ percentage point in the same year—would achieve actuarial balance and keep the cash flow deficits relatively modest over the 75-year projection period.

7. These projections are subject to considerable uncertainty. For example, compared to the baseline estimate of the combined actuarial OASDI and HI deficit of 3.89 percent of taxable payrolls over a 75-year period, the Trustees' report illustrates that plausible low-cost and high-cost scenarios would yield estimates ranging from an actuarial surplus of 0.64 percent to a deficit of 11.47 percent of payrolls. In all cases examined, the real interest rate is assumed to remain significantly higher than the real growth rate of the economy, which significantly exacerbates the systems' debt dynamics.

8. The longer-run fiscal implications of these trends are significant. In the absence of reforms, outlays on Social Security and Medicare programs are projected to rise rapidly from around 7 percent of GDP presently to nearly 10 percent by 2023, increasing further thereafter to reach nearly 16 percent of GDP by the end of the 75-year horizon (Figure 2). Simple budget simulations illustrate that these trends would cause the unified balance to erode

beginning in the next decade.³ As a result, federal debt held by the public would decline to around 5 percent of GDP just after 2020, but would then begin to increase rapidly as spending pressures intensified.

9. Although serious, the financial situation of the U.S. social security system is less dire than in many other industrial countries. In a recent OECD study, the United States was considered among the “slower-aging economies,” compared to other industrial countries, owing to its relatively high immigration and fertility rates, and relatively modest life expectancy. As a result, the projected increase in its age-related spending—including outlays for pensions and health care—was estimated to be at or somewhat less than average (table below). In view of the U.S. system’s relatively large trust fund assets and substantial contribution rate, its unfunded liability is also typically viewed as smaller than in other industrial countries. For example, Kohl and O’Brien (1998) estimate the unfunded liability of the Japanese, Italian, and Swedish systems as a share of GDP as 70 percent, 60 percent, and 132 percent, respectively.

Cross-Country Comparisons of Pension Systems (In percent of GDP)							
	United States	Advanced Country Average	Canada	Italy	Germany	Japan	United Kingdom
Age-related spending							
2000 level	11.2	16.9	17.9	14.2	11.8	13.7	15.6
Increase to 2050	5.5	5.9	8.7	-0.3	5.0	3.0	0.2
Unfunded liability (1994)	23	...	101	60	...	70	24
Sources: Age-related spending: OECD (2001a); and unfunded liability: Kohl and O’Brien (1998).							

B. Social Security Reform: The President’s Social Security Reform Commission

10. The President established a commission in early 2001 to examine options for reforming Social Security, taking into account several principles. In particular, reforms were supposed to (i) maintain benefits for retirees and near-retirees, (ii) avoid any increase in

³ The simulations are based on the assumption that the balance for the non-Medicare, non-OASDI, and noninterest federal budget remains constant as a share of GDP after 2012; that net interest payments on federal debt increase in line with the stock of debt; and that OASDI and Medicare spending as a share of GDP rise in line with the projections contained in the 2002 Trustee’s reports.

social security taxes; (iii) maintain the survivor and disability benefits; (iv) offer personal retirement accounts as a supplement to social security; and (v) avoid investing social security trust funds in the stock market.

11. The commission reported its findings in December 2001 and described three alternative plans whose key elements included:

- **Personal retirement accounts (PRAs):** Participants would be permitted to divert a portion—up to 4 percentage points—of their OASDI contributions to personal retirement accounts. OASDI benefits would be reduced by the amount of direct contributions to PRAs plus an implicit real return of up to 3½ percent.
- **Indexation:** The commission suggested moving to a system in which the pensionable earnings of future retirees would be indexed to prices rather than wages, which (as illustrated above) would tend to lower the growth of benefits substantially. In addition, the formula for calculating benefits could be adjusted to increase its progressivity.
- **Minimum benefit:** In some of the reform options considered, a worker with 30 years of employment would be provided a minimum benefit of up to 120 percent of the poverty line.

12. Although the report argued that PRAs would have important advantages—including increasing the rate of return on employee contributions and possibly increasing national saving—the report also clearly illustrated that PRAs would exacerbate the system’s insolvency. For example, introducing a PRA that would divert 2 percentage points from the OASDI payroll tax, would significantly reduce the cash flow available to meet current obligations. As a result, “transition payments” from general revenues to the trust funds would be needed over an extended period until benefit outlays were reduced to their new steady-state level. The net present value of these payments over the 75-year period would be equivalent to 10 percent of GDP.

13. The report also illustrated that reducing the generosity of the indexation of OASDI benefits would significantly improve the financial situation of the system, but that significant additional funding would still be required to close the system’s actuarial deficit. For example, in the third reform option considered, which assumed amending the benefit formula and a relatively modest PRA—i.e., a diversion of only 1 percentage point of payroll taxes—would still require significant transition payments as well as a permanent increase in system financing equivalent to 0.62 percent of the payroll tax.

C. Medicare Reform

14. With growing awareness of the longer-term fiscal pressures associated with Medicare, the Balanced Budget Act of 1997 legislated a number of reforms to the system.⁴ In particular, payments to physicians and hospitals were reduced, and in order to contain costs and promote competition in health care delivery, a wider variety of private plans were permitted to contract with Medicare, including health maintenance organizations, provider-sponsored organizations, and preferred provider organizations.

15. Although a number of subsequent reform proposals have been released, none have resulted in any significant changes to the Medicare system, and cost pressures have intensified. Recent Medicare proposals have focused on modernizing the benefit package which is widely regarded as overly limited in that only basic medical services are covered. In particular, prescription drugs are not a covered expense, and a variety of proposals have suggested how such a benefit could be introduced. While improving Medicare coverage, a prescription drug benefit would entail considerable costs, exacerbating the underlying financial pressures of the system, particularly given the rising costs of prescription drugs. For example, Congressional Budget Office (2002b) estimates suggest that in 2005, a prescription drug benefit—which pays for 100 percent of expenses over a \$3,000 deductible—would cost about \$50 billion. Such an estimate understates the true cost since it ignores subsidies to cover the federal share of premiums, cost-sharing for low-income enrollees, and the costs of creating and administering the benefit.

16. As outlined in Congressional Budget Office (2001b), options for comprehensive longer-term reform to restore solvency to the Medicare system might include an increase in premium revenues; a change in eligibility conditions to reduce the number of beneficiaries; cost reductions per beneficiary; or an increase in payroll taxes.⁵ However, more fundamental structural reform of the system has also been under discussion. For example, under a “premium support approach” Medicare recipients would be able to choose among a variety of competing private sector health plans with the government paying a portion of the premium. Private plans would be required to submit the level of premium at which they would provide the basic Medicare benefits package. Beneficiaries would enroll in at least one plan for a modest premium but could pay additional premiums for a more expensive plan. Although proponents of this approach have argued that such a plan would improve choice and reduce Medicare costs, others have doubted the scope for cost-saving.

⁴ The Balanced Budget Act also established a National Bipartisan Commission on the Future of Medicare which was charged with making recommendations by March 1999 to “strengthen and improve” the Medicare system in time for the retirement of the baby-boom generation. The 17-member commission failed to reach consensus on a single plan, and therefore was unable to make any formal recommendations.

⁵ The Administration has proposed a Medicare modernization program, and called for additional funding rising to \$19 billion by FY 2012, but no details appear available.

D. Concluding Remarks

17. The foregoing discussion has illustrated that demographic and other trends imply that the Social Security and Medicare systems are likely to place significant longer-term pressures on the U.S. fiscal system. Little progress has been made toward addressing the problems of the Medicare system, despite the very large deficits of the SMI and HI systems. Instead, the Administration's budget and the Congress appear to be focusing their attention on expanding benefits in the area of prescription drugs rather than addressing the fundamental reforms that would assure the programs' longer-term solvency.

18. In contrast, specific proposals for reform of Social Security have been put forward by the President's commission. The commission's report usefully illustrated that relatively small changes in benefit formulas could substantially improve the financial position of the system and that directing contributions to private retirement accounts would result in significant transition costs. Nonetheless, whether this recent set of proposals will trigger the broader reforms that are needed remains to be seen. Significant issues still need to be resolved:

- **Guarantees:** The commission's reform proposals explicitly do not include a guaranteed minimum return on PRA investments. Since PRAs would be seen as a replacement of at least part of the existing OASDI entitlement, there may be pressure to attach at least some insurance to these accounts, which would increase their fiscal cost.
- **Tax issues:** The tax treatment of OASDI is somewhat anomalous, since both contributions and benefits are taxable, but benefits are combined with other income by a formula that increases the progressivity of the system. It is unclear how PRAs would be treated, but to the extent that participants are able to voluntarily increase their contributions, there is a stronger argument for adopting similar tax treatment as for other retirement savings instruments (IRAs, 401(k)s, etc.).
- **Administrative issues:** The commission appears to favor PRAs held in the form of investment vehicles that would be somewhat constrained in order to minimize moral hazards related to excessive risk-taking by participants in their investment decisions, and would allow lump-sum distributions versus annuitization at retirement only to the extent that retirees could demonstrate sufficient wealth. As a number of authors have noted, a system of annuities could be expensive to administer and would pose challenges for regulatory and tax policies.⁶

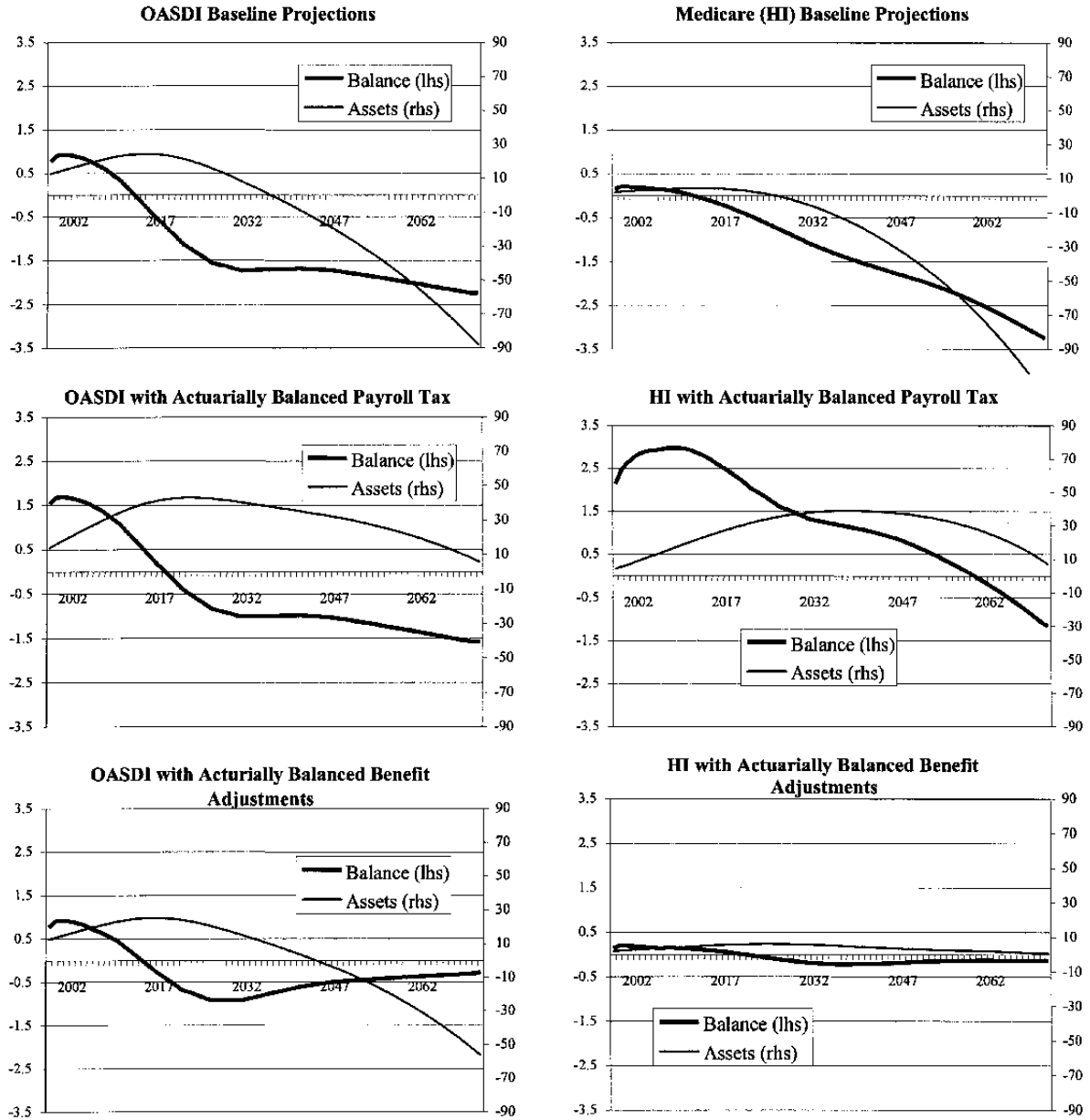
⁶ CBO (2001a) notes, for example, that there would be a strong incentive for providers to discriminate among retirees according to risk class. Diamond and Orszag (2002) also note that the administrative costs of PRAs would likely be significantly larger in the initial years than assumed by the President's commission, and these could be prohibitive when the size of accounts is small.

- **Benefits:** The report offers relatively limited options regarding cuts in OASDI benefits and more stringent alternatives could be considered. For example, pre-retirement earnings and post-retirement benefits could be indexed to the CPI less an ad hoc adjustment for the bias it contains, or by the national accounts deflator for consumer expenditures. Consideration could also be given to increasing the pace at which the normal retirement age is increased or lengthening the computation period for calculating benefits.
- **Supplemental Security Income:** The Commission's report acknowledges that reforms to the OASDI system should take into account the SSI system, and increases in the minimum OASDI benefits would likely need to be attached by a parallel increase in the SSI benefit.

List of References

- Board of Trustees, Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds, 2002, "The 2002 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds," March.
- Congressional Budget Office, 2002a, *The Budget and Economic Outlook: Fiscal Years 2003–2012* (Washington, D.C.: U.S. GPO).
- Congressional Budget Office, 2002b, "Projections of Medicare and Prescription Drug Spending," statement of Dan L. Crippen before the Committee on Finance, United States Senate, March 7.
- Congressional Budget Office, 2001a, *Social Security: A Primer* (Washington, D.C.: U.S. GPO).
- Congressional Budget Office, 2001b, *Budget Options* (Washington, D.C.: U.S. GPO).
- Diamond, P. A., and P. R. Orszag, 2002, "An Assessment of the Proposals of the President's Commission to Strengthen Social Security," unpublished mimeo, June.
- Kohl, R. and P. O'Brien, 1998, "The Macroeconomics of Ageing, Pensions, and Savings: A Survey," OECD Economics Department Working Paper 100, June.
- Mackenzie, G. A., 2001, "The Distribution Phase of an Individual Accounts Reform of Social Security: The Potential for Private Sector Annuities," Urban Institute, unpublished mimeo, November.
- OECD, 2001a, *OECD Economic Outlook*, Volume 2001/1, No. 69, June.
- OECD, 2001b, *OECD Economic Surveys: United States* (Paris: OECD).
- President's Commission to Strengthen Social Security, 2001, "Strengthening Social Security and Creating Personal Wealth for All Americans," December 21.

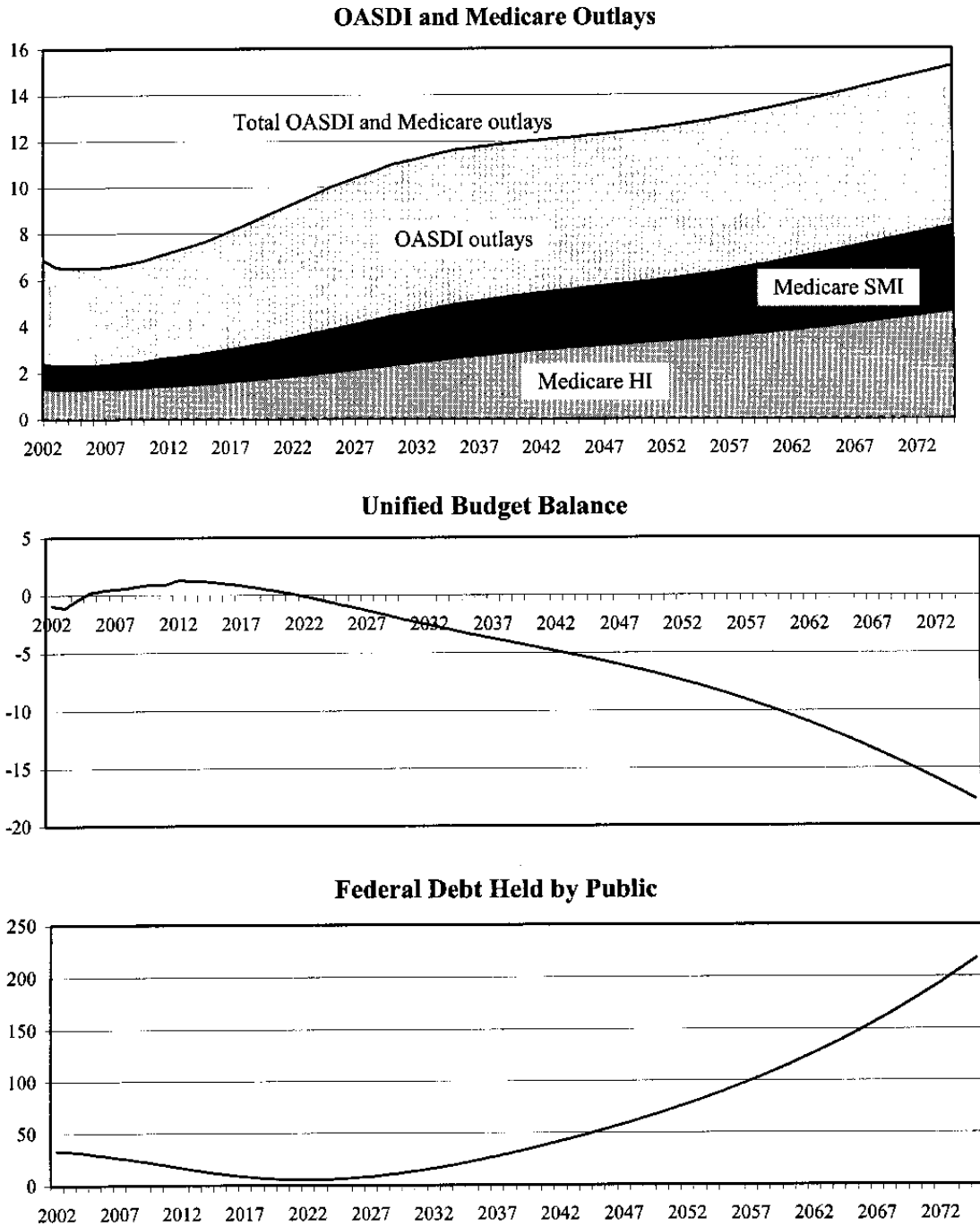
Figure 1. United States: Social Security and Medicare Projections
(In percent of GDP)



Source: Staff estimates based on long-range projections in the 2002 Trustees' reports. Benefit adjustments involve assuming that OASDI and HI benefits grow 0.5 percent and 1.6 percent slower than the baseline beginning in 2010. Balance is equal to the difference between non-interest receipts and expenditure.

Figure 2. United States: Budget Projections

(In percent of GDP)



Source: Staff estimates.