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**United States: Selected Issues**

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INTERNATIONAL MONETARY FUND

UNITED STATES OF AMERICA

**Selected Issues**

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July 5, 2001

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## I. The Condition of Household, Corporate, and Bank Balance Sheets[1]

1. During the 1990s, households and corporations increased their debt levels sharply, raising concern about their vulnerability during a prolonged economic downturn. A key factor in determining the depth and duration of the current economic slowdown rests on whether households and businesses encounter balance sheet problems which could spill over to the banking sector. Financial indicators suggest that household and corporate balance sheets generally remain healthy so far. A rise in mortgage debt accounts for much of the overall increase in household debt levels, but low unemployment and continued relatively high household net worth have meant that the credit quality of households has been solid. As long as unemployment remains relatively low, debt default is unlikely to create significant financial problems. Leverage and liquidity ratios of U.S. corporations show that the sector is in a sound position to weather the effects of the current economic slowdown, despite some concerns arising from the significant increase in corporate bond defaults and downgrades, particularly in the telecommunication sector. Similarly, the improvement of asset quality in the banking sector during the 1990s, together with strong profitability and capital ratios, should cushion the impact of the economic slowdown on financial firms.

### A. Household Balance Sheets

2. During the second half of the 1990s, personal saving in the United States fell to new lows, while household debt levels and net worth—through the rise in stock prices—increased dramatically (Figures 1 and 2). These developments have raised concerns that in the event of a prolonged economic downturn, the household sector could face considerable strains, and through defaulting on debt and sharply curtailing consumer spending could amplify the weakness in economic activity.

3. Rising household debt is not a new development in the United States. Household debt relative to income has been trending up since the 1950s (the earliest years for which data are available), but the trend rate of growth in debt picked up in the late 1970s, reflecting innovations in financial markets which provided households with easier access to credit (see Figure 2). Continuing this trend in the 1990s, household debt reached about 110 percent of disposable income in 2000. Other major industrial countries have also experienced a trend rise in household debt, and current household liabilities relative to disposable personal income in all major industrial countries, with the exception of France and Italy, are broadly similar to that in the United States (Table 1).

4. During the 1990s, rising mortgage debt—which accounts for about 65 percent of overall debt—explains the bulk of the increase in overall U.S. household debt (Figure 3). Factors fuelling the rise in mortgage debt in the 1990s have been low unemployment, lower

[1] Prepared by Paula De Masi and Martin Kaufman.

interest rates relative to the 1980s, the rise in refinancings that allows homeowners to liquefy equity in their houses,[2] and the tax advantages associated with home equity loans.[3] In contrast, consumer debt which accounts for about 21 percent of total household debt edged up relative to personal income in the early 1990s, but has remained relatively flat in the second half of the 1990s with a trend increase in revolving consumer debt (primarily outstanding credit card balances) offset by a decrease in nonrevolving debt (consumer loans) (see Figure 3).

5. The household debt-service burden increased during the 1990s, reaching over 14 percent by the end of 2000, its highest level since the end of 1986 (Figure 4). Although consumer debt is about one-third the size of mortgage debt outstanding, required payments on consumer debt are higher because of the shorter maturity structure and typically higher interest rates. Mortgage interest rates during the 1990s have trended downward so that mortgage debt service as a percent of disposable income has remained relatively flat at 5 to 6 percent of disposable income. However, the debt-service burden is not distributed uniformly across households of different income classes. Lower-income households have a much higher debt-service burden, making them and their creditors potentially more vulnerable to an economic slowdown.[4]

6. Despite the rise in the debt-service burden, consumer delinquencies remained relatively flat in the second half of the 1990s, but increased noticeably at the end of 2000, particularly for mortgages (Figure 5). The number of personal bankruptcies declined in 1999 and 2000, from a peak in 1998, but edged up in late 2000 and early 2001 (Figure 6).

7. Although household debt relative to disposable income increased over the 1990s, total assets rose by even more, resulting in a sharp increase in net worth that peaked at about 640 percent of disposable income in 1999, before falling in 2000, mainly because of lower

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[2] Particularly in 1997–99, homeowners took advantage of lower interest rates to refinance their mortgages, with many of these refinancings involving borrowing in excess of the original balance—so-called cash-out refinancings. Although there has been considerable speculation that refinancing fuelled the consumption boom, survey evidence suggests that the effect on consumption was modest, while the impact on investment spending—that is, spending on home improvements—was probably more significant. In addition, cash-out refinancing funds were also used to pay off other debts. See P. Brady, et al. (2000).

[3] Federal tax laws allow for interest deductibility on mortgages and home equity loans but not on credit cards or other nonmortgage debt.

[4]For example, households with a debt-service burden in excess of 40 percent (a level considered to be indicative of financial distress) was about 13 percent overall, but over 30 percent for households earning less than $10,000 in 1998 (the most recent year for which data are available). See Kennickell, Starr-McCluer, and Surette (2000).

equity prices (see Figure 1).[5] Reflecting sharp gains in equity prices in the second half of the 1990s, the share of financial assets rose to about 70 percent of total assets (Figure 7, Table 2).[6] Household portfolios remain diversified, but equities as a share of financial assets doubled to about 40 percent in 1999, compared to the early 1990s (Figure 8).[7] Recent evidence in Tracy and Schneider (2001) suggests that although a number of factors may have helped to raise the household equity share—including the increased prevalence of defined contribution retirement plans and the aging of the baby-boom generation and their need to seek higher returns to have adequate savings for retirement—the most important factor has been the high relative return on equity during the second half of the 1990s. More households are now exposed to movements in equity prices, with about 50 percent of households holding equities in the late 1990s up from just 30 percent in the late 1980s.

8. Household real estate holdings—which represent the bulk of nonfinancial assets—reached $11 trillion dollars in 2000, or about one quarter of household assets. Since the mid-1990s, housing prices nationwide increased at a relatively modest average annual rate of about 4¾ percent, although they rose by over 7¾ percent in 2000 (Table 3).[8] Case (2000) suggests that recent housing price increases have been driven by fundamental factors—including low unemployment, strong growth in personal income, demographics, and gains in stock market wealth—rather than by speculation and price inertia as was the case during the boom in housing prices in the late 1980s. Therefore, the slowdown in economic activity is unlikely to trigger a sharp decline in housing prices, although a substantial decline in equity wealth and a protracted recession would likely result in falling real estate prices. Since the mid-1990s, increases in real estate prices have been considerably smaller than the rise seen in land prices in Japan during the "bubble economy" period in the 1980s.[9]

### B. Corporate Balance Sheets

9. After declining in the first half of the 1990s, corporate debt as a percent of GDP increased by nearly 10 percentage points, reaching more than 45 percent in 2000, raising

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[5] Household net worth also rose in other G7 countries over this period, but with the exception of the United Kingdom these gains were smaller than in the United States (see Table 1).

[6] In contrast, in the United Kingdom, the rise in total assets was attributable to increases in both financial and nonfinancial assets.

[7] Relative to other G7 countries, equities as a share of total assets range from a low of 8 percent in Japan, over 40 percent in France and Italy.

[8] Aggregate figures mask considerable regional price variations. For example, since the mid-1990s housing prices increased at an annual rate of 6 percent in New England and by just 3½ percent in the East South Central region.

[9] Over the period 1985 to 1990s, Japanese land prices tripled in value. See IMF (2000).

questions about the vulnerability of the corporate sector to an economic downturn (Figure 9). Broad indicators of corporate sector financial health, however, provide a reasonably encouraging picture. Various measures of leverage comprising long-term debt, total debt, long-term liabilities, and total liabilities as a share of equity have declined significantly through the 1990s (Figure 10).[10] The debt-to-equity ratio, for example, has fallen in the 1990s from an average of above 80 percent in the 1980s to below 40 percent since 1997. The stock market correction that started in 2000 has brought these measures of leverage up slightly, but they are generally less than half their levels of the 1980s. A further stock market correction of over 40 percent from the April 2001 level would have to occur for the leverage ratio to rise back to its level of the 1980s. The evolution of corporate leverage in the United States in the 1990s stands in contrast to developments in Japan during the bubble period of the 1980s; and corporate leverage in Japan in the 1980s was more than four times the level in the United States in the 1990s (Figure 11). However, individual sectors, such as telecommunications or health care, could be under increased pressures in the event that the slowdown in economic activity turns out be more prolonged.

10. Various liquidity measures suggest that the corporate sector, in aggregate, is not highly vulnerable to adverse shocks that might be associated with an economic downturn. The ratio of net interest expenditures to income before taxes, which averaged 20 percent in the 1980s, fell to an average of 11 percent in 1994–98, before rising to 12½ percent in 2000. Net interest expenses would need to rise nearly 60 percent, or income would need to fall nearly 40 percent from their end-2000 level for the liquidity ratio to move back to the 20 percent mark of the 1980s (Figure 12).

11. In this regard, the effects of the current economic slowdown have started to show up in rising numbers of corporate bond defaults and downgrades. After falling significantly in the first half of the 1990s, corporate defaults have increased since 1998, although by the end of 2000 they still remained well below previous peaks. In particular, defaults in the high-yield segment of the corporate bond market have risen since 1998, but so far the differential of default rates between high-yield and investment-grade securities has not widened to the extent observed in previous recessions (Figure 13). The recent increase in default rates can be traced to various industrial sectors, including technology and telecommunications, consumer products, and retail activities. Looking forward, credit rating agencies have forecasted that default rates would increase steadily through 2001 and approach previous cyclical highs.[11]

12. Corporate downgrades by rating agencies have also increased since 1997, after falling sharply in the early 1990s; the ratio of downgrades to upgrades at the end of 2000 reached

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[10] Leverage ratios of smaller firms have risen sharply since 1995 and are fairly high by historical standards, as noted by Osler and Hong (2000). However, smaller firms represent a small fraction of stock market valuation and total outstanding debt.

[11] See Moody's Investor Service (2001a).

the highest level seen in the 1990s, but still below the 1990 peak (Figure 14). In turn, high-yield downgrades as a ratio to upgrades have risen sharply since 1998, after reaching relative downgrade rates below those of investment-grade firms in 1996–97.

### C. Bank Balance Sheets

13. The quality of assets in the U.S. banking sector has improved markedly through the 1990s, especially in the first half of the decade as the banking sector recovered from the difficulties experienced in the 1980s. Beginning in the late 1990s, the asset quality of commercial and industrial loans deteriorated modestly, but this was offset by improvements in delinquency ratios of other asset categories, including consumer credit loans (Figure 15). The deterioration in commercial and industrial loans reflected slowing profit growth and weakness in certain industrial sectors (particularly telecommunications and health care). In general, the loans encountering difficulties were the ones made prior to 1998, when credit standards were more relaxed. Following a series of warnings by the banking supervisory agencies against the dangers of lax lending practices, beginning in mid-1998 lending terms and conditions have been tightened.

14. Banks' charge-offs have increased slightly since the mid-1990s, led initially by charge-offs related to consumer lending and later to commercial and industrial loans (Figure 16). Although charge-offs in 2000 were well below their peak in 1991 and the level of the 1980s, the effect of the economic slowdown on banks' loses may only fully emerge in coming quarters. Bank provisioning has closely followed the general pattern of charge-offs in the 1990s; after declining sharply in the early 1990s, provisions have increased moderately since 1995 and remained relatively subdued at a level greatly lower than that achieved in the late 1980s and early 1990s (Figure 17).

15. In the aftermath of the real estate related banking problems of the 1980s and early 1990s, real estate lending has been an area of persistent concern and monitoring for the supervisory authorities. Residential and commercial real estate loans as a percent of total lending remained virtually constant in the second half of the 1990s, at about 25 and 12 percent, respectively. But construction and land development (CLD) lending, after declining in the first half of the 1990s, rebounded strongly in the second half of the decade raising some concerns. Overall, banks' real estate exposure, accounting for over 40 percent of total loans, has been high and well above that in the 1980s, especially in the residential and nonfarm, nonresidential categories. Nevertheless, the quality of the real estate portfolio has been very good, with the lowest delinquency ratios of all loan categories in 2000. In contrast to the 1980s, currently there are no indications of over-investment in commercial buildings.

16. Banks have remained profitable and well-capitalized, which provides a cushion to weather the effects of an economic slowdown on the quality of assets. The indicators of banks' returns on equity and on assets improved markedly in the early 1990s, and have remained broadly stable at about 15 percent and 1.2 percent, respectively (Figure 18). Net-interest margins, after increasing sharply in the early 1990s, fell back to the 1980's average

of about 5.5 percent of loans. Noninterest income continued its upward trend, partly offsetting the reduction in the net-interest margin in this period (Figure 19). However, in 2000, bank profitability experienced some downward pressures due to slower revenue growth, losses on security sales, and higher provisioning. The slowdown in revenues was primarily due to a slowdown in noninterest income, a primary engine of revenue growth in the 1990s, affecting larger banks more significantly; net-interest income growth improved slightly, despite a fall in net-interest margins, due to an acceleration in loan growth in 2000. Overall, sound recurring earnings, stemming from strong market positions in higher-margined products, have been regarded by rating agencies as placing banks in good standing to cope with the effects of the economic slowdown on credit quality[12].

17. Banks' off-balance sheet activities have been increasing in the 1990s. The significant increase in notional values of derivative transactions, however, represents a small share of the loan portfolio. Moreover, measures that track bank exposure to risks from derivative activities indicate that banks' uncovered positions are very small (Figure 20). Off-balance sheet activities are concentrated in a few banks; in 2000, a total of five banks accounted for about 90 percent of derivative notional values. Swaps have been the most dynamic instruments, while credit derivatives have started to grow from very small notional values. The concentration of derivative activities in a few institutions raises some questions; although economies of scale may call for a limited number of participants at this stage, the increased counter-party risk and heightened dependence on this income source pose a challenge to both banks and supervisors. On the other hand, the small number of institutions that the oversight authorities need to pay close attention to simplifies the task of supervision.

18. Capital ratios in the banking sector have remained solid in the 1990s. Total risk-based capital has diminished marginally since the mid-1990s, by about ¾ of a percentage point, to 12¼ percent at end-2000 (Figure 21). However, core capital at end-2000 was higher than in the mid-1990s.

19. Market valuation of bank shares, relative to broad market indices, increased significantly in the 1990s through 1998, recovering the ground lost in the later part of the 1980s. After 1998, bank stocks fell, and started to recoup part of their loss only in 2000 (Figure 22). Bond spreads to comparable industrial bonds fell significantly in the early 1990s and turned negative by almost 20 basis points in early 1993 (Figure 23). Since then, banks' bond spreads have increased, reaching a peak of 50 basis points in 1998, then falling sharply in 1999 and moving up to 30 basis points in late 2000.

[12] See for example Moody's Investor Service (2001b).

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Table 1. International Comparison: Household Net Wealth, Assets, and Liabilities

(In percent of personal disposable income)

| | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|
| United States | | | | | | | |
| Net wealth | 479.0 | 505.1 | 526.9 | 564.3 | 586.2 | 636.7 | 584.6 |
| Net financial wealth | 261.8 | 307.9 | 329.9 | 364.7 | 384.0 | 428.5 | 374.5 |
| Nonfinancial assets | 217.2 | 197.3 | 197.0 | 199.6 | 202.1 | 208.2 | 218.1 |
| Financial assets | 349.1 | 401.8 | 425.8 | 462.4 | 484.3 | 533.3 | 482.7 |
| *Of which:* Equities | 52.4 | 96.4 | 108.9 | 131.5 | 143.1 | 178.6 | 165.3 |
| Liabilities | 87.3 | 94.0 | 95.9 | 97.6 | 100.2 | 104.8 | 108.2 |
| *Of which:* Mortgages | 60.9 | 63.8 | 64.7 | 65.7 | 68.1 | 71.3 | 71.9 |
| Canada | | | | | | | |
| Net wealth | 418.6 | 481.9 | 496.4 | 505.2 | 502.8 | 507.8 | 509.4 |
| Net financial wealth | 183.4 | 228.0 | 239.7 | 246.7 | 243.3 | 245.6 | 243.1 |
| Nonfinancial assets | 235.1 | 253.8 | 256.6 | 258.5 | 259.5 | 262.2 | 266.4 |
| Financial assets | 275.6 | 330.3 | 345.1 | 355.0 | 353.7 | 358.6 | 354.9 |
| *Of which:* Equities | 53.8 | 72.4 | 79.6 | 88.0 | 93.8 | 94.3 | 96.8 |
| Liabilities | 92.2 | 102.3 | 105.3 | 108.3 | 110.4 | 113.1 | 111.8 |
| *Of which:* Mortgages | 58.7 | 68.4 | 70.3 | 71.0 | 71.4 | 71.9 | 71.0 |
| France | | | | | | | |
| Net wealth | 417.9 | 454.4 | 481.7 | 501.6 | 520.4 | 574.1 | ... |
| Net financial wealth | 130.6 | 184.7 | 208.4 | 228.7 | 251.8 | 309.8 | ... |
| Nonfinancial assets | 287.3 | 269.7 | 273.3 | 272.8 | 270.9 | 264.2 | ... |
| Financial assets | 218.9 | 249.0 | 273.5 | 294.2 | 317.6 | 378.5 | ... |
| *Of which:* Equities | 87.3 | 84.9 | 98.9 | 110.8 | 130.2 | 183.3 | ... |
| Liabilities | 88.3 | 64.3 | 65.1 | 65.5 | 65.7 | 68.7 | ... |
| *Of which:* Mortgages | 51.9 | 48.8 | 49.4 | 49.8 | 50.2 | 52.4 | ... |
| Germany | | | | | | | |
| Net wealth | 535.6 | 564.2 | 571.7 | 580.2 | 586.2 | 597.7 | ... |
| Net financial wealth | 130.8 | 136.1 | 141.3 | 150.5 | 157.0 | 169.7 | ... |
| Nonfinancial assets | 404.8 | 428.1 | 430.4 | 429.6 | 429.1 | 427.9 | ... |
| Financial assets | 200.7 | 236.9 | 246.1 | 258.0 | 267.8 | 284.9 | ... |
| *Of which:* Equities | 11.6 | 42.5 | 46.8 | 55.7 | 61.9 | 77.6 | ... |
| Liabilities | 70.0 | 100.7 | 104.8 | 107.5 | 110.8 | 115.2 | ... |
| *Of which:* Mortgages | 53.6 | 60.6 | 63.7 | 66.4 | 68.5 | 70.6 | ... |
| Italy | | | | | | | |
| Net wealth | 430.9 | 469.0 | 461.6 | ... | ... | ... | ... |
| Net financial wealth | 196.3 | 217.1 | 223.5 | 234.5 | 257.2 | 270.4 | ... |
| Nonfinancial assets | 234.6 | 244.1 | 238.1 | ... | ... | ... | ... |
| Financial assets | 225.4 | 248.1 | 255.9 | 268.6 | 294.0 | 310.5 | ... |
| *Of which:* Equities | 46.0 | 42.6 | 47.9 | 68.1 | 106.6 | 134.5 | ... |
| Liabilities | 29.1 | 31.1 | 32.4 | 34.0 | 36.7 | 40.0 | ... |
| *Of which:* Medium- and long-term loans | 13.7 | 15.7 | 15.9 | 17.9 | 19.5 | 21.7 | ... |
| Japan | | | | | | | |
| Net wealth | 937.5 | 749.4 | 754.9 | 752.8 | 738.8 | 752.9 | ... |
| Net financial wealth | 260.3 | 283.8 | 296.2 | 306.8 | 300.8 | 333.3 | ... |
| Nonfinancial assets | 677.2 | 465.7 | 458.4 | 446.0 | 438.0 | 419.7 | ... |
| Financial assets | 390.9 | 421.4 | 428.2 | 438.4 | 432.3 | 463.1 | ... |
| *Of which:* Equities | 51.4 | 43.2 | 39.5 | 36.5 | 25.6 | 44.5 | ... |
| Liabilities | 130.7 | 137.6 | 132.0 | 131.6 | 131.5 | 129.8 | ... |
| *Of which:* Mortgages | 50.4 | 58.3 | 59.4 | 61.2 | 55.0 | 57.4 | ... |
| United Kingdom | | | | | | | |
| Net wealth | 618.6 | 563.1 | 585.1 | 634.8 | 681.1 | 723.3 | ... |
| Net financial wealth | 211.8 | 284.4 | 296.2 | 342.6 | 355.3 | 372.7 | 372.2 |
| Non-financial assets | 406.9 | 278.7 | 288.9 | 292.2 | 325.7 | 350.6 | ... |
| Financial assets | 328.7 | 391.6 | 402.2 | 449.0 | 465.7 | 486.4 | 482.3 |
| *Of which:* Equities | 56.9 | 76.2 | 80.8 | 96.8 | 92.8 | 110.9 | 103.7 |
| Liabilities | 116.9 | 107.2 | 106.0 | 106.3 | 110.4 | 113.8 | 110.2 |
| *Of which:* Mortgages | 105.8 | 97.3 | 96.5 | 96.7 | 100.6 | 103.9 | ... |

Source: OECD, 2001, Economic Outlook, June; and national data sources.

1/ Assets and liabilities are amounts outstanding at the end of the period. Figures are based mainly on the UN System of National Accounts 1993 (SNA 93) (for Japan 1990-98 only) and, more specifically, for European Union countries, on the corresponding European System of Accounts 1995 (ESA 95). Households include nonprofit institutions serving households (according to SNA 93 and ESA 95, households also include self-employed persons and sole proprietors). Net wealth is defined as non-financial and financial assets minus liabilities; net financial wealth is financial assets minus liabilities. Nonfinancial assets include stock of durable goods and dwellings, at replacement cost and at market value, respectively. Financial assets comprise currency and deposits, securities other than shares, loans, shares and other equity, insurance technical reserves; and other accounts receivable/payable. Not included are assets with regard to social security pension insurance schemes. Equities comprise shares and other equity, including quoted, unquoted and mutual fund shares.

Table 2. United States: Composition of Household Assets

(In percent of total household assets)

| | 1970 | 1980 | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| Total assets | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Total nonfinancial assets | 34.9 | 39.9 | 38.4 | 32.9 | 31.6 | 30.2 | 29.4 | 28.1 | 31.1 |
| Real estate holdings | 26.1 | 31.1 | 30.5 | 25.9 | 25.0 | 24.0 | 23.7 | 22.6 | 25.1 |
| Consumer durable goods | 8.6 | 8.5 | 7.6 | 6.7 | 6.4 | 5.9 | 5.6 | 5.3 | 5.8 |
| Total financial assets | 65.1 | 60.1 | 61.6 | 67.1 | 68.4 | 69.8 | 70.6 | 71.9 | 68.9 |
| *of which:* | | | | | | | | | |
| Total deposits and currency | 13.5 | 13.8 | 13.4 | 10.2 | 9.8 | 9.2 | 9.3 | 8.6 | 9.4 |
| Credit market instruments | 5.5 | 3.9 | 6.2 | 6.0 | 6.0 | 5.3 | 4.7 | 4.7 | 4.4 |
| Corporate equities | 14.5 | 8.0 | 7.4 | 12.5 | 13.3 | 15.0 | 15.4 | 17.8 | 13.4 |
| Mutual funds shares | 1.0 | 0.4 | 1.9 | 3.6 | 4.2 | 4.9 | 5.5 | 6.3 | 6.2 |
| Pension fund reserves | 6.4 | 8.8 | 14.2 | 18.0 | 18.6 | 19.6 | 20.2 | 19.8 | 20.1 |
| Equity in noncorp. business | 16.6 | 20.0 | 13.5 | 11.3 | 11.0 | 10.5 | 10.2 | 9.6 | 10.0 |
| *Memorandum:* | | | | | | | | | |
| Total assets as a percent of disposable income | 535.3 | 544.1 | 566.3 | 599.1 | 622.8 | 662.0 | 686.4 | 741.5 | 700.8 |

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

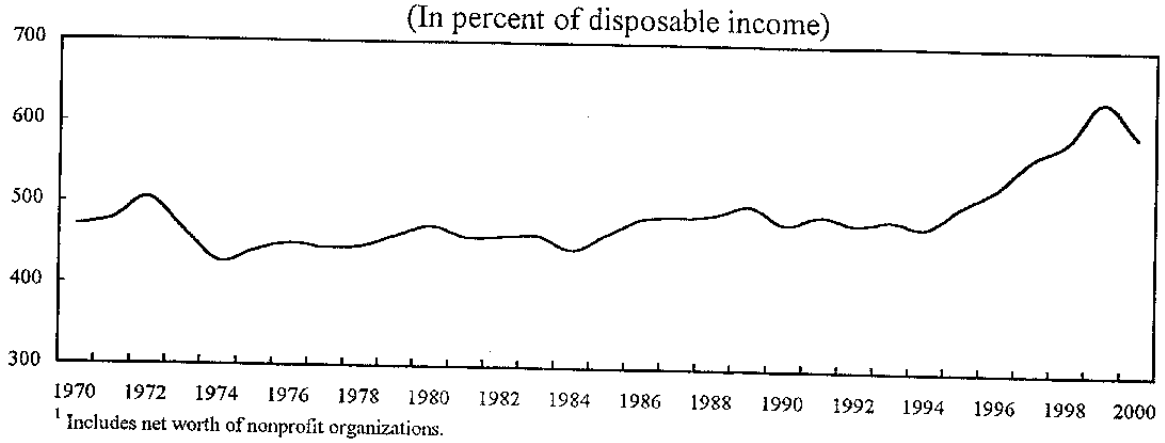
Table 3. United States: Change in Housing Prices

(In percent at compound annual rate)

| | 2000 | 1995-2000 | 1990-2000 |
|---|---|---|---|
| New England | 12.3 | 5.8 | 2.0 |
| Middle Atlantic | 7.7 | 3.5 | 2.0 |
| South Atlantic | 6.7 | 4.3 | 3.2 |
| East North Central | 6.2 | 5.5 | 4.9 |
| East South Central | 4.2 | 4.7 | 4.0 |
| West South Central | 6.6 | 4.2 | 3.6 |
| West North Central | 8.0 | 5.7 | 4.6 |
| Mountain | 7.0 | 5.8 | 5.7 |
| Pacific | 10.2 | 4.9 | 3.1 |
| Total USA | 7.7 | 4.8 | 3.5 |
| Memorandum: | | | |
| CPI | 3.4 | 2.5 | 3.0 |
| S&P 500 | 7.6 | 20.7 | 14.5 |

Source: Office of Federal Housing Enterprise Oversight, House Price Index, October 4, 2000.

Figure 1. United States: Household Net Worth[1]
(In percent of disposable income)




[1] Includes net worth of nonprofit organizations.

Figure 2. United States: Total Household Debt
(In percent of disposable income)

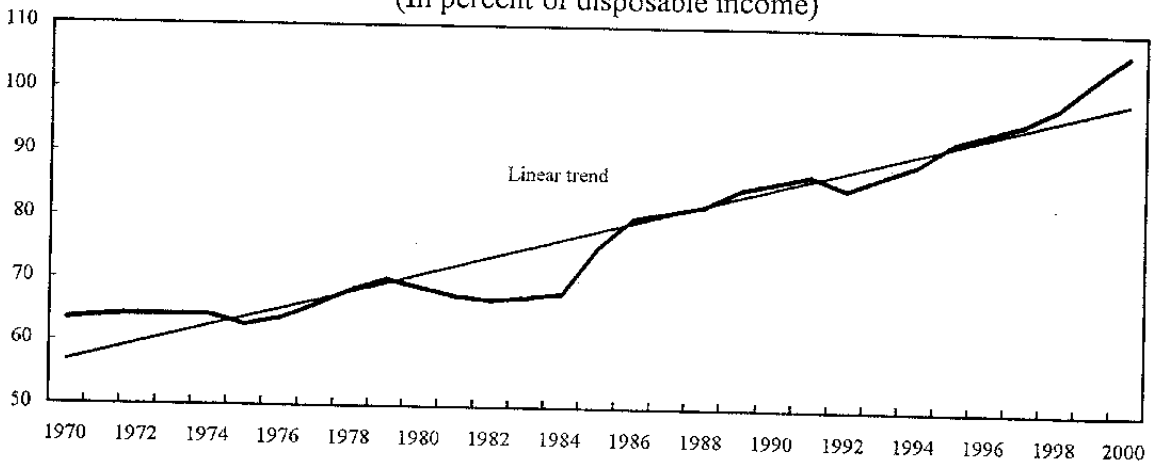
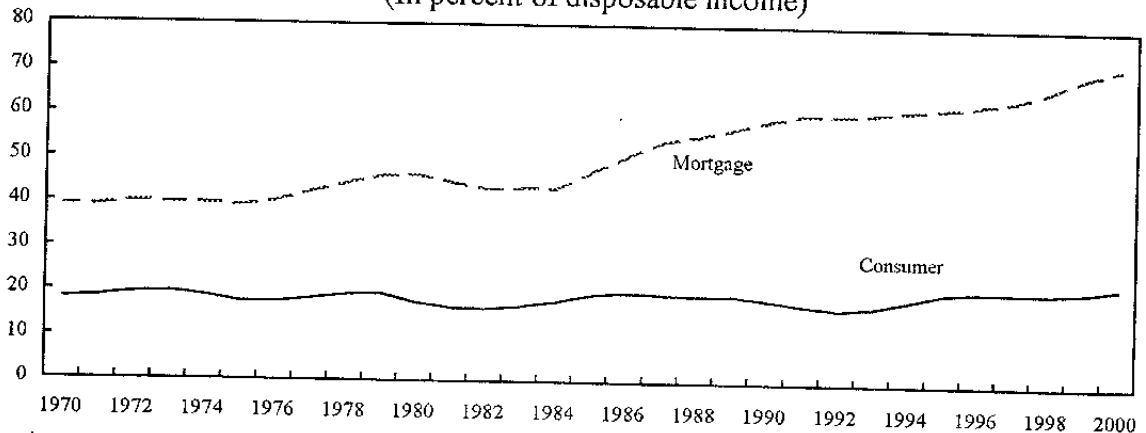


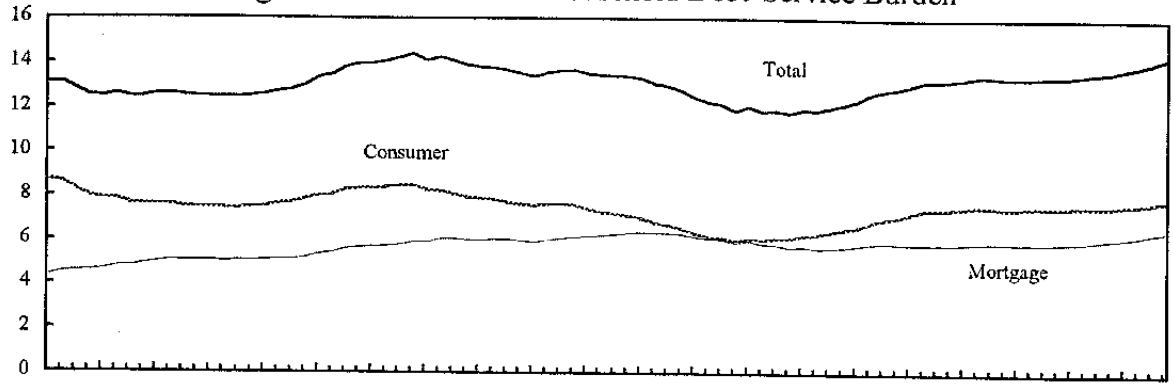

Figure 3. United States: Mortgage and Consumer Debt[1]
(In percent of disposable income)




[1] Includes liabilities of nonprofit organizations.

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

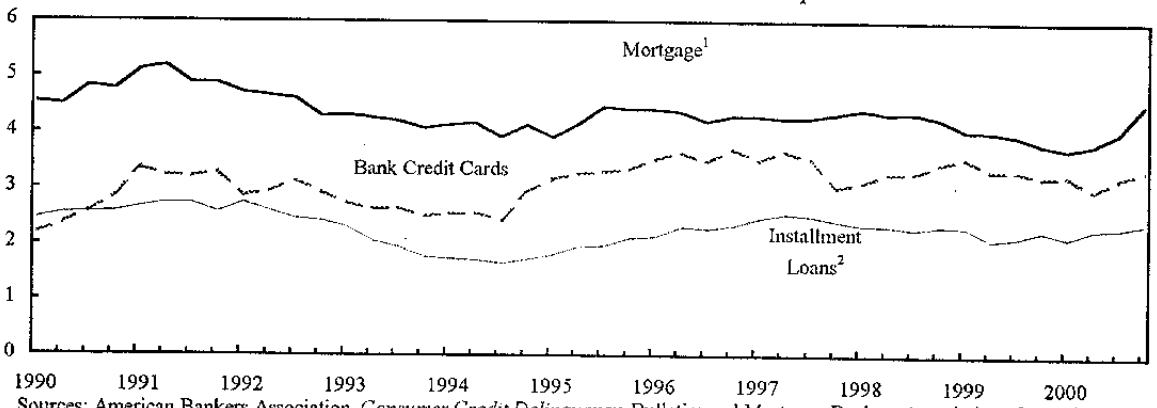
Figure 4. United States: Household Debt-Service Burden[1]




Source: Board of Governors of the Federal Reserve System.

[1] Household debt payments (both interest and principal) in percent of disposable income.

Figure 5. United States: Consumer Delinquencies

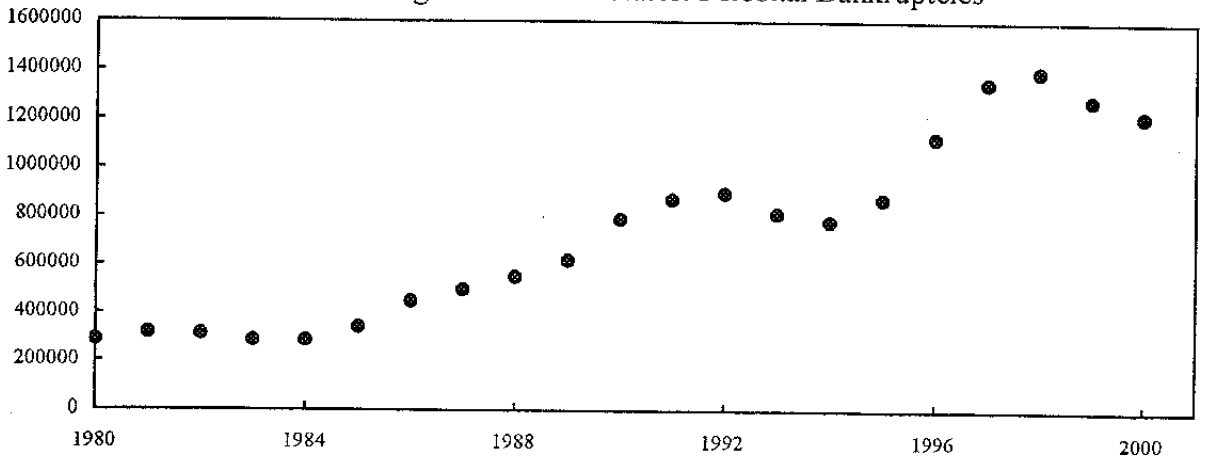



Sources: American Bankers Association, *Consumer Credit Delinquency* Bulletin; and Mortgage Bankers Association of America, *National Delinquency Survey.*

[1]Delinquency rate on all loans on 1 to 4-unit residential mortgage loans past 30 days due.

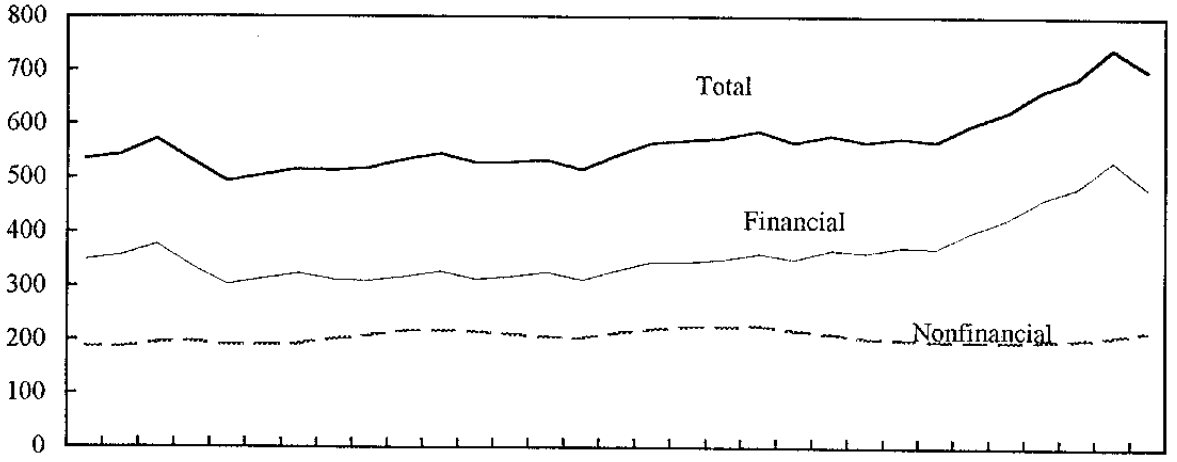
[2]Average ratio of eight types of closed-end loans.

Figure 6. United States: Personal Bankruptcies




Source: Administrative Office of the U.S. Courts.

Figure 7. United States: Household Total Assets[1]
(In percent of disposable income)

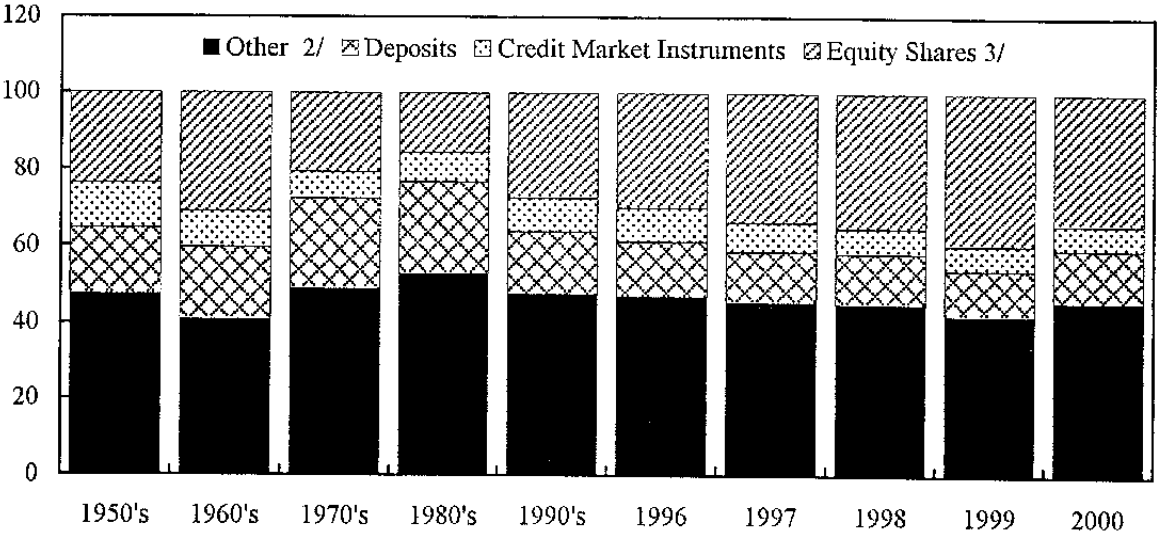



Source: Board of Governors of the Federal Reserve System, *Flow of Funds Accounts of the United States.*

[1]Includes assets of nonprofit organizations.

2Includes real estate, equipment and software owned by nonprofit organizations and consumer

Figure 8. United States: Household Composition of Financial Assets[1]
(1950-2000)



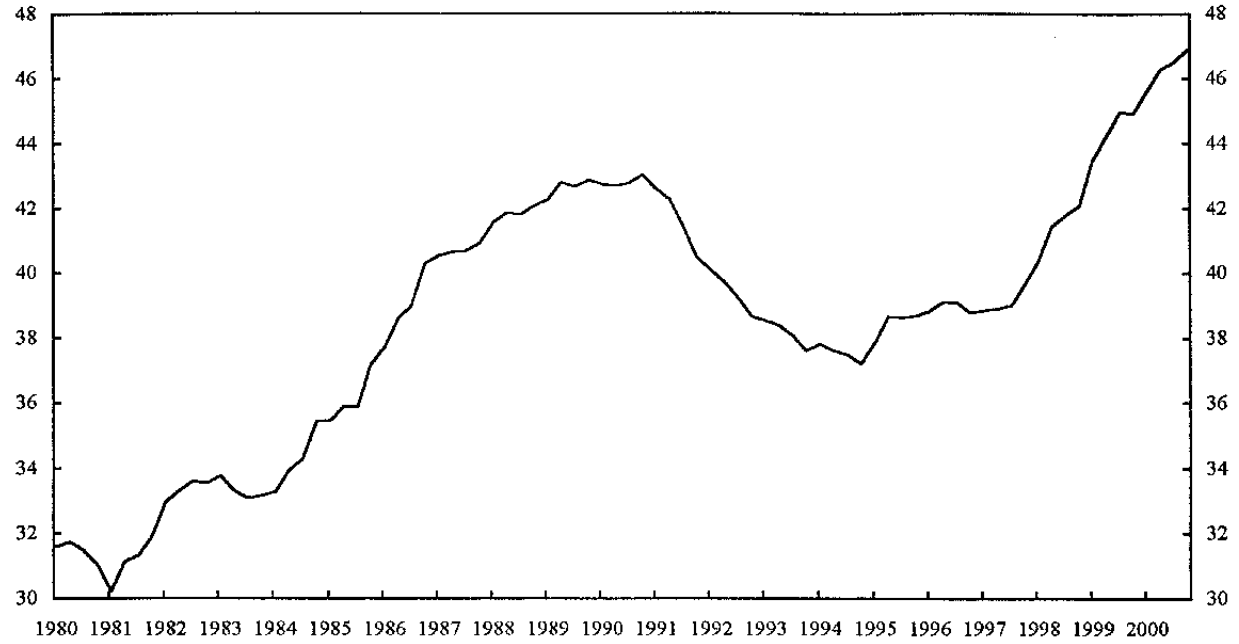

Source: Board of Governors of the Federal Reserve System, *Flow of Funds Accounts of the United States.*

[1] Includes results of nonprofit organizations.

[2] Includes defined benefit pension plans.

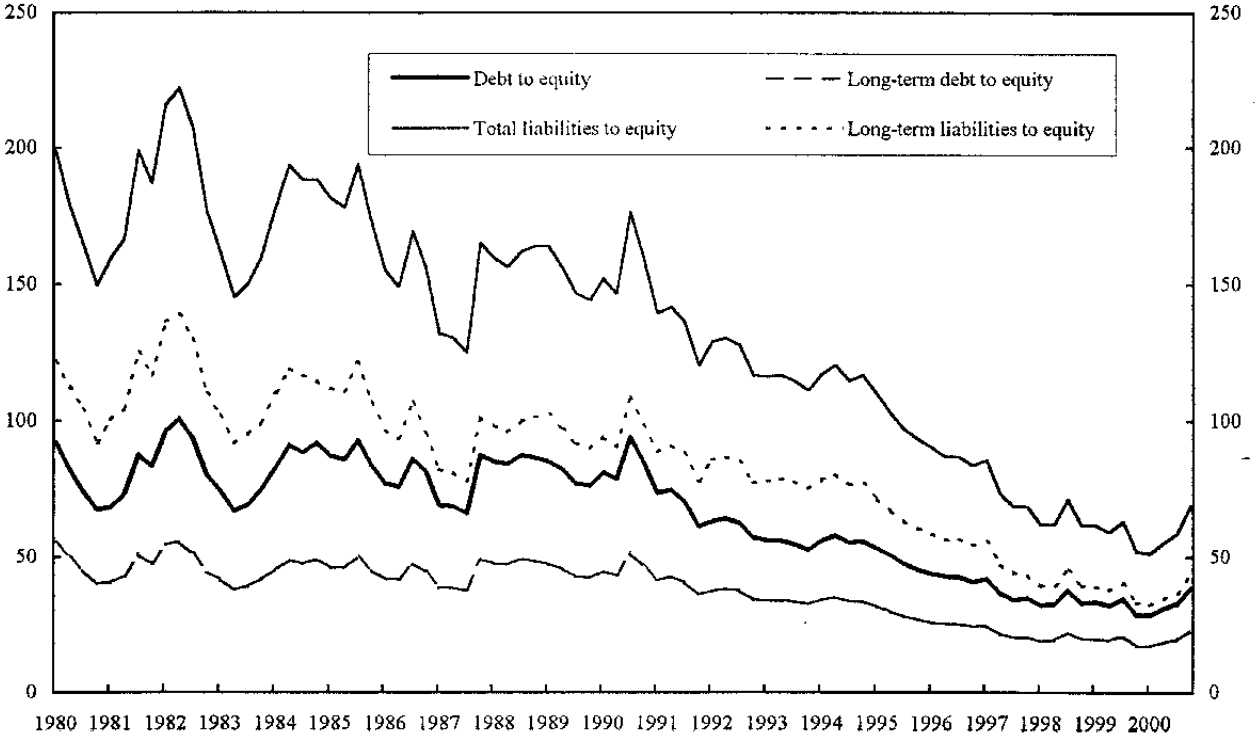
[3] Includes direct holdings of corporate equities, mutual funds, and equity shares held by bank trusts, pension funds, life insurance companies and mutual funds.

Figure 9. United States: Corporate Sector Debt
(Percent of GDP)



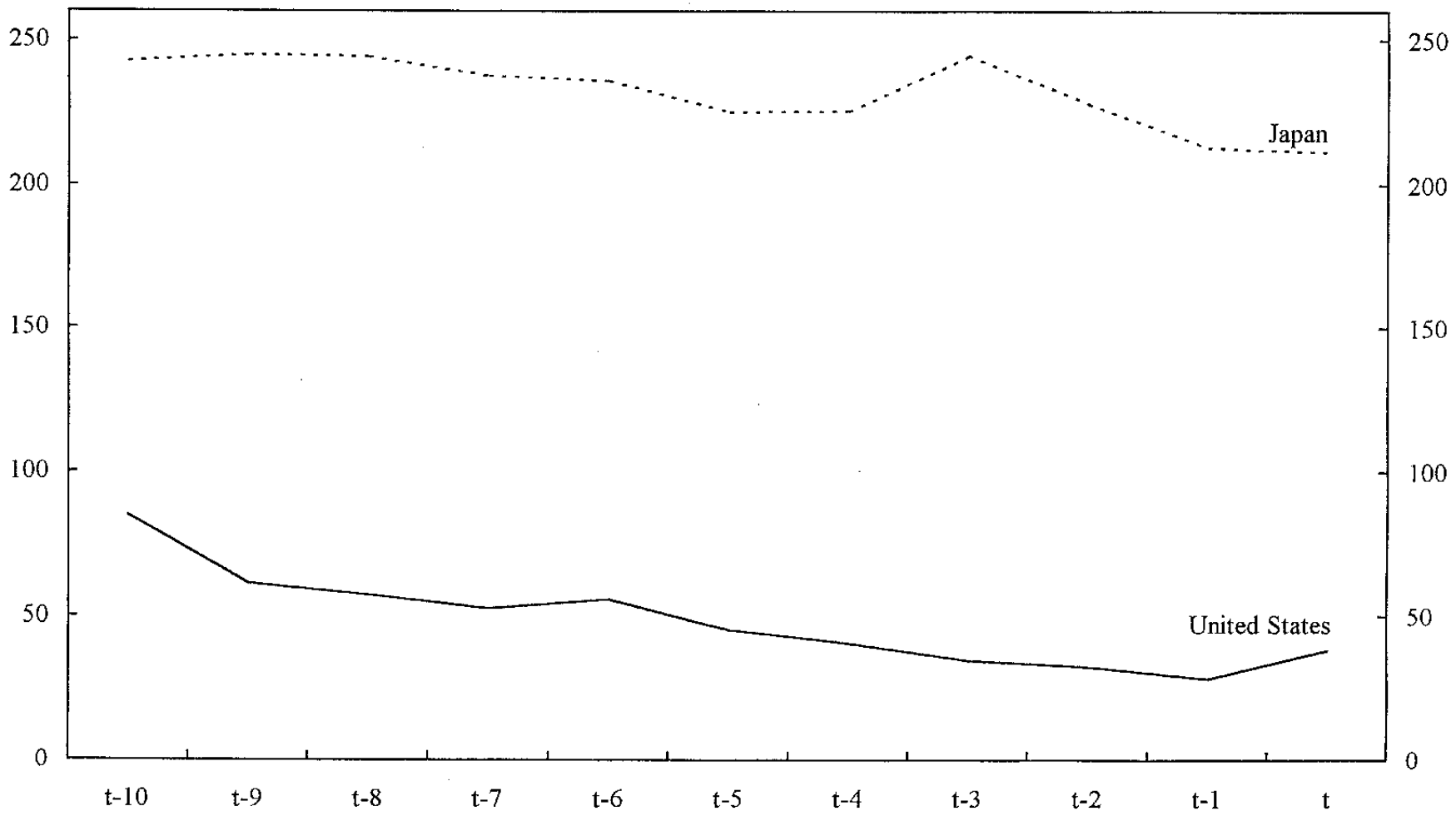

Source: Board of Governors of the Federal Reserve System, *Flow of Funds Accounts of the United States.*

Figure 10. United States: Corporate Sector Leverage Ratios



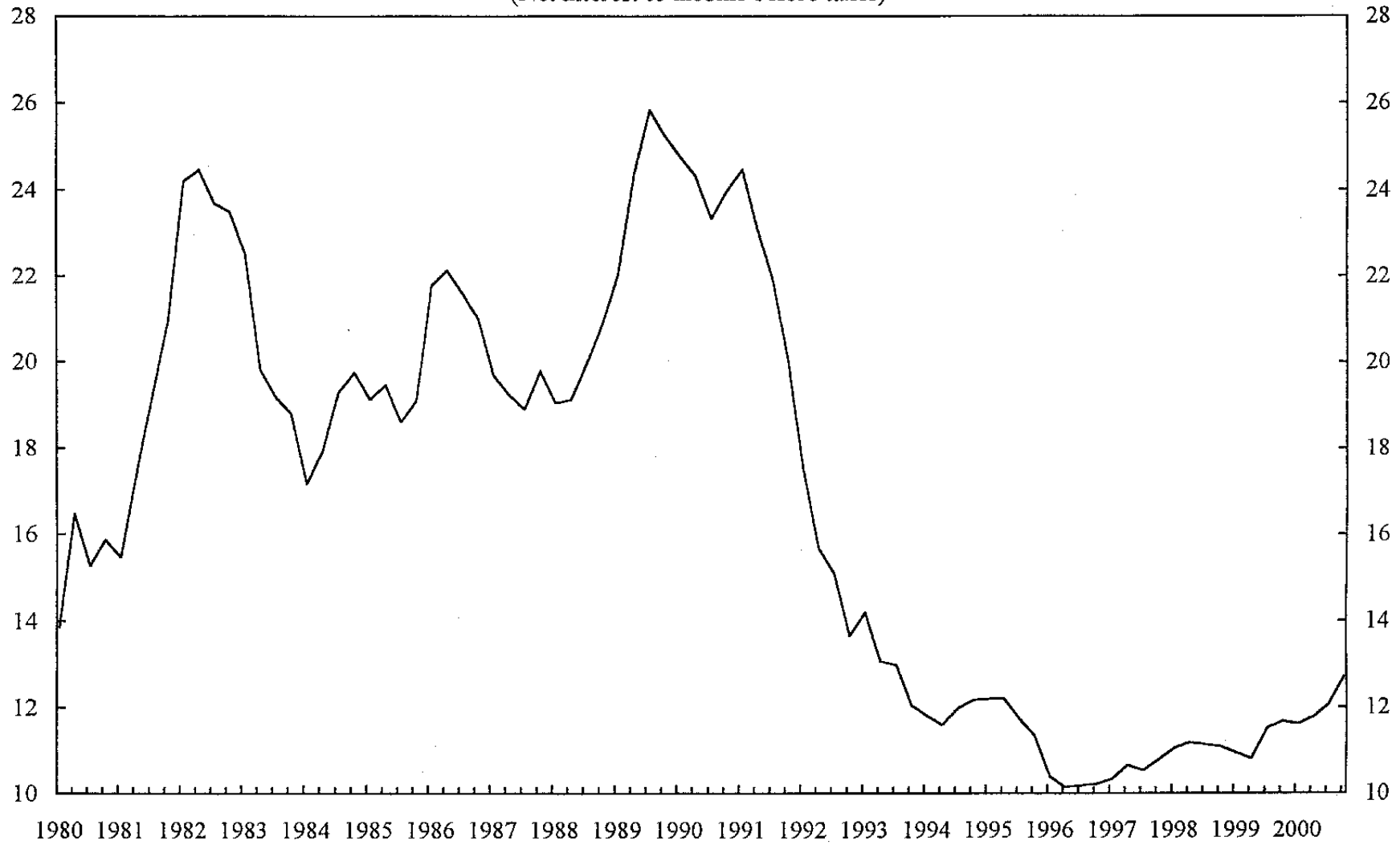

Source: Board of Governors of the Federal Reserve System, *Flow of Funds Accounts of the United States.*

Figure 11. United States and Japan: Corporate Sector Leverage During Possible "Bubble" Periods[1]
(Debt to equity ratio)



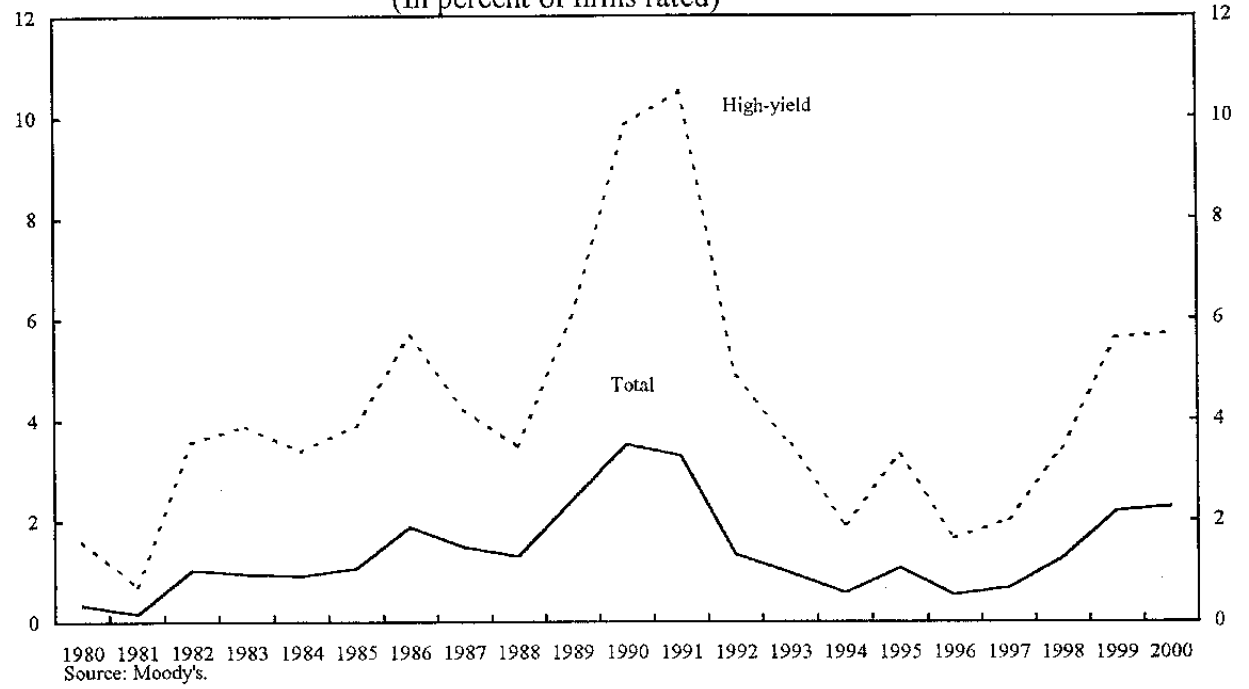

Sources: Board of Governors of the Federal Reserve System. *Flow of Funds Accounts of the United States;* and Japan, Ministry of Finance.
1/ For the United States t = 2000, and for Japan t = 1990.

Figure 12. United States: Corporate Sector Liquidity Ratio
(Net interest to income before taxes)



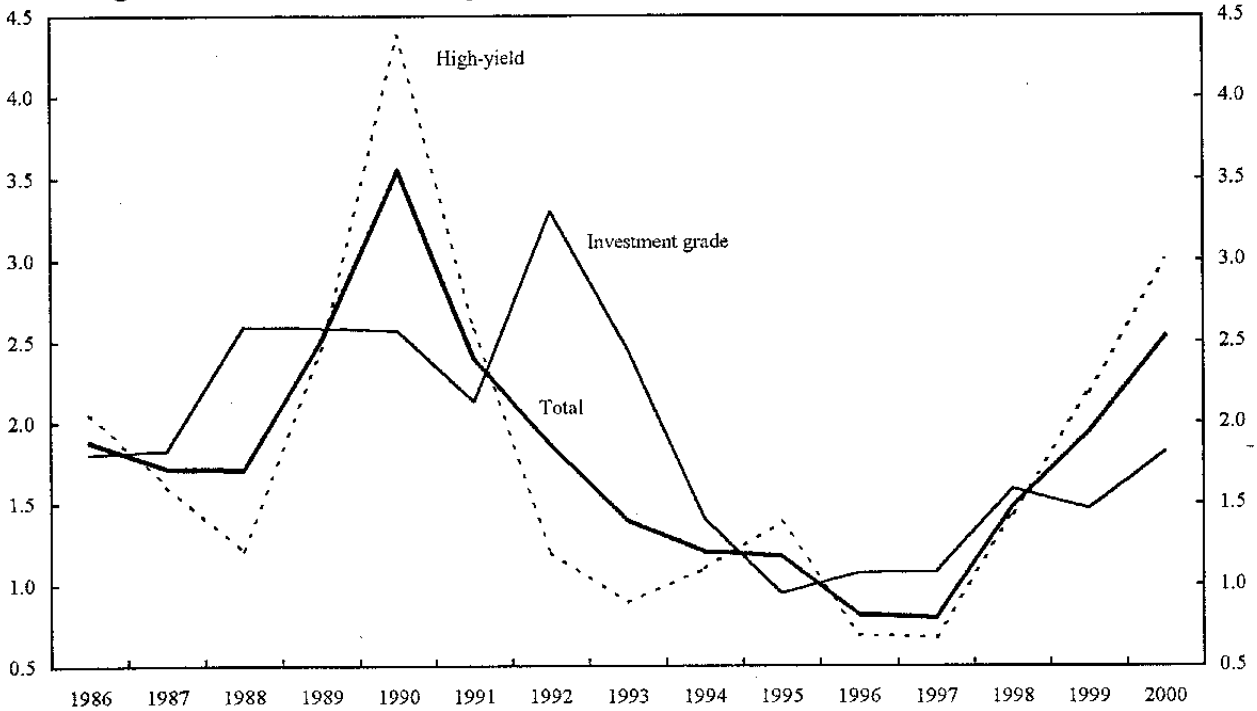

Source: Board of Governors of the Federal Reserve System, *Flow of Funds Accounts of the United States.*

Figure 13. United States: Default Rate in the Corporate Sector
(In percent of firms rated)



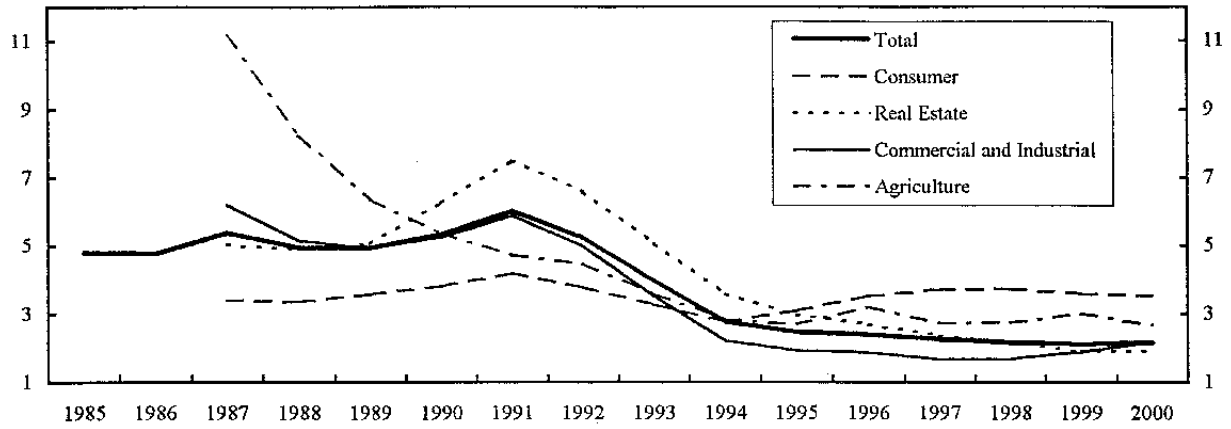

Source: Moody's.

Figure 14. United States: Corporate Sector Downgrades to Upgrades Ratio



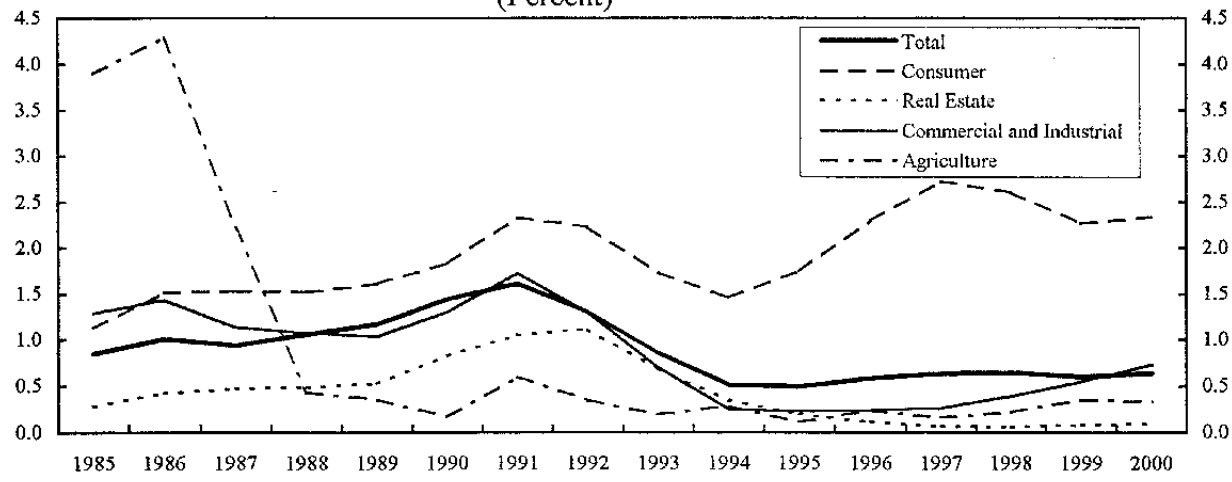

Source: Moody's.

Figure 15. United States: Banking Sector Delinquency Ratios
(Percent)



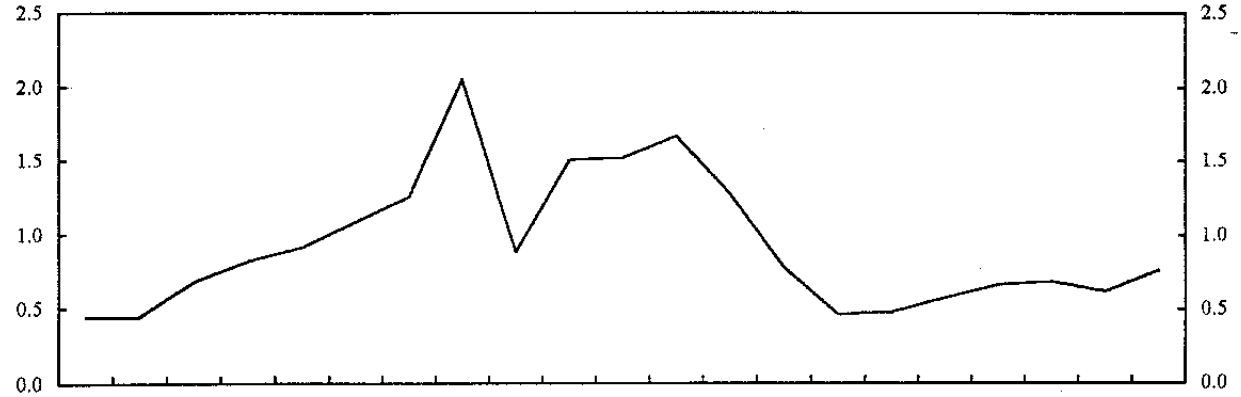

Source: Federal Deposit Insurance Corporation.

Figure 16. United States: Banking Sector Charge-Offs
(Percent)



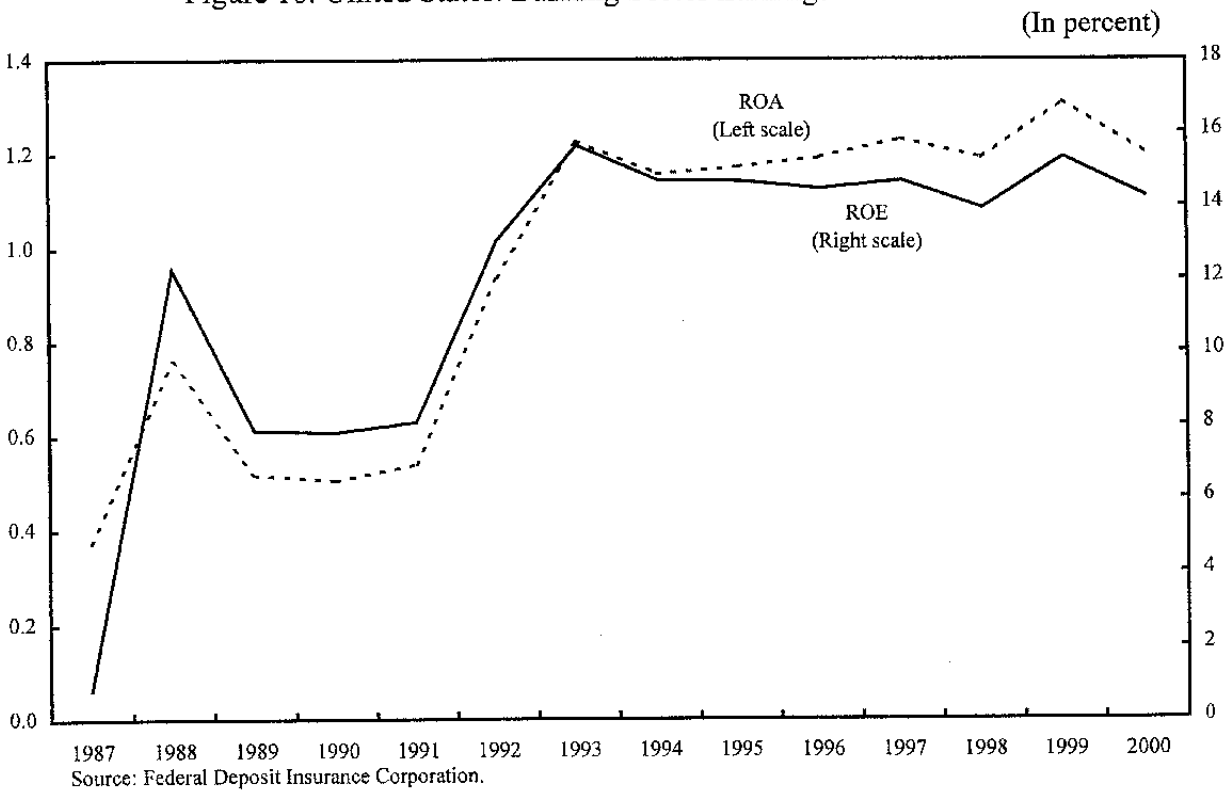

Source: Federal Deposit Insurance Corporation.

Figure 17. United States: Banking Sector Loan-Loss Provisions
(Percent)



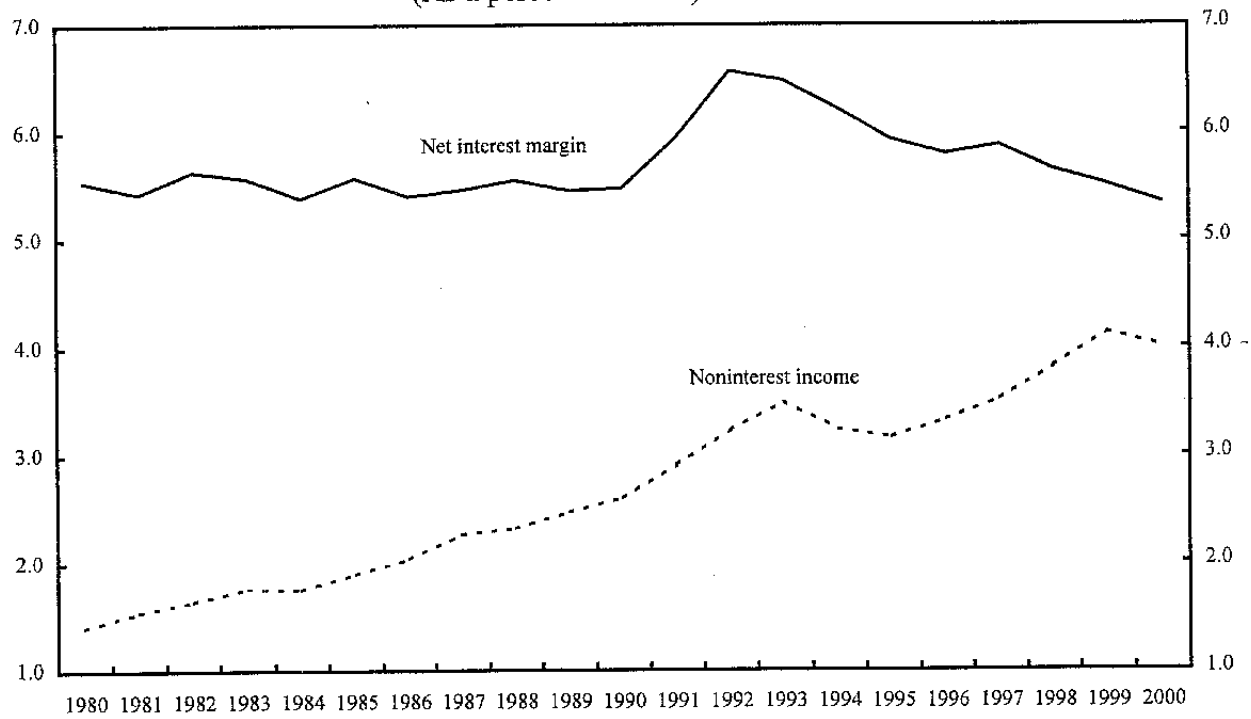

Source: Federal Deposit Insurance Corporation.

Figure 18. United States: Banking Sector Earnings Ratios



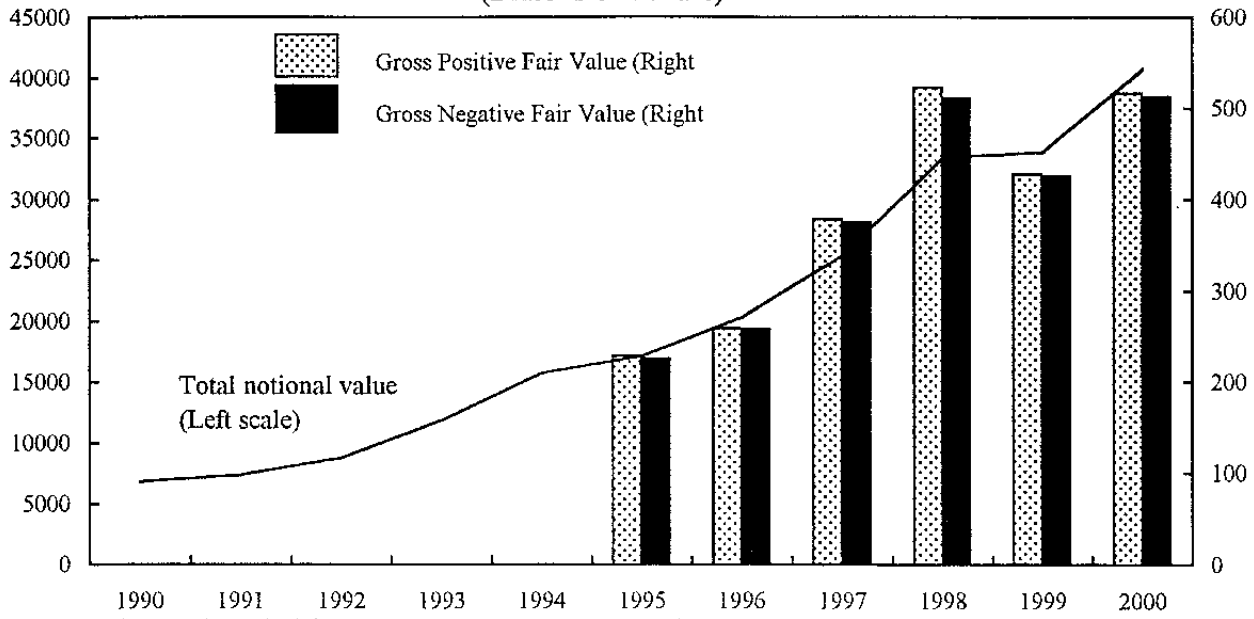

Source: Federal Deposit Insurance Corporation.

Figure 19. United States: Sources of Income in the Banking Sector
(As a percent of loans)



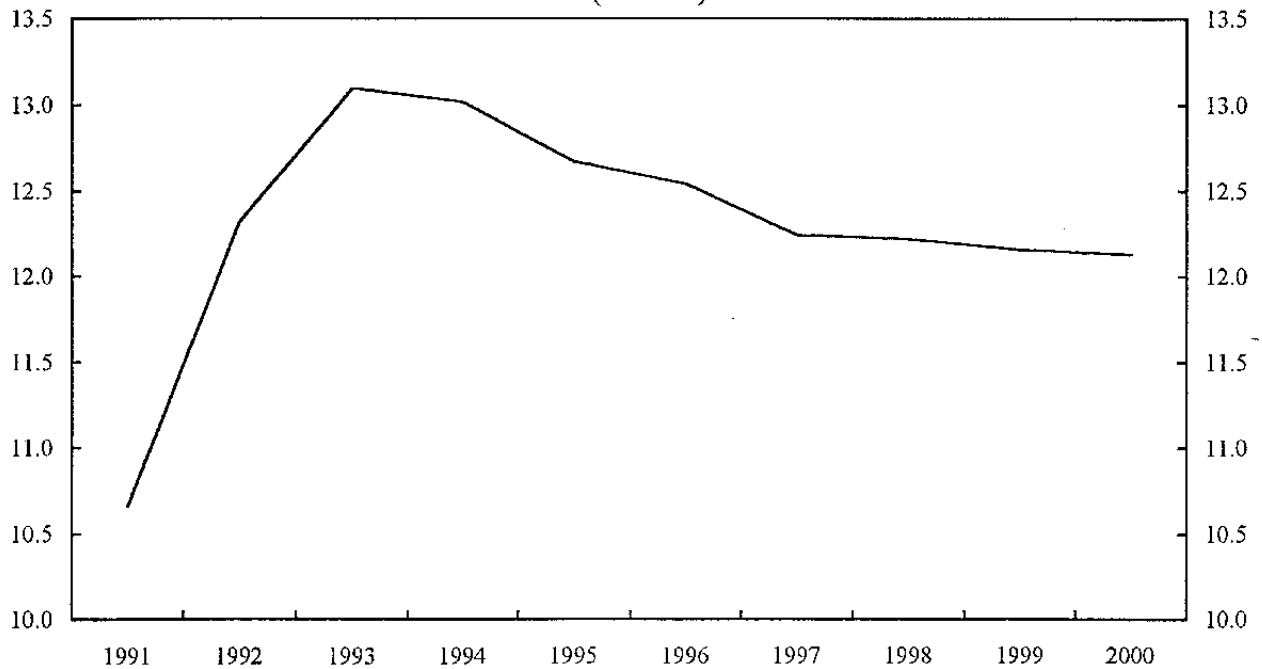

Source: Federal Deposit Insurance Corporation.

Figure 20. United States: Notional and Fair Values of Derivatives, All Insured Commercial Banks
(Billions of dollars)



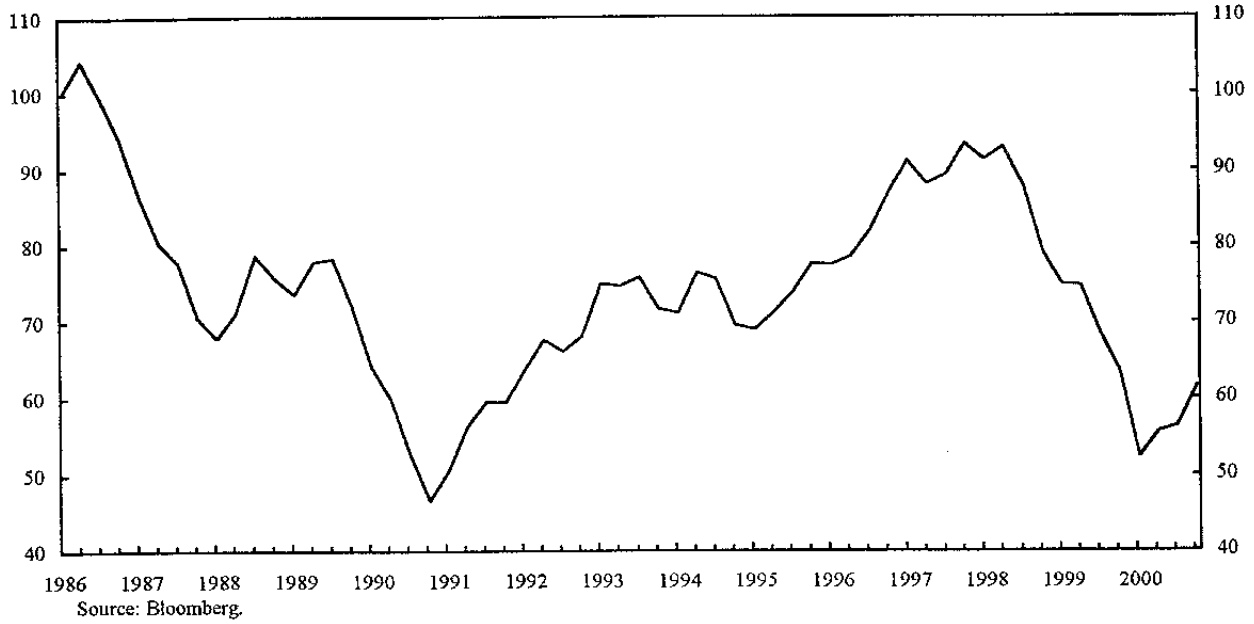

Source: Board of Governors of the Federal Reserve System.

Figure 21. United States: Total Risk-Based Capital Ratio, All Insured Commercial Banks
(Percent)



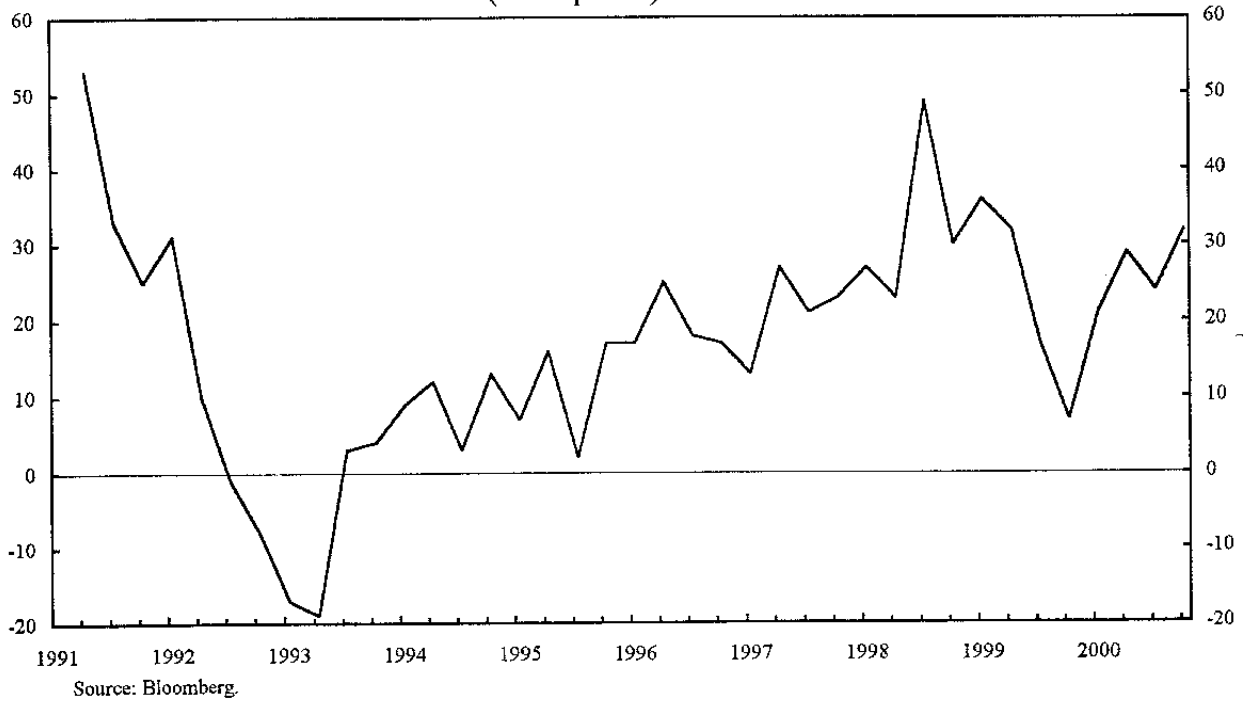

Source: Board of Governors of the Federal Reserve System.

Figure 22. United States: Relative Stock Market Performance
of the Banking Sector
S&P Bank Composite vs. S&P Index




Source: Bloomberg.

Figure 23. United States: Interest Rate Spreads Ten-Year A1 Bank Minus
Industrial Interest
(Basis points)




Source: Bloomberg.

## II. Sustainability of the U.S. External Current Account Deficit [1]

1. The rise in the U.S. external current account deficit to unprecedented levels in recent years has raised doubts about its sustainability and concerns regarding the impact that a rapid and disorderly correction of this imbalance might have. The deficit rose from 1½ percent of GDP in 1995 to 4½ percent ($445 billion) in 2000, compared with its average during the previous two decades of 1½ percent. The financing of the deficit in 2000 absorbed an estimated 7¾ percent of the savings of the rest of the world, in contrast to the 2½ percent absorbed on average during most of the last two decades.

2. A number of observers have argued that such high levels of the deficit cannot persist for very long.[2] They argue that if such deficits were to continue for an extended period, U.S. external liabilities would rise to an unprecedented level, and U.S. dollar assets would represent a growing portion of world portfolios that foreign investors would be increasingly less willing to hold. This situation would run the risk of large or possibly sharp adjustments in the current account and the external value of the dollar. Such abrupt adjustments could potentially lead to substantial dislocations in the global economy and disruptions in U.S. and world financial markets.

3. Rapid U.S. GDP growth and relatively weaker growth in other parts of the world, notably Europe and Japan, contributed to the rise in the deficit. Inflows also have risen rapidly during periods of global financial stress, when the demand for dollar assets as a "safe haven" has increased. More importantly, however, there has been a surge in capital inflows seeking higher risk-adjusted real returns in the United States. Higher U.S. real returns have been related to the pickup in U.S. productivity growth since the mid-1990s. The surge in capital inflows since the mid-1990s has included, in addition to direct investment inflows, a substantial increase in portfolio inflows, of which a large share has come from the euro area (Figure 1).

4. Over the medium term, adjustment in the U.S. current account imbalance would take place if output and income growth in the United States and the other major industrial countries converge. In addition, a depreciation of the U.S. dollar in real terms is expected to contribute to the adjustment process. Such a depreciation may result from movements in relative prices if U.S. traded goods prices tend to rise more slowly than competitors' prices. It may also come from a nominal depreciation of the dollar. At this juncture, whether there may be a large nominal decline in the dollar appears to depend significantly on expected real returns on U.S. assets, which would reflect expectations regarding the relative performance of U.S. productivity growth. The paper dicusses scenarios derived from the IMF's multi-country model (MULTIMOD) based on alternative patterns of relative productivity growth.

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[1] Prepared by Vivek Arora, Steven Dunaway, and Hamid Faruqee.

[2] See, for example, Mann (2000) and Schott (2000).

If U.S. productivity growth were to continue to substantially exceed that in other major countries, large deficits in the current account could persist for some time. Conversely, if the productivity growth gap were to narrow quickly, the nominal value of the dollar and the U.S. external imbalance could adjust rapidly.

5. Concerns regarding the long-term viability of the U.S. current account balance center on whether there exist underlying structural problems that could prevent the external balance from achieving a sustainable level. In particular, attention has been focused on the difference in estimated income elasticities of U.S. exports and imports, and the implication that this difference would perpetuate a large current account deficit in the absence of sharp and sustained declines in the real value of the dollar. However, historically, there has been no long-term trend in the real value of the dollar. This is because the difference in the estimated income elasticities for exports and imports has been offset by a tendency for U.S. incomes to grow more slowly than foreign incomes. Moreover, estimates of income elasticities for U.S. exports and imports for periods ending in the 1990s demonstrate that these elasticities appear to be converging as U.S. and foreign income growth has likewise converged.

6. Assuming that income growth in the United States and the rest of the world and income elasticities for U.S. exports and imports converge, MULTIMOD scenarios suggest that the current account deficit would decline over the longer term to around ½ percent of GDP on average (equivalent to 1 percent of rest of the world savings, a level in line with historical experience), provided the United States continues to follow prudent macroeconomic policies. The scenarios also illustrate that a higher level of national income and a more favorable external position could be achieved if the United States were to move more aggressively in the near term and run larger fiscal surpluses as a means of pre-funding part of its future liabilities associated with the aging of the population. This could be achieved by adopting, as a long-term fiscal objective, measures to eliminate the actuarial imbalances in the Social Security and Medicare programs and keeping the rest of the budget in balance over the economic cycle.

### A. Medium-Term Adjustment

7. Over the medium term, the U.S. current account deficit is expected to narrow. Whether the adjustment in the deficit is a smooth or abrupt process is a key concern. Indeed, some observers argue that the risks arise not so much from the size of the deficit, or the outstanding U.S. net liability position, as from the suddenness of any adjustment.[3] The experience of recent decades suggests that, during periods of current account adjustment, movements in the external balance have typically been gradual and have been associated with relatively smooth adjustments in the real value of the dollar (Figure 2). An exception was the substantial fall in the real value of the dollar and the current account adjustment that took place during the latter half of the 1980s. The adjustment was, however, spread out over

[3] Obstfeld and Rogoff (2000).

a period of more than three years and, moreover, the period was characterized by very loose fiscal policy and the expectation that significant budget deficits would continue. The current fiscal environment is substantially different, with the prospect of continuing fiscal surpluses.

8. Over time, the relative growth performance between the United States and other countries may shift, with other countries growing relatively faster as the information-technology-driven gains in productivity of recent years spread more rapidly beyond the United States. Higher investment in information technology by other countries would boost U.S. exports, since the United States is a major supplier of this equipment. A cyclical slowing in U.S. activity relative to other countries would moderate U.S. import growth. These developments would tend to foster adjustment in the U.S. external balance.

9. Depreciation in the real value of the dollar is likely to bear the brunt of the adjustment in the external deficit, with the change coming through some combination of movements in relative prices and the nominal exchange rate. A slower rate of increase in U.S. export prices relative to competitors' prices, possibly as a result of relative gains in productivity reducing U.S. costs, would contribute toward a depreciation of the real exchange rate. At the same time, the nominal value of the dollar could depreciate over time if capital flows to the United States diminish. The speed and extent of the depreciation would be influenced by the evolution of relative productivity gains in the United States and partner countries and its implications for the pattern of net capital flows.

10. Insofar as the current account deficit and the strong value of the dollar have been largely supported by productivity improvements in the United States relative to other countries, a reversal in this factor could induce rapid external adjustment. Buoyant equity prices and capital spending in the United States have in some measure been predicated on expectations of continued strong productivity growth. A weaker outturn in productivity—at least relative to partner countries—could lower comparative rates of return, reduce the level of capital inflows, and narrow the current account deficit. As with the dollar, the nature of the adjustment in the current account could depend significantly on the rapidity of these developments. Prolonged productivity gains in the United States would be supportive of the external deficit and the value of the dollar. But relatively rapid gains in partner countries (especially if coupled with some slowdown in the United States) could induce a sharp adjustment in the dollar and the current account balance.

11. To address these questions, the staff conducted two alternative "productivity" scenarios using MULTIMOD (Table 1). In the first scenario, a positive productivity shock prolongs relative gains in the United States before catch-up in the rest of the world gradually takes place. The shock contains two components: a temporary increase in total factor productivity (TFP) growth and a temporary increase in the market value of capital.[4]

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[4] The productivity shock consists of a roughly ½ percentage point increase in the rate of total factor productivity (TFP) growth and an exogenous 1–2 percent increase in the market value of capital relative to their respective baseline values. The shocks are perceived to be

(continued)

Together, the effects of this shock replicate qualitatively many aspects of the U.S. economy in recent years. GDP growth rises persistently above baseline; investment is the demand component that reacts most strongly, rising as a share of GDP; consumption spending also rises as private saving rates decline (albeit slightly). Meanwhile, the dollar appreciates in the near term, and the current account moves into deficit for a sustained period relative to its baseline level.

12. In the second scenario, partner countries are assumed to catch up to U.S. productivity levels relatively quickly.[5] In this case, the relative gains abroad contribute to a sharp depreciation of the dollar and a rapid reduction in the U.S. current account deficit. The output loss, dollar depreciation, and narrowing of the current account deficit would be more severe if the United States were also to experience a slowdown in productivity growth.

### B. Long-Term Outlook

13. In some quarters, concern about adjustment in the current account deficit stems from the size of the deficit and an expectation that it would persist in the absence of a large real depreciation of the dollar, owing to a significant difference in the income elasticities of U.S. imports and exports. For most of the past several decades, the income elasticity of U.S. imports has exceeded that of U.S. exports by a wide margin.[6] (Some other countries, notably Japan, have had the opposite pattern.) Empirically, however, the difference between a country's import and export income elasticities seems to be indirectly related to the relative rates of trend growth in domestic and foreign GDP. Over long periods of time, the income elasticities of imports and exports tend to converge toward each other as trend domestic growth converges toward that of a country's trading partners over time.[7]

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permanent on impact, before dissipating over a period of five years. The reason for adopting a composite shock in the scenario is that a simple TFP shock alone in MULTIMOD does not raise investment significantly relative to consumption. The second component—an additional increase in the market value of capital—raises domestic returns sufficiently to spur domestic investment to a much greater extent, as well as to induce capital inflows and a currency appreciation, in a manner similar to the experience in the United States during the second half of the 1990s.

[5] The results are similar if instead U.S. productivity levels fall to levels prevailing in partner countries.

[6] See Goldstein and Khan (1985) for a comprehensive review, and Houthakker and Magee (1969).

[7] See Krugman (1989). Krugman refers to the relationship between relative trade income elasticities and relative growth rates as the "45-degree rule."

14. The observation that the ratio of the income elasticity of exports to that of imports has been roughly equal to the ratio of domestic to foreign growth rates is equivalent to the observation that there have not been significant trends in real exchange rates over time if there is no trend in the trade balance. If a country's economic growth is much faster than that of its trading partners, while the income elasticities of its exports and imports are similar, a trend real depreciation would be required in order for it to find foreign markets for its output in order to balance its external position over time. Similarly, if a country's income elasticity of exports is much smaller than that of its imports, while domestic and foreign trend growth rates are similar, a real depreciation would be required over time.

15. In the United States, while real GDP growth was lower than in its trading partner countries during the 1970–2000 period, the differential narrowed substantially over time (Table 2). Indeed, during 1992–2000, a period that includes the most recent economic expansion, U.S. growth was ½ percentage point higher than in partner countries. Meanwhile, the real effective exchange rate, notwithstanding marked fluctuations in specific years, has not exhibited a long-term trend.

16. Accordingly, during the recent period, the income elasticity of exports would be expected to have risen relative to that of imports. Estimates by the staff suggest that this does appear to have been the case during the 1990s. Exports and imports of goods and nonfactor services in constant prices were regressed against real income and relative prices, with both sets of coefficients having the expected sign (Table 3).[8] The results suggest that the income elasticity of exports was less than that of imports during 1975–85, but the elasticities converged subsequently at around 1¾, and in recent years the elasticity of exports rose further relative to that of imports. The positive serial correlation in both the export and the import equations, however, suggests an omitted variable in the equations. The addition of lagged regressors alleviates this problem somewhat but evidence of serial correlation remains. The point estimates of the elasticities should thus be interpreted with caution, but the results do suggest that the estimated income elasticities of U.S. exports and imports appear to be converging.

17. Over the longer term, if growth rates in the United States and the rest of the world converge, as do the income elasticities of U.S. imports and exports, there remains a question as to whether there may be some fundamental problem that would prevent the U.S. external

---

[8] In the export and import equations, real income was captured by real foreign and U.S. GDP, respectively, and relative prices by the ratio of U.S. export prices to the foreign import-weighted consumer price index and the ratio of U.S. import prices to the U.S. GDP deflator. The export price elasticities are very low, and not significant at the 5 percent level for 1975–2000. An alternative specification using the foreign export deflator in place of the foreign CPI suggested that the elasticity of U.S. exports with respect to relative prices was -0.7 during 1975–2000.

balance from adjusting to a "sustainable" position. Sustainability in this context would be defined as a long-term current account balance that could be maintained without a continuing, large real depreciation of the dollar. Analysis by the staff suggests that the current account could smoothly adjust to a long-term sustainable position provided the United States continues to follow sound macroeconomic policies, with monetary policy maintaining low inflation and fiscal policy aimed at meeting the long-term financing needs of Social Security and Medicare, while keeping the rest of the budget balanced (Figures 3–6).[9] In this scenario, over the longer term the current account deficit would average around ½ percent of GDP, fluctuating within a range of 0–2½ percent of GDP, following a sizeable correction in the external position in the medium term (roughly the period through 2010). A U.S. deficit of this size in the long term would absorb around 1 percent of world savings, a level that would not be out of line with historical averages.[10]

18. With less fiscal adjustment, the improvement in the current account would be more modest than in the first scenario and the dollar somewhat more depreciated in the long run. An alternative fiscal scenario was examined in which only Social Security is put into actuarial balance and its surplus is saved. It was assumed that no measures are taken to put the Medicare HI system into actuarial balance and that the HI surplus is not saved. After the HI trust fund runs out, it was assumed that HI was financed on a pay-as-you-go basis, with the payroll tax being raised to finance benefits in each year. Nevertheless, this less-ambitious policy stance would still help reduce the current account deficit to 1–3 percent of GDP (around 1½ percent of GDP on average) during the longer term, although the longer-term output benefits would be smaller than in the first fiscal scenario and the degree of debt consolidation would be smaller.

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[9] For actuarial balance, it was assumed that Social Security and Medicare HI payroll taxes are raised such that the present value of expenditures over the 75-year horizon is not larger than the net present value of revenues, and that the trust funds have sufficient resources to cover expenditure for an additional year. See also Cerisola, Faruqee, and Keenan (1999).

[10] For partner countries, it is assumed that fiscal policies attain balanced budgets. The simulations also included the saving-investment balance implications of faster population aging in other industrial countries as described in Cerisola, Faruqee, and Keenan (1999).

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Table 1. United States: MULTIMOD Scenario

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2010 | 2015 | 2020 |
|---|---|---|---|---|---|---|---|---|---|
| I. Gradual Catch-up of Rest-of-the-World Productivity to U.S. Levels | | | | | | | | | |
| (percent deviation from baseline) | | | | | | | | | |
| GDP | 0.6 | 1.5 | 1.5 | 1.2 | 0.8 | 0.6 | 0.8 | 0.7 | 0.5 |
| Consumption | 0.8 | 1.6 | 2.0 | 1.8 | 1.2 | 0.8 | 0.5 | 0.3 | 0.2 |
| Investment | 3.6 | 8.6 | 7.3 | 6.5 | 4.7 | 2.9 | 1.9 | 1.3 | 1.1 |
| Exports | -0.8 | -1.3 | -1.5 | -1.6 | -1.3 | -0.9 | 0.8 | 1.2 | 1.0 |
| Imports | 2.4 | 4.3 | 4.2 | 3.7 | 2.3 | 1.0 | -0.4 | -0.1 | 0.0 |
| Real effective exchange rate | 1.5 | 2.0 | 2.0 | 1.8 | 0.9 | 0.0 | -1.6 | -0.9 | -0.6 |
| (percentage point deviation from baseline) | | | | | | | | | |
| Interest rate | -0.1 | 0.0 | -0.1 | 0.0 | -0.1 | -0.1 | -0.2 | 0.1 | 0.0 |
| Current account/GDP | -0.2 | -0.7 | -0.8 | -0.9 | -0.7 | -0.5 | -0.2 | -0.1 | -0.1 |
| National saving/GDP | 0.3 | 0.3 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 |
| II. Rapid Catch-up of Rest-of-the-World Productivity to U.S. Levels | | | | | | | | | |
| (percent deviation from baseline) | | | | | | | | | |
| GDP | -0.3 | -0.6 | -0.8 | -0.6 | 0.1 | 0.5 | -0.1 | -0.3 | -0.2 |
| Consumption | -1.0 | -2.3 | -3.5 | -3.5 | -1.7 | -0.3 | 0.4 | 0.2 | 0.2 |
| Investment | -0.3 | -1.1 | -1.7 | -2.0 | -1.5 | -1.0 | -0.8 | -0.5 | -0.3 |
| Exports | 1.6 | 3.6 | 5.8 | 6.6 | 4.9 | 3.4 | 0.4 | -1.4 | -1.2 |
| Imports | -2.1 | -4.5 | -7.0 | -7.3 | -4.4 | -1.7 | 1.7 | 1.1 | 0.3 |
| Real effective exchange rate | -2.2 | -4.9 | -7.6 | -8.2 | -5.2 | -2.4 | 2.9 | 2.0 | 0.6 |
| (percentage point deviation from baseline) | | | | | | | | | |
| Interest rate | 0.3 | 0.5 | 0.7 | 0.6 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 |
| Current account/GDP | 0.2 | 0.4 | 0.7 | 0.8 | 0.6 | 0.5 | 0.3 | 0.0 | 0.0 |
| National saving/GDP | 0.2 | 0.5 | 0.9 | 0.9 | 0.5 | 0.1 | 0.1 | 0.0 | 0.0 |

Table 2. United States and Trading Partners: Real GDP Growth

(average, in percent)

| | United States | Trading Partners 1/ |
|---|---|---|
| 1970–1979 | 3.3 | 5.5 |
| 1980–1989 | 3.0 | 3.6 |
| 1990–2000 | 3.2 | 3.3 |
| 1970–2000 | 3.2 | 4.1 |
| 1992–2000 | 3.8 | 3.4 |

Source: World Economic Outlook database.

1/ Weighted by shares in U.S. exports.

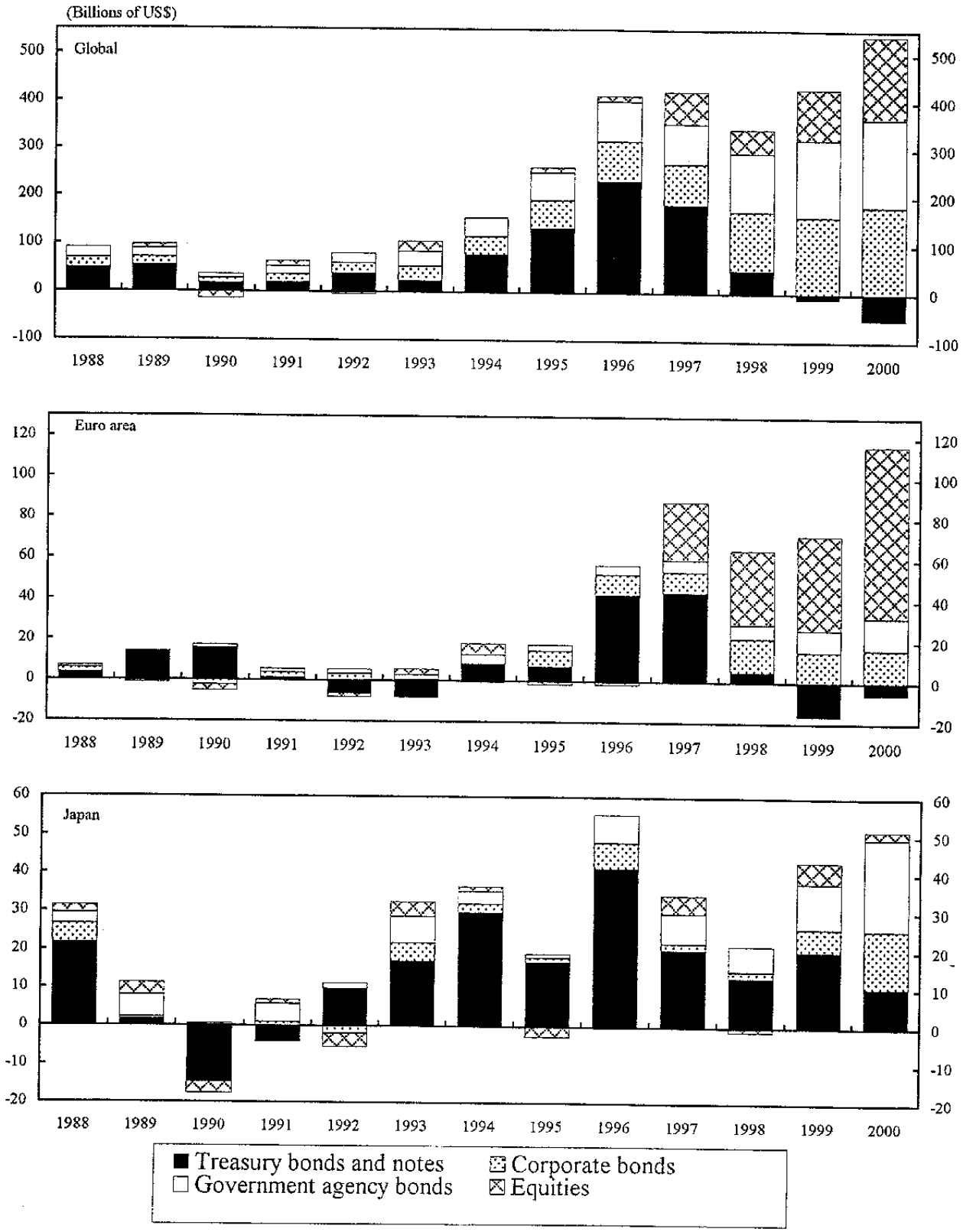
Table 3. United States: Income and Price Elasticities of Exports and Imports of Goods and Nonfactor Services

| | Exports | | | | | Imports | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Elasticity with respect to | | | | Durbin- | Elasticity with respect to | | | | Durbin- |
| | Constant | GDP | P(t) 1/ | $R^2$ | Watson | Constant | GDP | P(t) | $R^2$ | Watson |
| 1975-85 | -1.45 | 1.66 | -0.12 | 0.85 | 0.25 | -9.40 | 1.81 | -0.51 | 0.95 | 0.65 |
| | (-3.05) | (15.21) | (-0.69) | | | (-15.37) | (25.28) | (-6.64) | | |
| 1975-1990 | -1.84 | 1.76 | -0.24 | 0.95 | 0.19 | -8.84 | 1.75 | -0.50 | 0.98 | 0.60 |
| | (-3.82) | (16.49) | (-2.70) | | | (-24.35) | (42.21) | (-8.16) | | |
| 1975-1995 | -2.40 | 1.89 | -0.28 | 0.98 | 0.19 | -8.92 | 1.76 | -0.49 | 0.99 | 0.49 |
| | (-5.36) | (19.24) | (-3.40) | | | (-26.52) | (46.30) | (-8.39) | | |
| 1975-2000 | -3.35 | 2.10 | -0.16 | 0.99 | 0.18 | -9.41 | 1.82 | -0.61 | 0.99 | 0.32 |
| | (-11.36) | (32.84) | (-2.38) | | | (-24.52) | (42.13) | (-9.40) | | |

Quarterly data, with all variables expressed in logarithms. t-statistics in parentheses. P(t) refers to the relative price.

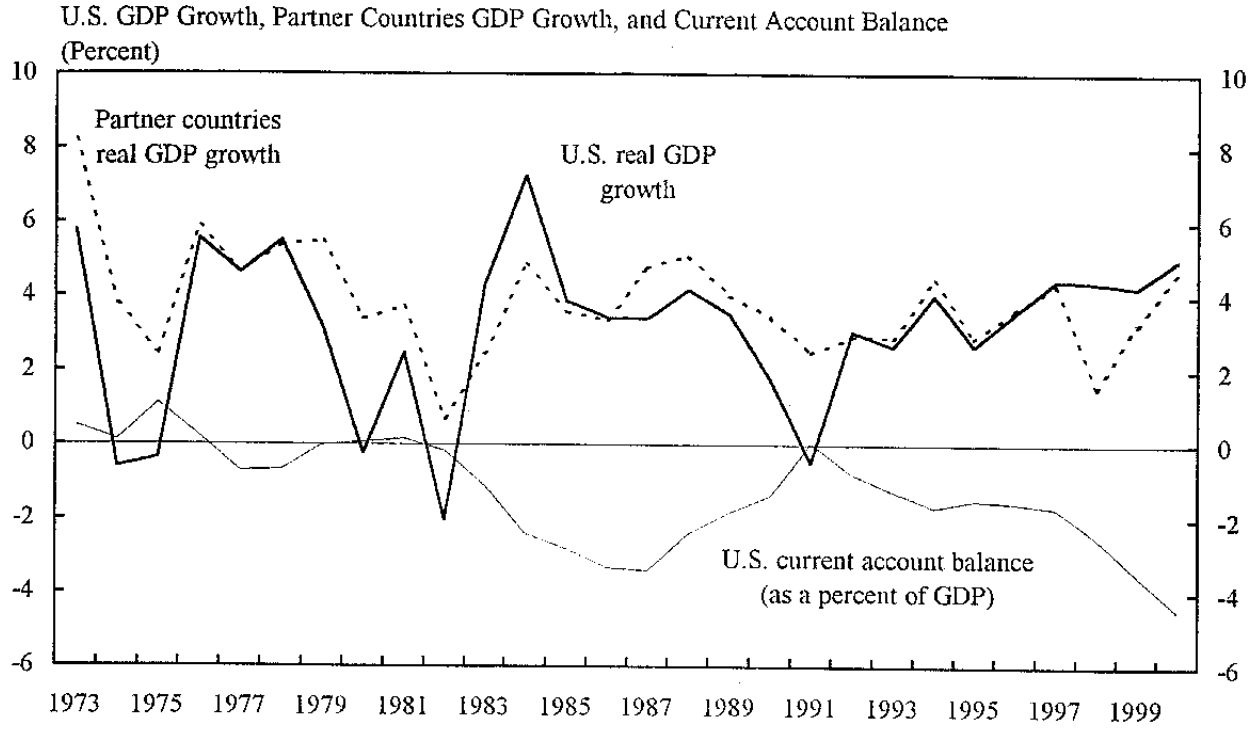
1/ Export prices relative to trading partners' CPI.

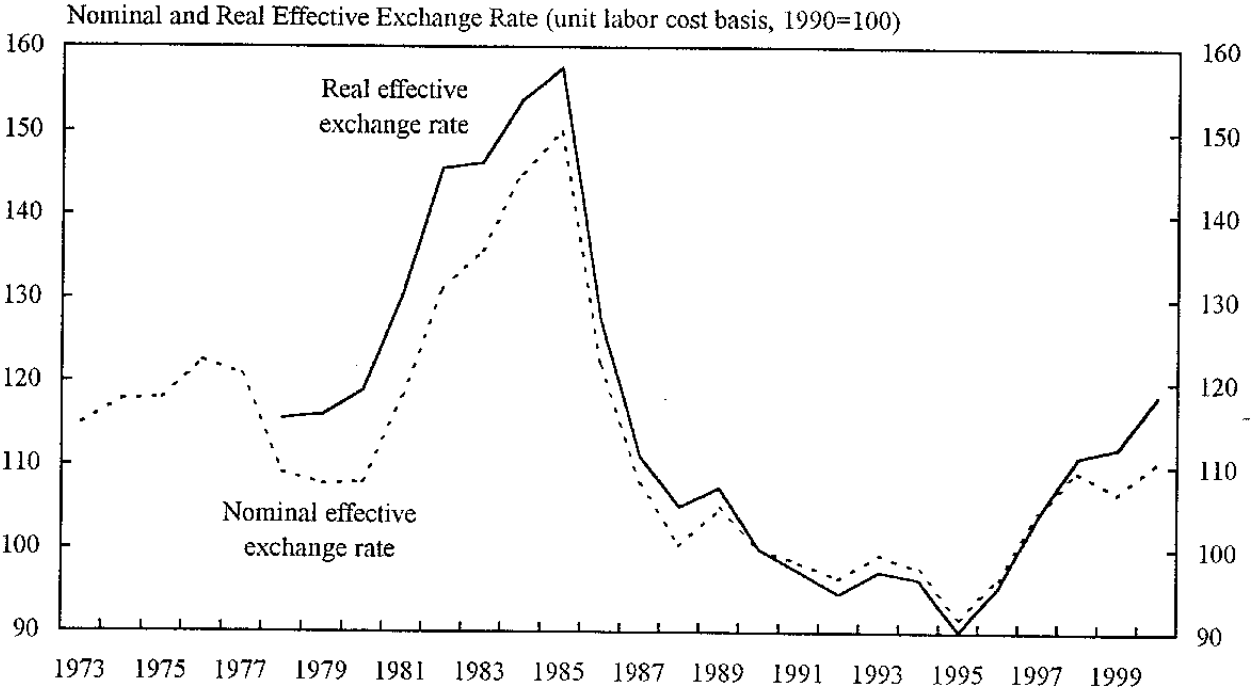
Figure 1. United States: Global Net Portfolio Inflows
by Asset Class




Source: U.S. Treasury International Capital Reporting System.

Figure 2. United States: GDP Growth, Current Account Balance, and Nominal and Real Effective Exchange Rate




Sources: U.S. Bureau of Economic Analysis; and IMF-WEO estimates.

Figure 3. United States: Current Account Balance
(Percent of GDP)

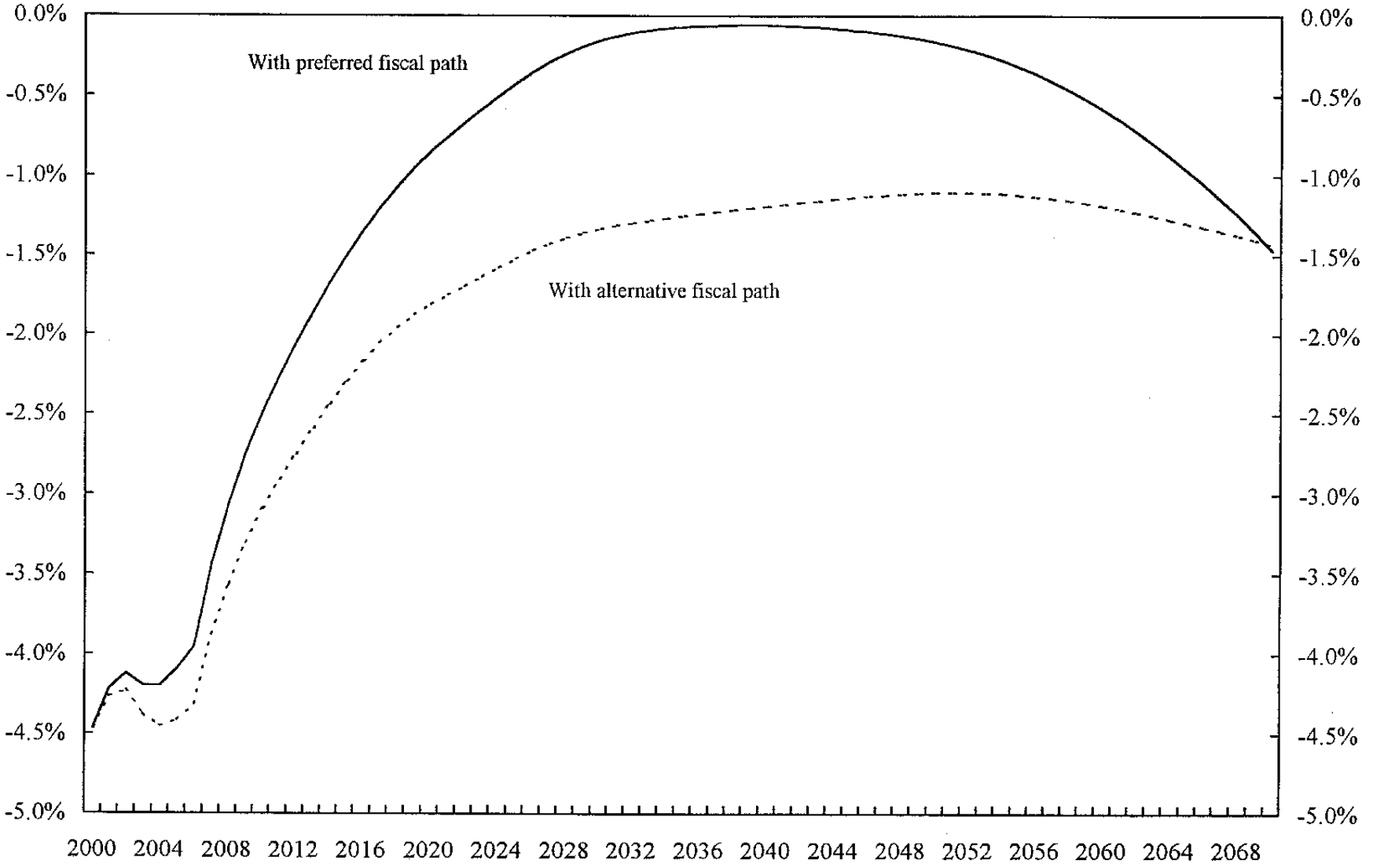


Figure 4. United States: Real Effective Exchange Rate

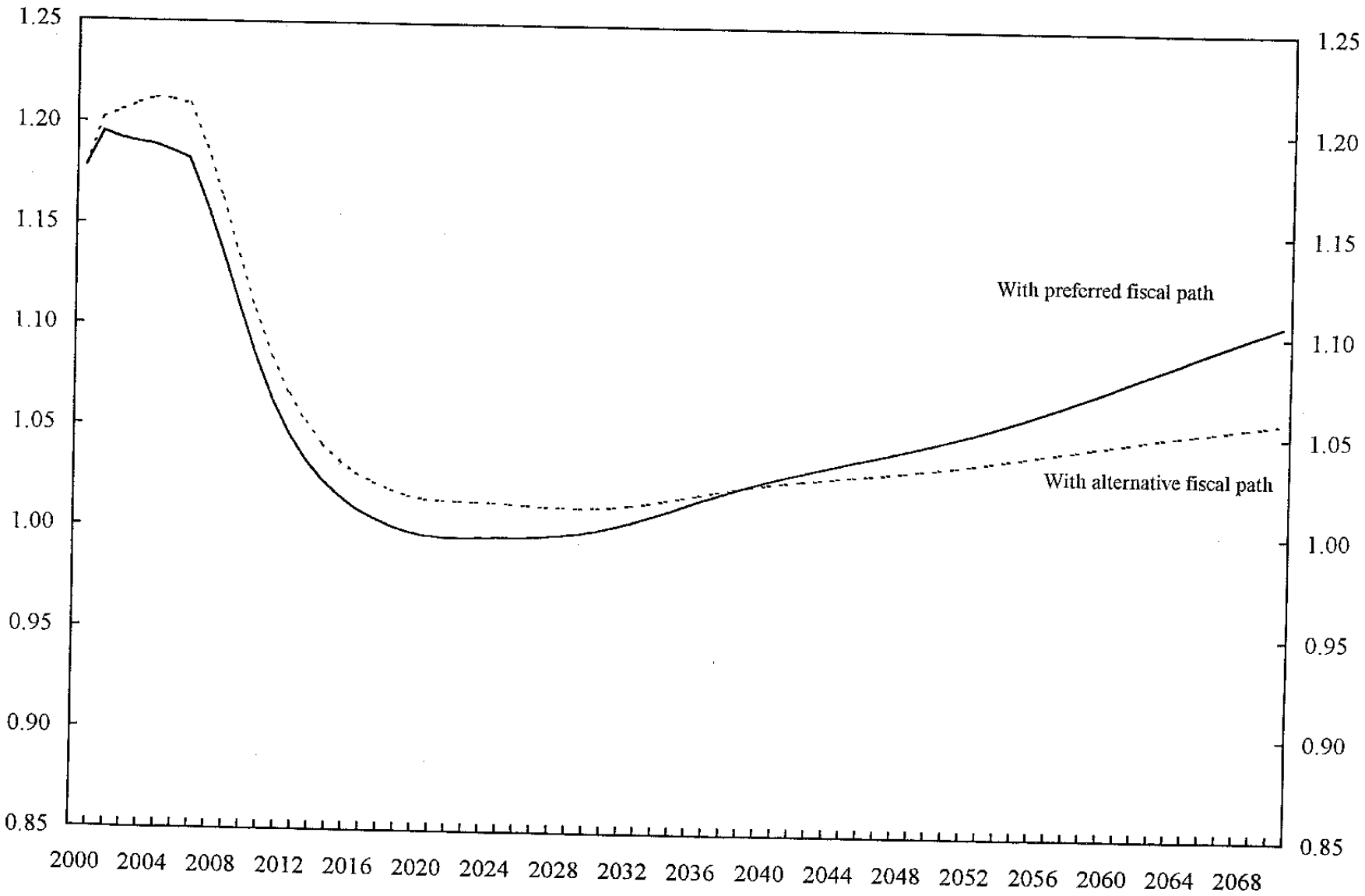


Figure 5. United States: General Government Balance
(Percent of GDP)

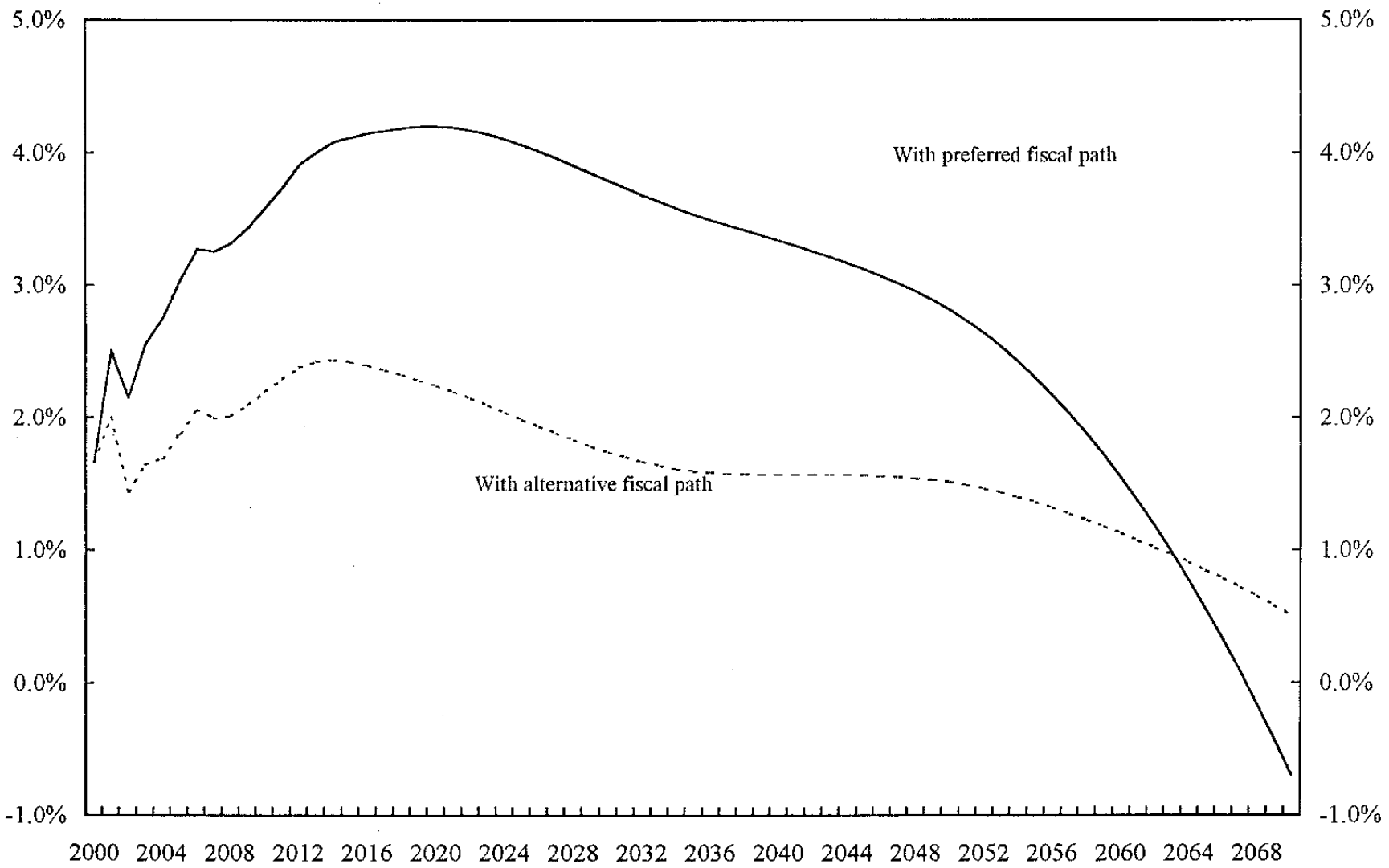
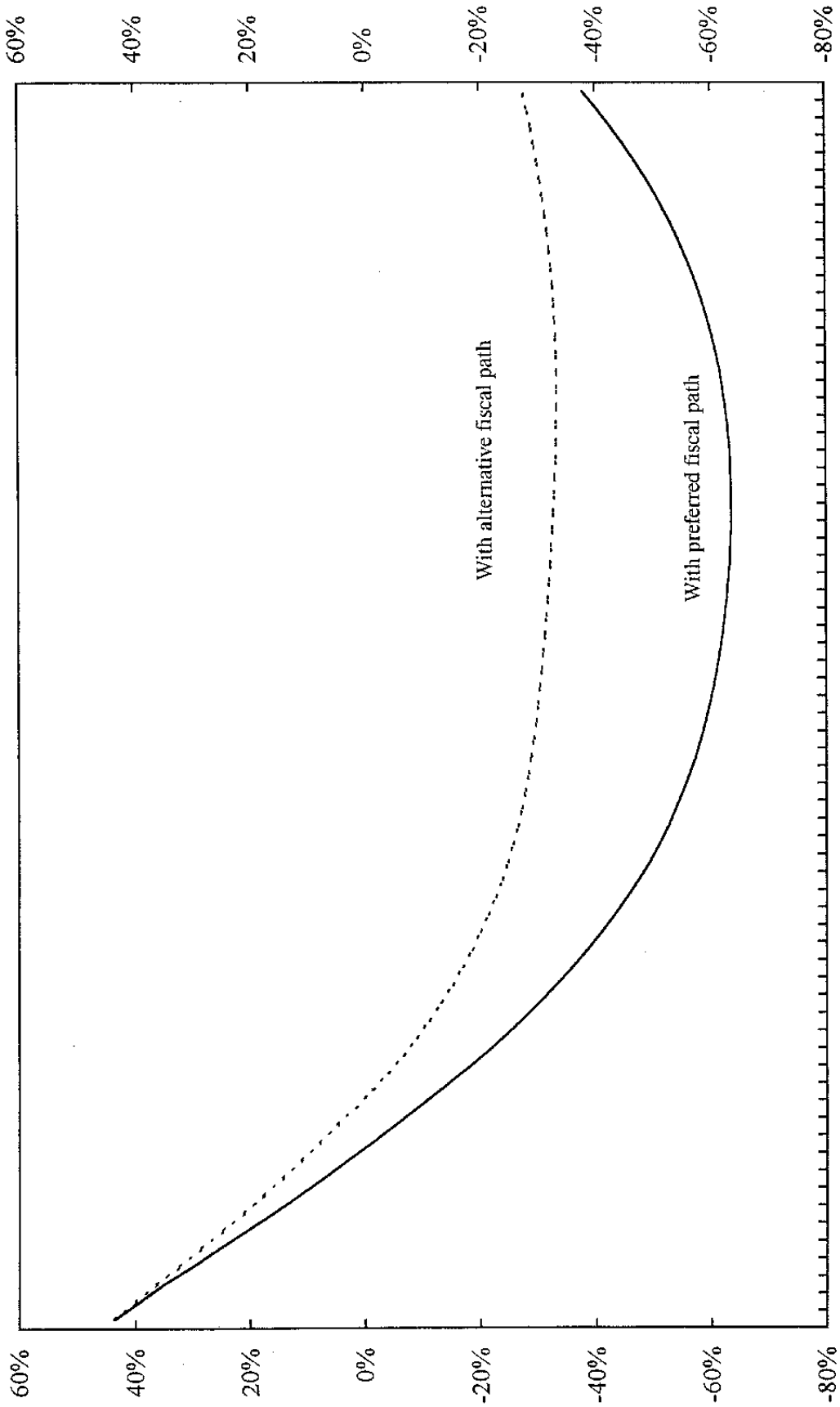


Figure 6. United States: General Government Debt
(Percent of GDP)



## III. Impact of a Slowdown in U.S. Growth on the Euro-Area Economy[1]

1. The view that the euro area may be relatively well insulated from the adverse spillover effects of a sharp U.S. growth slowdown has rested largely on the observation that, since direct trade linkages between the euro area and the United States are relatively small, spillover effects from the U.S. slowdown would be expected to have only a marginal impact. However, economic developments in the euro area, the United States, and Japan are much more closely correlated than would be suggested by trade linkages alone. When consideration is given to how financial and exchange markets might react to slower U.S. growth and to the growing linkages between U.S. and euro-area businesses and financial firms, these spillover effects could be quite substantial, contributing to significantly lower euro-area growth.

2. Historically, there is a relatively weak correlation between fluctuations in the growth rates of U.S. and euro-area GDP, with this correlation being particularly weak during sharp cyclical swings in the U.S. growth rate (Figure 1). In part, the weak correlation reflects the relatively small direct trade links between the United States and the euro area. For example, exports of goods to the United States account for about 13 percent of total euro-area exports and 14 percent of imports (1¾ percent and 1½ percent of euro-area GDP, respectively).[2] However, as Figure 1 illustrates, the co-movement (with a one- to two-quarter lag) in U.S. and euro-area growth rates appears to have increased markedly since the mid-1990s.

3. The euro area would also be exposed indirectly to the effects of sharply slower U.S. growth through the impact of that slowdown on other countries. Asian countries, in particular, could be hard hit by a U.S. slowdown since the United States is a major export market for many of these countries. Currently, Asia (including Japan) absorbs some 12 percent of euro-area exports. Asian suppliers of products for the technology sector could be especially hard hit by falling U.S. investment, and euro-area exports to these countries are likely to slow as a consequence.

4. A sharp slowdown in U.S. economic growth would generate second-round effects on domestic income and demand in the euro area, arising out of the slowdown's negative impact on traded goods and services. In turn, euro-area consumer and business confidence is likely to be adversely affected. Business confidence in the euro area also appears to be correlated with that in the United States, with the euro area lagging by several months during recent cycles; this suggests that the decline in U.S. business sentiment in 2000 may not yet be fully reflected in confidence levels in Europe (Figure 2). Consumer confidence in the euro area could also decline from its recent highs, although it has proved to be relatively robust in recent months.

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[1] Prepared by Albert Jaeger and Maitland MacFarlan.

[2] Averages for 1997–99; staff calculations based on Eurostat trade data.

5. If there were to be a significant U.S. slowdown, it could trigger and be reinforced by a further substantial drop in U.S. stock prices. This would, in turn, be expected to take a toll on euro-area stock markets, with additional negative implications for business and consumer confidence in the euro area. Movements in the U.S. and euro-area stock markets have been strongly correlated since the mid-1990s; in the past couple of years, particularly high correlations are evident in the prices of the stocks of "high technology" companies (Figure 3). In particular, recent declines in euro-area share prices have reflected a fallout from financial difficulties encountered by telecommunications companies in the United States and in Europe and a general reevaluation of prospects for information technology companies. Moreover, European investors now have a significantly larger stake in U.S. asset markets, especially the stock market. Flows of portfolio investment from the euro area to the United States have expanded rapidly in recent years, including a dramatic increase in euro-area flows into U.S. equities (Figure 4). While precise data are not available, euro-area holdings of U.S. equities appear to have reached between 5 and 10 percent of euro-area GDP in 2000, with these investments in 2000 alone amounting to around 1½ percent of euro-area GDP.

6. The strength of the U.S. economy and widely held perceptions that returns on investments in the United States were higher than in the rest of the world stimulated large inflows of capital to the United States and contributed to the substantial appreciation of the U.S. dollar since early 1995. A sharper-than-expected slowdown in the U.S. economy accompanied by a further large decline in U.S. equity prices could trigger a fall in the value of the dollar and significant appreciation of the euro. In such circumstances, euro-area producers would be faced with much stiffer competition in euro-area, U.S., and third-country markets.

7. Simulations using the IMF's econometric model of the world economy (MULTIMOD) illustrate the possible magnitude of the impact of a growth slowdown in the United States on the euro-area economy and can be used to derive "spillover" coefficients (defined as the percentage point reduction in euro-area growth given a 1 percentage point reduction in U.S. growth). A decline in U.S. aggregate demand alone would cut into growth in the euro area mainly through trade channels. Taking account of just these channels, a shock that would reduce U.S. growth by 1 percentage point would lower euro-area growth by about 0.1 percentage point, reflecting the relatively small share of U.S. trade in the external transactions of the euro-area economy. An aggregate demand shock in the United States accompanied by a further major price correction (20 percent) in the U.S. stock market and smaller corrections in the equity markets of other major industrial countries would broaden the impact on the euro-area economy. In these circumstances, an aggregate demand and stock market shock that would reduce U.S. growth by 1 percentage point would lower euro-area growth by about 0.4 percentage point. Finally, an aggregate demand and stock market shock coupled with a substantial drop in the value of the U.S. dollar (about 15 percent) would have a more profound effect on euro-area growth, as the impact of the dollar's fall (rise in the euro's value) would change relative prices of traded goods and reduce euro-area net exports. Factoring in this additional transmission channel, a shock resulting in a 1 percentage point reduction in U.S. growth would lower euro-area growth by about 0.7 percentage point.

8. MULTIMOD does not fully capture possible spillover effects that stem from the increasing links between business and financial firms in the United States and in the euro area that have developed over the past several years. Euro-area businesses have substantially increased their ties to firms in the United States. At present, some 20 percent of the revenues for companies listed on euro-area stock exchanges are estimated to come from exports to the United States or from their U.S. subsidiaries.[3] In 1999, earnings from direct investments in the United States amounted to 2.3 percent of GDP in the Netherlands and to 0.2–0.3 percent of GDP in France and Germany. Global mergers and acquisitions quadrupled to $1.2 trillion between 1997 and 2000, with about 40 percent of the companies originating these deals being based in the euro area. In turn, a significant part of this mergers and acquisitions activity was conducted by euro-area companies in the United States. Mergers and acquisitions announced in 2000 implied a net inflow of around $200 billion to the United States and a net outflow from the euro area of about $300 billion. Reflecting the globalization of world financial markets, euro-area financial institutions have significantly raised their presence in the United States. In so doing, they tended to increase their exposure in the fastest growing sectors of the U.S. economy (such as telecommunications), to bid down credit spreads, and to take on more lesser-quality U.S. borrowers. Hence, a substantial deterioration in U.S. credit quality could contribute to a tightening of credit conditions in euro-area countries as these financial institutions attempt to cope with their losses.

[3] Estimate of HSBC, cited in the Financial Times of February 14, 2001.

Figure 1. International Comparison: Real GDP Growth in Euro Area, United States, and the Rest of the World

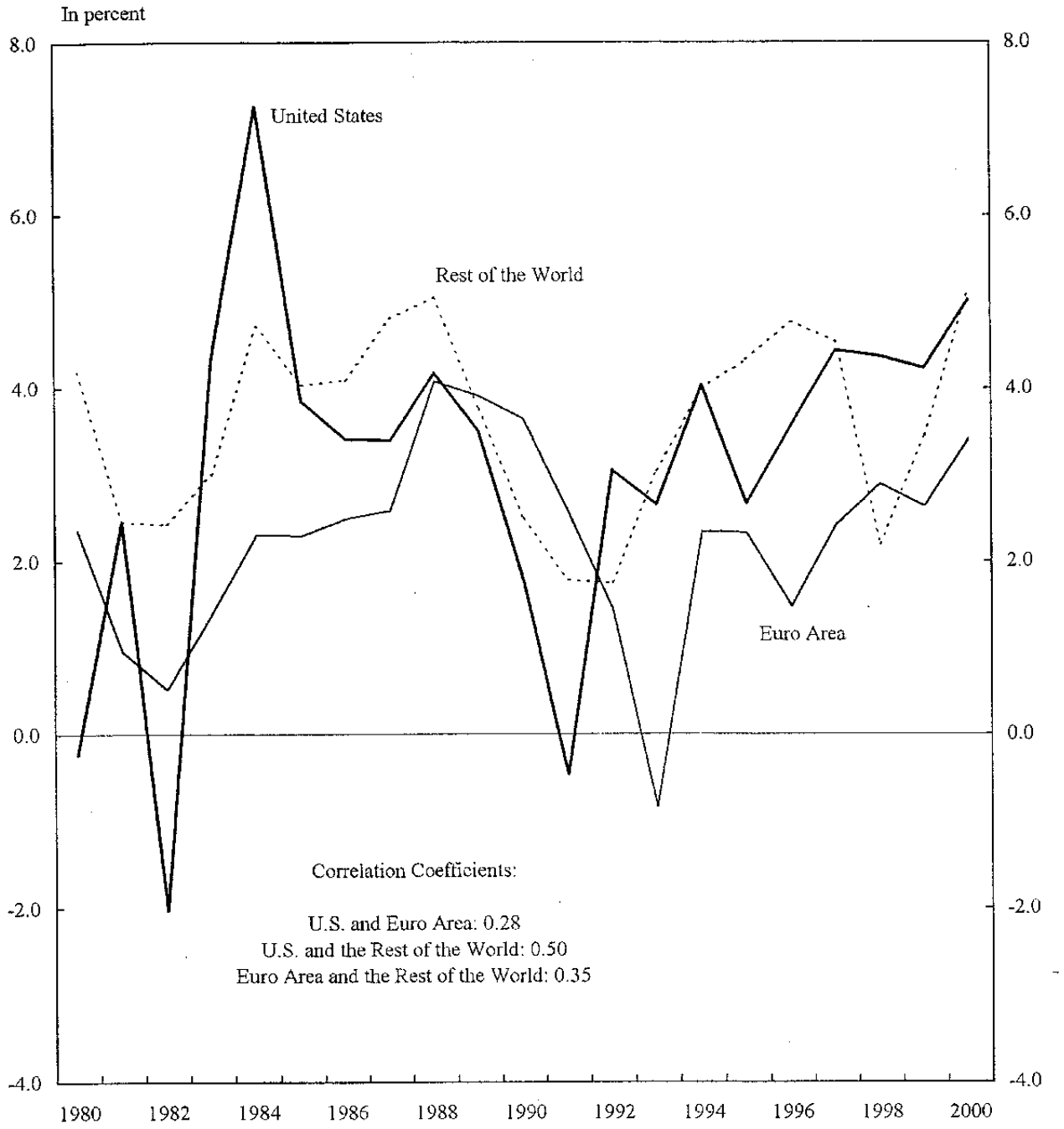
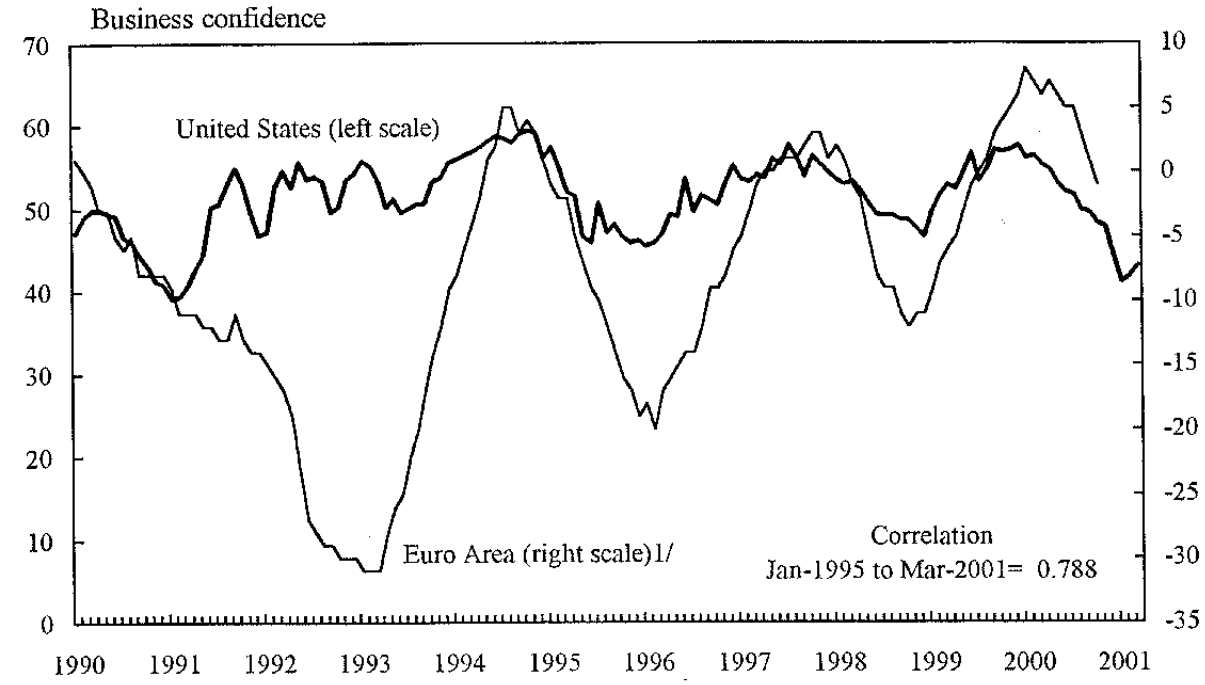
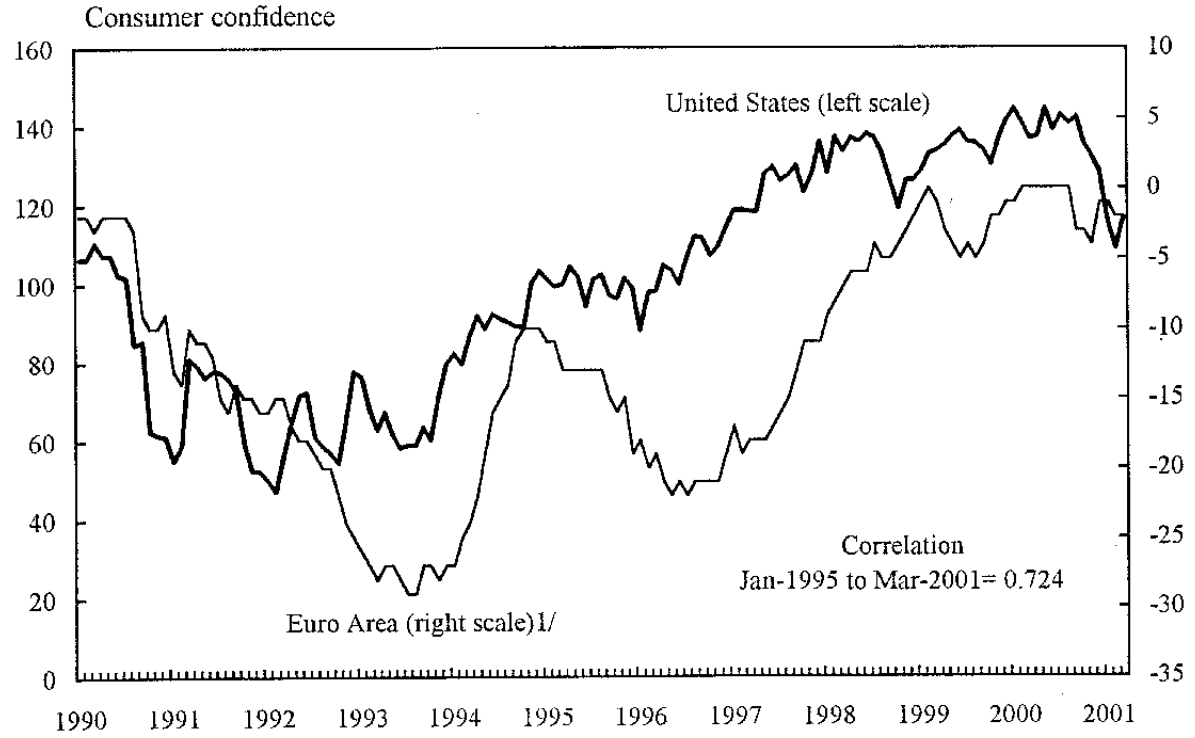


Figure 2. International Comparison: Confidence Indicators




1/ Euro area series lagged five months.

Figure 3. International Comparison: Equity Market Returns

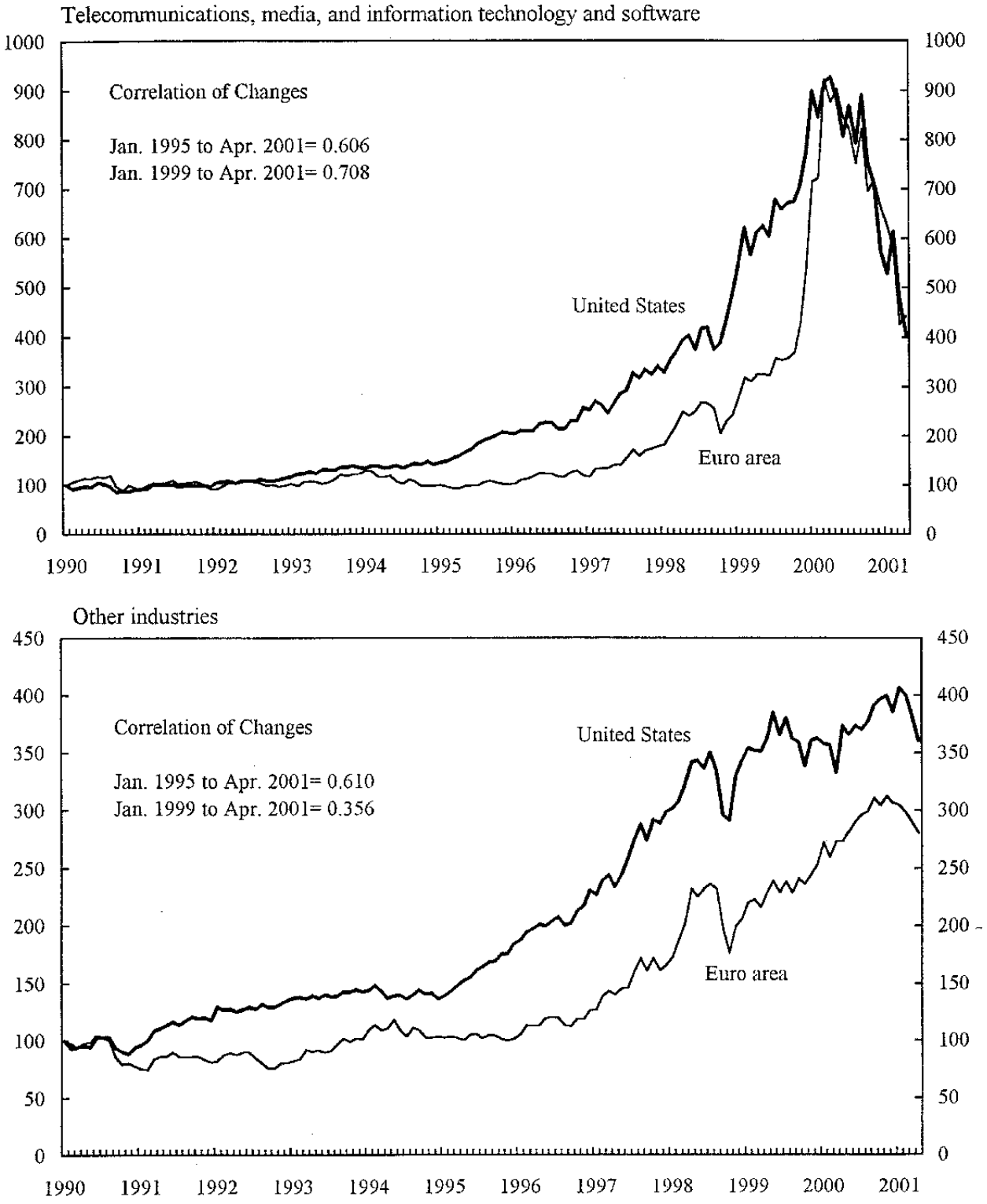
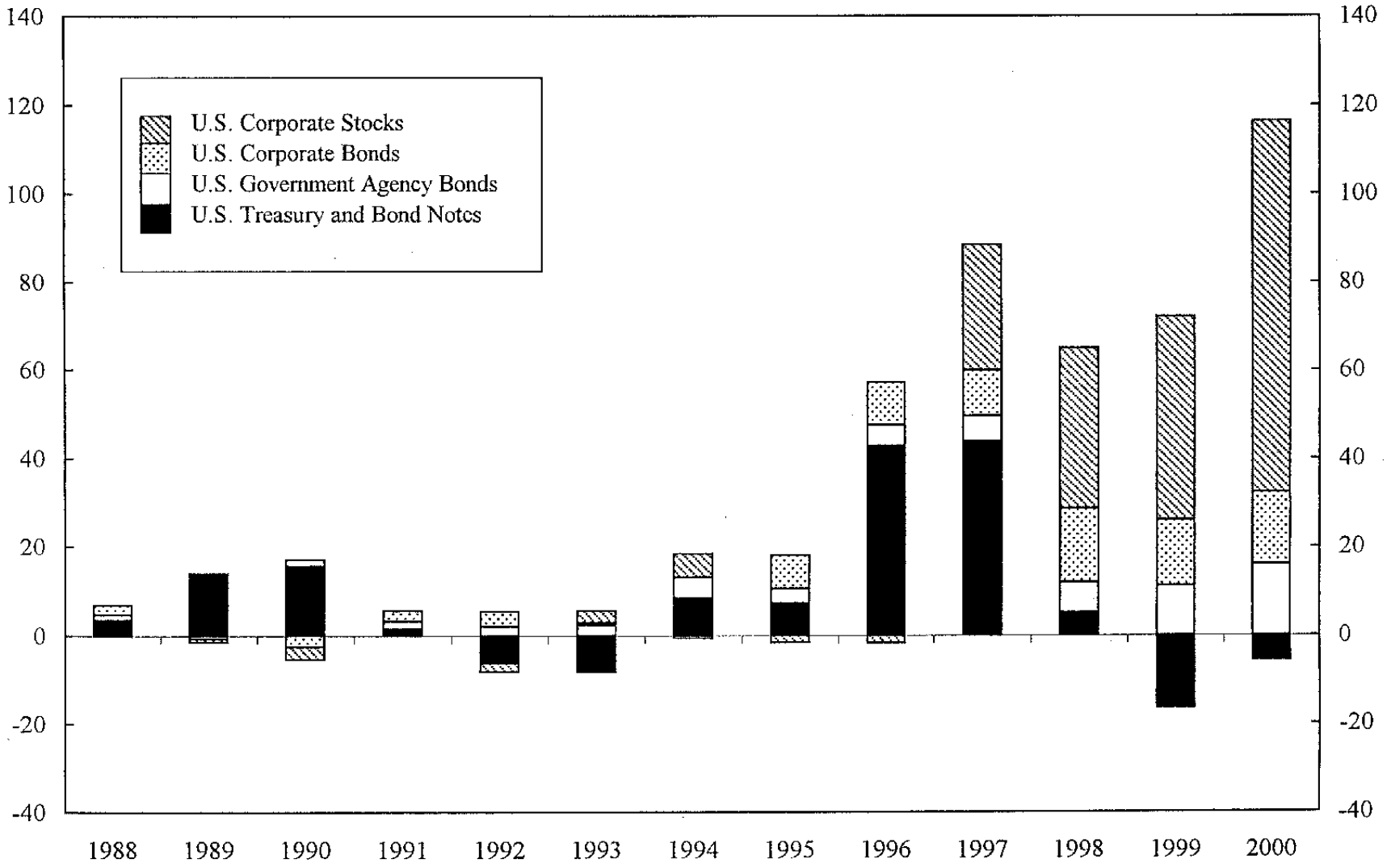


Figure 4. United States: European Holdings of U.S. Investments
(Billions of U.S. dollars)




Source: Euro Stat.

## IV. Implications of the Reduction in U.S. Treasury Securities for Monetary Policy and Financial Markets[1]

1. In the United States, as in several industrial countries, fiscal surpluses in recent years have led to a marked reduction in federal government debt (Figure 1). Prospects are for continued debt reduction over the next decade, with the Administration's budget proposal for FY 2002 envisaging an elimination of redeemable Treasury debt held by the public by FY 2011 (see Office of Management and Budget (2001)).[2]

2. The reduction in the supply of Treasury securities has implications for monetary policy implementation and financial markets in the United States, as well as for foreign holders of these securities. The Federal Reserve has started to adapt its operations to the reduction in Treasury securities, but further debt reduction will require a broadening in the range of instruments through which the Federal Reserve conducts monetary policy. Treasury securities perform various roles in U.S. financial markets, including as a benchmark for pricing and quoting fixed-income securities; an instrument for hedging market risk; a form of collateral; and a safe-haven asset. Alternative instruments, such as interest rate swaps, are starting to fulfill some of the roles traditionally played by Treasuries, although it is not yet clear what will substitute for Treasuries as a safe-haven asset. Foreign central banks hold a significant share of their foreign exchange reserves in the form of U.S. Treasury securities, and as the supply of Treasuries declines, they are moving toward alternative U.S. dollar assets, such as agency securities.[3]

### A. Debt Developments and Outlook

3. The bulk of federal government debt is interest-bearing securities held by private investors, the Federal Reserve Banks (FRB), and U.S. government accounts, that are both marketable and non-marketable.[4] Marketable securities account for just over half of total

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[1] Prepared by Vivek Arora and Rodolfo Luzio.

[2] The U.S. fiscal year starts October 1.

[3] Agency securities are securities issued by Government Sponsored Enterprises (GSE)—the largest of which are the Federal National Mortgage Association (or Fannie Mae) and the Federal Home Loan Mortgage Association (or Freddie Mac)—and federal agencies, such as the Government National Mortgage Association (or Ginne Mae).

[4] Marketable securities can be traded after their initial purchase. New marketable securities are regularly issued in maturities ranging from 13 weeks to 30 years. They comprise bills (with initial maturity of one year or less), notes (initial maturity of 1–10 years), and bonds (over 10 years). Notes account for almost half the marketable debt outstanding, with the rest roughly evenly split between bills and bonds. Nearly all marketable debt is nominally denominated (with coupon and principal fixed in dollar terms), although the Treasury has issued some inflation-indexed debt since 1997. Most of the marketable debt is non-callable.

(continued)

federal government debt. The significance of marketable securities arises from their use in financial markets and monetary policy implementation. Gross federal government debt held by private investors fell from $3.4 trillion (41 percent of GDP) in FY 1997 to $2.9 trillion (29 percent of GDP) in FY 2000 (Table 1); marketable debt held by private investors declined by over $500 billion to just under $2.5 trillion. These declines reflected reduced domestic holdings, as foreign holdings remained unchanged at around $1.2 trillion (Figure 2). The share of FRB holdings of marketable debt has risen steadily from below 13 percent in 1997 to over 17 percent in 2000.

4. The Treasury's debt-management strategy has evolved with the reduction in federal government debt.[5] In recent years, its main objectives have included avoiding a further lengthening in the average maturity of the government debt stock and maintaining liquidity in key "benchmark" issues (90- and 180-day bills; 2-, 5-, and 10-year notes; and 30-year bonds). The issuance frequencies in some maturities have been reduced (e.g., 30-year bond auctions were moved from a quarterly to a semi-annual frequency), and other maturities have been eliminated (e.g., the 1-year bill and 3-year note), allowing new security issues to be concentrated on benchmark issues.

5. Before 2000, the Treasury did not buy back outstanding debt in significant quantities, and as a result the reduction in debt associated with fiscal surpluses was all reflected in reduced debt issuance and retirement of maturing debt, resulting predominantly in a decline in shorter-maturity debt (Table 2). The average maturity of the government's debt rose, making interest costs higher than they would have been otherwise. In January 2000, the Treasury initiated a debt-buyback program, under which it began to repurchase outstanding Treasury securities in the secondary market. Consistent with the objective of preventing a lengthening in the maturity, buybacks were tilted toward longer-maturity debt. Going forward, the reduction in government debt is likely to occur across the yield curve.

6. The fiscal surpluses projected for the next decade suggest that outstanding federal government debt will fall to very low levels. It is estimated that over this period only around $2 trillion of the $3 trillion outstanding stock of marketable securities at end-FY 2000 will mature or be available for easy repurchase by the government.[6] If, in line with the Administration's intention, the cumulative surpluses of the Social Security trust fund

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Non-marketable securities, which cannot be traded, are mostly held in U.S. government accounts (mainly in the Social Security trust funds); a portion is held by private investors in the form of U.S. savings bonds.

[5] See Dupont and Sack (1999).

[6] The remaining, "non-redeemable" debt would comprise debt that had not yet reached maturity, was held in non-marketable forms (e.g., savings bonds), or whose repurchase would require a premium that the Treasury may consider too high.

amounting to $2.6 trillion are preserved, annual unified budget surpluses by FY 2009 would start to exceed the debt available for redemption, leaving the federal government with an excess cash balance (Figure 3).

### B. Implications for Monetary Policy Implementation

7. The potential implications of debt reduction for monetary policy implementation arise from the key role that Treasury securities play in monetary operations. Open market operations in the United States are of two kinds:

- Permanent operations, comprising outright open market purchases, are used to meet the expanding demand for currency and reserves. Permanent operations principally involve Treasury securities.[7]

- Temporary operations, through repos and matched-sale-purchase transactions (MSPs), are used to move the federal funds rate toward the target rate set by the Federal Open Market Committee of the Federal Reserve. Temporary operations traditionally have been conducted using only Treasuries and agency securities as collateral. In 2000, Treasuries accounted for 89 percent of the total assets of the Federal Reserve (Table 3).

8. Additional implications of debt reduction for monetary policy implementation could arise from the role of Treasury securities during crises, their role in markets' interpretation of the stance of monetary policy, and their use in meeting reserve requirements. Treasury securities are typically the means by which the Federal Reserve eases liquidity during periods of financial stress, both by buying up Treasuries and by the fact that it accepts Treasuries as collateral for borrowing by banks. These attributes, together with the absence of credit risk, contribute to making Treasuries a "safe haven" asset in financial markets. In addition, government debt developments affect the government yield curve, an important indicator of market expectations of inflation and the monetary policy stance. When money market conditions indicate persistent reserve imbalances among depository institutions, the Federal Reserve uses outright sales or purchases of Treasury securities to drain or add reserves to the system. When they indicate temporary imbalances, repos or MSPs backed mainly by Treasuries are used.

9. In the past few years, changes in the stock of Treasuries contributed to distortions in the government yield curve, confusing market signals. The government yield curve is usually a better indicator of market conditions such as inflationary expectations than, say, the corporate yield curve, which, in addition to inflation risk, also reflects liquidity risk and credit risk. With the reduction in Treasuries, idiosyncratic factors (including scarcity at the long end) have started to influence the yield curve. The shape of the yield curve has changed

[7] Under the Federal Reserve Act, the Federal Reserve is also allowed to buy agency securities, some municipal securities, foreign exchange, and sovereign debt.

frequently in recent years. From a "normal" upward slope in 1998, the curve flattened in 1999, inverted at the longer end in early 2000, and then inverted altogether in late 2000—before reverting to a normal upward slope in early 2001 (Figure 4). With the frequent changes in its shape, the yield curve has become harder to interpret as an indicator of market conditions. In addition, with a thinner market for Treasuries, small operations by the Federal Reserve can have larger-than-expected effects on interest rates.

10. Debt reduction could complicate the implementation of monetary policy well before the debt is fully paid down. In particular, as the Treasury market becomes less liquid over time, outright purchases of Treasuries by the Federal Reserve to accommodate the trend growth in currency demand may start to unduly affect market prices.[8] Also, reduced activity in the Treasury repo market could make it harder for these repos to be used in response to temporary imbalances in banks' reserves.

11. The Federal Reserve has started to adapt its operations to the declining stock of government debt.[9] In 1999, the Federal Reserve temporarily expanded the asset class for eligible collateral in repos to include mortgage-backed securities guaranteed by a GSE or federal agency, and expanded the eligible maturity of term repos from 15 to 90 days.[10] These changes have facilitated an increased reliance on the use of temporary operations and minimized disruptions in monetary policy operations. In 2000, the Federal Reserve met part of the demand for reserves through longer-term repos rather than outright purchases of Treasuries. In addition, a legal revision in 2000 allowed the Federal Reserve to use discount loans to banks as backing for paper currency. Since Treasuries are the principal asset-backing currency, the revision effectively allowed the Federal Reserve to reduce its holdings of Treasuries.[11]

12. Furthermore, in July 2000, the Federal Reserve instituted self-imposed limits on its holdings of individual Treasury security issues as a proportion of the outstanding amounts of the issues. The limits range from 35 percent for Treasury bills to 15 percent for longer-term bonds. To keep within the limits, the Federal Reserve has from time to time redeemed some

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[8] See Federal Reserve Board (2001).

[9] For further discussion of the U.S. experience, see Fleming, Hall, and Krieger (2000), and Reinhart and Sack (2000).

[10] These temporary measures initially extended through January 2001, at which time they were renewed.

[11] The revision was not, however, made in response to the falling stock of Treasuries, but rather was in response to a decline in banks' reserve deposits at the Federal Reserve, which led to a reduction in permissible assets to back currency issuance.

of its holdings of Treasuries, whenever the amount of maturing holdings has exceeded the amount that could be rolled over into newly issued Treasuries within the set limits.[12]

13. Despite these temporary measures, the prospect of continued debt reduction suggests that the Federal Reserve's limits will become binding significantly earlier than the date by which the redeemable debt will be eliminated. Estimates of the slack remaining under the limits are in the range of only about $230 billion as of early 2001 (Table 4). In the next few years, if the Federal Reserve continues to purchase Treasuries in order to expand its balance sheet in line with nominal growth in the economy, and if the Treasury reduces debt proportionately across maturities as fiscal surpluses accumulate, the ceilings could be reached by FY 2003.[13]

14. The Federal Reserve is examining several possible adaptations to its monetary operations.[14] For the near term, one possibility being considered is a further expansion of the class of eligible collateral for repos to include certain debt obligations of U.S. states and foreign governments.[15] In the longer term, the Federal Reserve has identified several issues for further study, including whether it should expand the use of the discount window for depository institutions (the current alternative to open market operations for injecting liquidity). One approach would be to auction discount loans to financially sound depository institutions, although such a program would have to be structured to take account of moral hazard, specifically to prevent certain institutions from becoming unduly dependent on such loans or from taking excessive risk. Furthermore, the process of credit allocation through the discount window is currently kept separate from day-to-day monetary policy implementation (through open market operations), helping to keep such operations free from direct pressure to bail out troubled financial institutions. Heavy reliance on the discount window would eliminate this implicit firewall.[16] Another issue for further study is whether there are merits in relying more heavily on temporary short-term transactions in a broader range of assets (in the form of both repos with security dealers and discount window loans to depository institutions) as compared with outright purchases of such a range of assets.[17]

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[12] See Greenspan (2001a).

[13] See Folkerts-Landau, Garber, and Dinmore (2001).

[14] See Greenspan (2001b).

[15] As noted, the Federal Reserve has statutory authority under the Federal Reserve Act to transact in these assets, but it has traditionally not used them in open market operations.

[16] See Gertler (2000).

[17] See Federal Reserve Board (2001).

15. A key issue is whether it will eventually be necessary for the Federal Reserve to seek to acquire a wider range of assets in its open market operations. Both international and historical U.S. experience suggest that such instruments have on occasion been used successfully. In principle, open market operations can be based on any highly rated, liquid asset rather than only on government securities. Cross-country experience does indeed suggest that monetary policy operations need not be based only on government securities. In the euro area, open market operations by the European System of Central Banks (ESCB) are based on a range of assets, so-called "tier one" and "tier two" assets, which must fulfill certain criteria (such as meeting high credit standards) but are not restricted to government securities.[18] In the United Kingdom, the class of eligible securities for monetary operations by the Bank of England includes, in addition to various government securities, securities accepted by the ESCB and eligible bank bills. Even in the United States, before 1932 the Federal Reserve was not allowed to use government securities to back the currency and instead transacted in eligible commercial paper and bankers' acceptances.[19]

16. The use of non-Treasury securities would seem to be viable from the perspective of monetary operations, but it raises a few broader policy questions. The selection of a particular non-government security would confer the security with a special status in the market, providing the issuer with an indirect advantage that may or may not be desirable from a broader policy perspective. In the context of the GSEs, for example, a concern has been that their special status might divert additional resources into one sector (housing). Furthermore, with the use of private securities as collateral for repos, the Federal Reserve would have less control over the composition of the collateral on its books, and dealers typically would post the assets (within the eligible class) they value the least.[20]

17. In addition, the Federal Reserve would start to bear credit risk, especially if it were to hold non-Treasury securities outright. Although credit risk would not affect monetary

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[18] The most important instruments are refinancing operations in the form of reverse transactions, which are conducted on the basis of either repurchase agreements or collateralized loans. In addition to refinancing operations, the ESCB may use outright transactions, issuance of debt certificates, foreign exchange swaps, and collection of fixed-term deposits. However, these additional instruments have not yet been used. For details, see European Central Bank (1998).

[19] The Federal Reserve also transacted in gold, since the United States was on the gold standard at the time. See Meltzer (2001).

[20] The effects on the Federal Reserve's balance sheet would be mitigated to some extent by marking to market of collateral. The Federal Reserve has noted in addition that the use of private securities in open market operations raises risk management and accounting questions that need to be studied further, as well as the question of whether their introduction should be incremental or rapid.

operations (because the monetary injection is completed with the open market purchase), it could have other implications, including the remote possibility of a need to recapitalize the Federal Reserve in the event of widespread defaults. Also, monetary operations currently involve substitution between two assets (cash and Treasuries), both of which are free of credit risk. The introduction of a risky asset could influence private capital allocation.[21] Furthermore, the Federal Reserve would have to incur costs associated with evaluating asset values and creditworthiness. Finally, when the status of a particular asset or loan in the Federal Reserve's portfolio deteriorates, requiring it to be sold or not rolled over, political or supervisory considerations may not always allow the Federal Reserve to sell the asset or call the loan.[22]

### C. Financial Market Implications

18. A reduction in government debt has the potential to affect financial markets because of the key roles that government securities play in most countries with mature financial systems:[23]

- Government bonds represent the main benchmark asset against which other fixed-income assets are priced.

- Government bond yields are used as the risk-free rate in many valuation decisions and are also used as a reference rate against which yields on other fixed-income securities are quoted.

- Government bonds are important vehicles for hedging private sector credit risk, and, in addition, are used in day-to-day liquidity management and as collateral.

- Finally, government bonds represent a "safe haven" during periods of market turmoil, and their value in such situations is enhanced by the fact that central banks typically ease liquidity by buying up government securities.

19. In U.S. financial markets, the shrinking supply of Treasury securities has already led to substantial changes in the instruments used by market participants for various purposes. For pricing and quoting private fixed-income instruments, hedging market risks, and to some extent in collateralizing counterparty risks, market participants have shifted significantly to private financial instruments (mainly interest-rate swaps). In some of the other roles played by Treasuries, there is a concern that private securities may not be able to substitute

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[21] See Greenspan (2001c).

[22] See Broaddus and Goodfriend (2001).

[23] This section draws on Schinasi, Kramer, and Smith (2001).

adequately. First, a comparable security to substitute for the role of Treasuries as domestic and international safe havens is difficult to envision at this stage. Second, private securities include an element of credit risk, and it may take time before market participants come to accept them as universal collateral in place of Treasuries. Also, they have not been tested in times of stress, which may lead some market participants to move toward cash (bank deposits) as an alternative collateral to Treasuries. Third, for some types of institutional investors, such as pension funds and insurance companies, which have a substantial demand for relatively safe long-term investments, private substitutes may not be available in sufficient volume to adequately replace long-term government securities.[24]

20. The reduction in federal debt since 1998 has affected financial markets in several dimensions. Liquidity in the government securities' market has declined across maturities, reflected in lower trading volumes (Figure 5). The cost of borrowing in the repo market has increased since early 2000, partly reflecting the increased scarcity of the one-year Treasury bill, which was used as collateral on overnight repos (Figure 6).[25] The relationship among different Treasury securities has changed at times, reflected most visibly in the yield-curve inversion in 2000. The relationship between Treasuries and other fixed-income securities has also varied, with the spreads between interest rate swaps, agency securities, and corporate debt versus the ten-year Treasury note all widening since 1998, as well as becoming more volatile (Figure 7).[26] In addition, the correlation of private fixed-income yields with Treasury yields has declined while their correlation with swap rates has been rising.

21. The greater disparity between the performance of Treasuries and other fixed-income securities has reduced the usefulness of Treasuries as a reference rate and a hedging vehicle. At the long end, the decline in liquidity of the 30-year Treasury bond has resulted in higher and more volatile spreads vis-à-vis other 30-year securities, reducing its reference and hedging role in this segment. With the changing yield curve, it has proved difficult to find an alternative Treasury security with which to proxy the 30-year Treasury yield.

22. Financial markets have started to assess the usefulness of alternative instruments as benchmarks. The main alternative instruments are interest rate swaps, agency securities, and corporate debt, with interest rate swaps appearing to be the favored alternative at present.[27] Swap rates have tended to move closely with other fixed-income yields, increasing their

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[24] If the supply of Treasuries declines substantially, these investors may simply need to manage greater mismatches between their assets and liabilities.

[25] The one-year Treasury bill stopped being issued in February 2001.

[26] The change in spreads between Treasuries and other fixed-income securities partly reflects the failure of Long-Term Capital Management in 1998 which led market participants to re-evaluate financial transactions.

[27] See Fleming (2000) and Zamsky (2000).

attractiveness for referencing and hedging. Fixed-income positions are often hedged using interest rate swaps, several corporate issues have been priced off swap rates, and swap rates are increasingly being used to evaluate other fixed-income securities. The predominance of swaps is consistent with the experience in the euro area, where there is no uniform government asset to play a benchmark role and where pricing and hedging are typically done with swaps. Swaps are not, however, a perfect substitute for Treasuries. Being bilateral contracts for a fixed period of time, they are costly to unwind. In addition, given that they are over-the-counter instruments, they are not as widely accessible as Treasuries and are confined to large corporations and financial institutions.[28]

23. Agency debt is increasing in importance, although its liquidity remains much lower than that of Treasuries (Table 5). Since 1998, agencies have increased issuance of "benchmark" securities, which mimic many of the features of Treasuries. Agency yields have indeed moved closely with other fixed-income yields (Figure 7), and there is an active repo market and a developing futures market. High-rated corporate debt used to be the main long-term benchmark in U.S. financial markets before the introduction of 30-year Treasuries in the mid-1970s. Although such debt is sometimes used for pricing and hedging, it is not a practical alternative to Treasuries, since few issues are actively traded. In addition, individual issues are subject to credit risk and although there is an active repo market, there is no futures market.

### D. International Implications

24. A reduction in U.S. government debt has the potential to affect other countries through several channels, including the role of Treasuries as a component of foreign central banks' international reserves, as a means of settlement for international transactions in goods and services, and as safe haven assets in international financial markets. Foreign holdings of U.S. Treasuries account for over one-fifth of the total and are roughly evenly split between central banks and the private sector.[29]

25. Foreign central banks hold the bulk of their official foreign exchange reserves in U.S. dollars,[30] and nearly 60 percent of the dollar reserves are held in the form of Treasuries. A fall in the supply of Treasuries has implications for central banks' reserve management, and in turn for the foreign demand for U.S. financial assets. A key question is whether central banks will shift the composition of their reserves toward other U.S. assets or whether they will move away from U.S. assets altogether. Thus far, they appear to be shifting toward other U.S. assets, mainly agency securities. Moreover, the move toward non-Treasury U.S. assets

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[28] Steps that would widen the tradability and accessibility of swaps could include the establishment of a clearing house as well as of a swap futures market.

[29] See Fung and McCauley (2001).

[30] Fung and McCauley (2000) estimate the proportion at over three quarters.

began even before debt reduction was speeded up through buybacks (Table 6). To the extent that central banks do hold some Treasuries, and that they manage their portfolios much less actively than other foreign investors, their demand would contribute to reducing market liquidity. In recent years, foreign official holdings of Treasury securities have been equivalent to about 2½ percent of the financial transactions of the rest of the world, as proxied by the rest of the world's current and capital account flows (Figure 8). On this basis, foreign official demand for Treasuries would rise from about $600 billion in 2000 to nearly $950 billion in 2006.[31]

26. Other factors also will influence the foreign demand for U.S. Treasuries. In several economies (e.g., Hong Kong SAR, Singapore) the authorities have continued to issue government bonds even in the absence of a financing need, in part to continue to provide fixed-income markets with government benchmarks.[32] In Hong Kong SAR and Singapore, the proceeds of such "overfunding" are invested in foreign currency assets. To the extent that this includes U.S. Treasury securities, it accelerates the decline in the stock of Treasuries in private hands.[33] In addition, as the stock of Treasuries declines, foreign fiscal authorities will, like central banks, need to consider alternative investment vehicles.

27. The international demand for U.S. Treasuries as safe-haven assets may be influenced by the debt reduction, which could potentially influence international safe-haven flows. The main questions include whether such flows will continue to be directed toward U.S. assets, what the alternative U.S. assets might be, and whether the volume of flows is likely to be affected. It is possible that private investors will increase their demand for agency securities, for which there are deep and liquid markets and which have only a thin sliver of credit risk. However, without any recent experience of significant financial stress, it is difficult to answer these questions definitively and several outcomes are possible.

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[31] The foreign official demand for Treasuries could be smaller than this, especially if foreigners remain willing to move into other dollar-demonimated instruments.

[32] See Fung and McCauley (2000).

[33] The choice of assets in which to invest such proceeds is a separate policy issue, which is discussed in Chapter V of the selected issues paper.

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## Table 1. United States: Gross Federal Government Debt

(In billions of dollars)

| | Fiscal Years | | | |
|---|---|---|---|---|
| | 1997 | 1998 | 1999 | 2000 |
| Total debt | 5,446 | 5,556 | 5,685 | 5,702 |
| Interest bearing debt | 5,408 | 5,519 | 5,647 | 5,622 |
| Held by U.S. government accounts | 1,598 | 1,766 | 1,989 | 2,236 |
| Marketable | 1 | 1 | 1 | 0 |
| Non-marketable | 1,597 | 1,764 | 1,988 | 2,235 |
| Held by private investors | 3,373 | 3,295 | 3,162 | 2,875 |
| Marketable | 3,002 | 2,872 | 2,735 | 2,481 |
| Non-marketable | 371 | 423 | 426 | 394 |
| Held by Federal Reserve banks | 436 | 458 | 496 | 511 |
| Matured and noninterest-bearing debt | 6 | 8 | 9 | 52 |
| Other 1/ | 33 | 29 | 29 | 28 |

Source: U.S. Treasury *Monthly Bulletin*, December 2000.

1/ Federal Savings and Loan Insurance Corporation resolution fund, Federal Housing Administration, Farm Credit Sytem Financial Assistance Corporation, and Tennessee Valley Authority.

## Table 2. United States: Marketable Government Debt Held by Private Investors: Maturity Distribution

(In billions of dollars)

| | Fiscal Years | | | |
|---|---|---|---|---|
| | 1997 | 1998 | 1999 | 2000 |
| Marketable government debt held by private investors | 3,002 | 2,872 | 2,735 | 2,481 |
| Maturity classes: | | | | |
| Within 1 year | 1,018 | 941 | 915 | 859 |
| 1-5 years | 1,207 | 1,105 | 963 | 792 |
| 5-10 years | 322 | 319 | 378 | 355 |
| 10-20 years | 154 | 157 | 150 | 167 |
| 20 years or more | 298 | 334 | 322 | 296 |
| Unspecified | 3 | 15 | 7 | 12 |
| Average length (years (y), months (m)) | 5y 4m | 5y 8m | 5y 9m | 5y 10m |

Source: U.S. Treasury *Monthly Bulletin*, December 2000.

Table 3. United States: Assets of U.S. Federal Reserve Board

(In percent of total assets)

| | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 |
|---|---|---|---|---|---|---|
| Assets | | | | | | |
| Gold, SDRs | 50.1 | 33.1 | 12.1 | 8.2 | 6.6 | 2.4 |
| Loans to depository institutions | 0.0 | 0.0 | 0.0 | 1.0 | 0.1 | 0.0 |
| Federal agencies | | | | | | |
| Outright | 0.0 | 0.0 | 0.0 | 5.1 | 1.9 | 0.0 |
| Repos | 0.0 | 0.0 | 0.0 | 0.3 | 0.4 | 0.0 |
| U.S. Treasuries | | | | | | |
| Outright | 47.3 | 50.9 | 69.0 | 69.6 | 71.8 | 88.8 |
| Repos | 0.0 | 0.8 | 0.0 | 1.2 | 5.2 | 0.0 |
| Other assets | 2.6 | 15.3 | 18.9 | 14.7 | 14.0 | 8.8 |
| Memorandum item: | | | | | | |
| Total assets (in billions of U.S. dollars) | 42.9 | 52.9 | 90.0 | 171.5 | 327.6 | 578.9 |

Source: U.S. Federal Reserve Board, *Federal Reserve Bulletin*, various issues.

Table 4. United States: Caps on Federal Reserve Holdings of Treasury Securities

| | Federal Reserve Cap (Percent of Total Issued) | Remaining Slack ($ Billions) |
|---|---|---|
| Maturity: | | |
| Less than 1 year | 35 | 126 |
| 1–2 years | 35–25 | 48 |
| 2–5 years | 25–20 | 37 |
| 5–10 years | 20–15 | 6 |
| Over 10 years | 15 | 14 |
| **Total** | | **231** |

Source: Folkerts-Landau, Garber, and Dinmore (February 2001).

Table 5. United States: Agency Debt

(In billions of dollars)

| | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| Agency debt outstanding | 926 | 1,023 | 1,296 | 1,616 | 1,852 |
| Federal agencies | 29 | 28 | 27 | 26 | 26 |
| Government-sponsored enterprises | 896 | 995 | 1,270 | 1,590 | 1,826 |
| Freddie Mac | 157 | 169 | 287 | 361 | 427 |
| Fannie Mae | 331 | 370 | 460 | 548 | 643 |
| Other | 408 | 456 | 522 | 682 | 756 |

Source: *Federal Reserve Bulletin*, various issues.

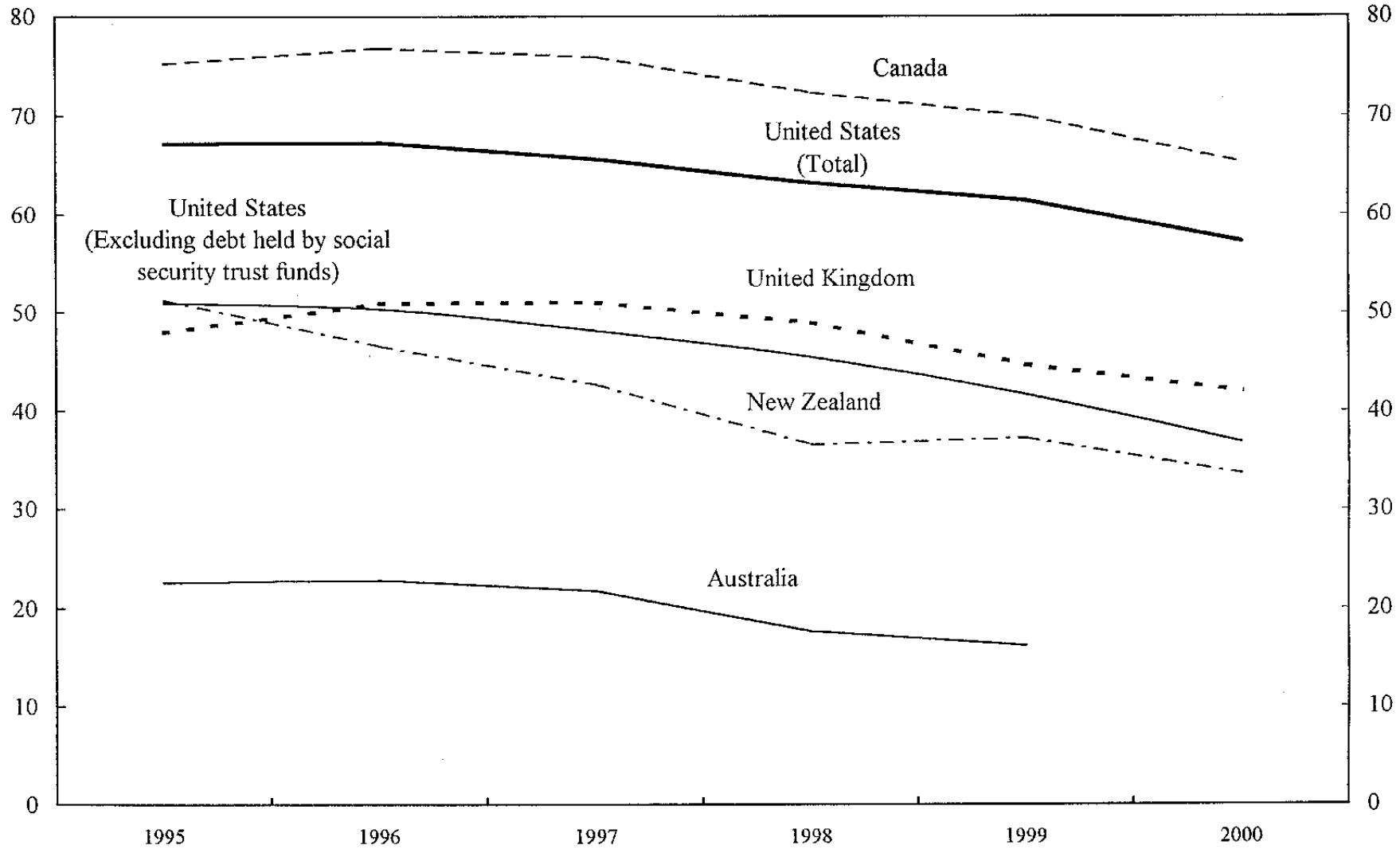
Table 6. Instrument Composition of Foreign U.S. Dollar Official Reserves

(In percent)

| | 1989 | 1999 |
|---|---|---|
| Treasury securities | 64 | 58 |
| Other U.S. dollar assets | 36 | 42 |
| Deposits in the United States | 3 | 3 |
| Money market paper | 6 | 11 |
| Offshore deposits | 18 | 14 |
| Agency securities | 2 | 5 |
| Corporate bonds | 0 | 1 |
| Equity | 7 | 8 |

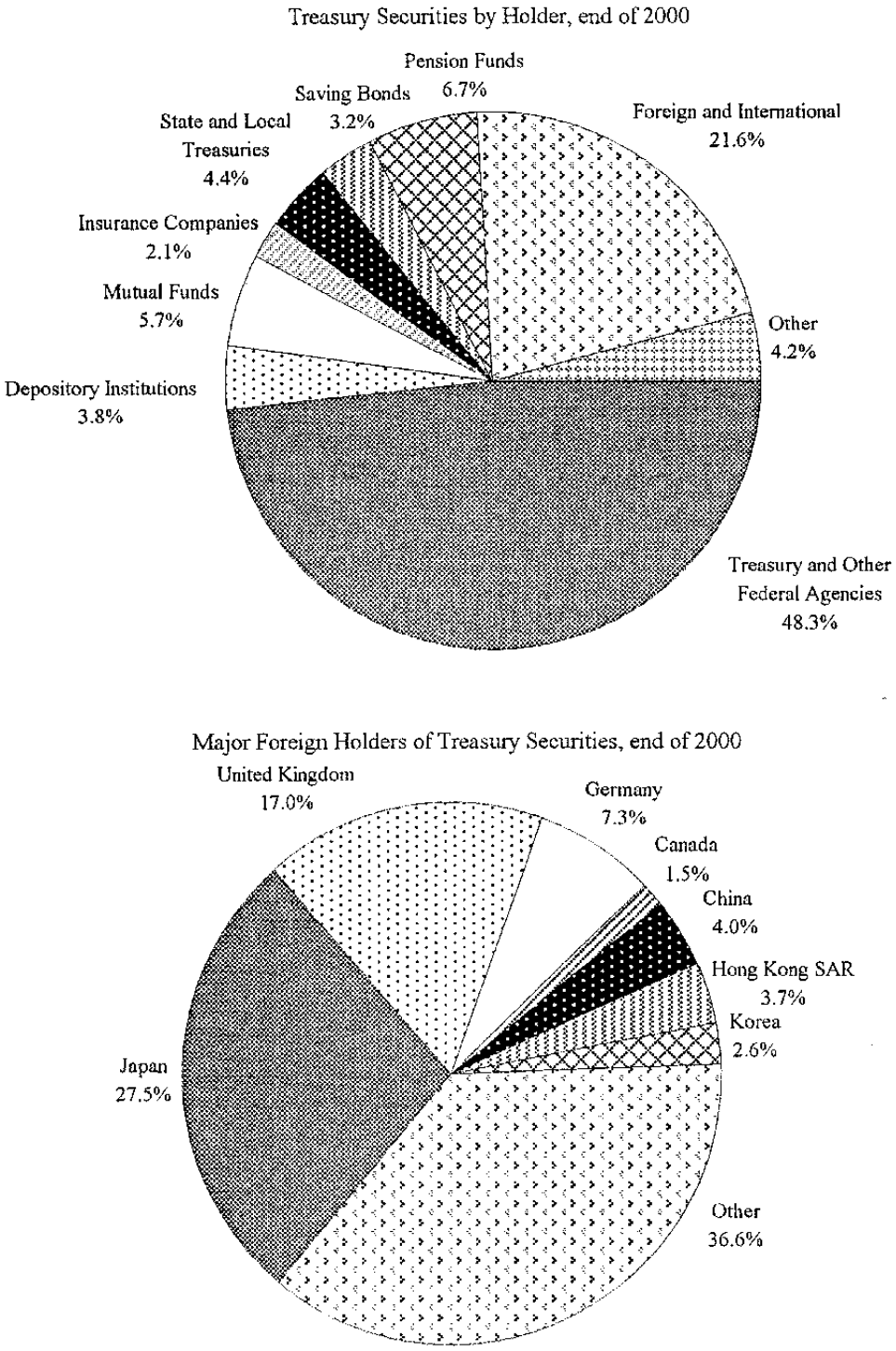
Source: Fung and McCauley (2000).

Figure 1. Selected Countries: Gross Federal/ Central Government Debt
(Fiscal years, in percent of GDP)



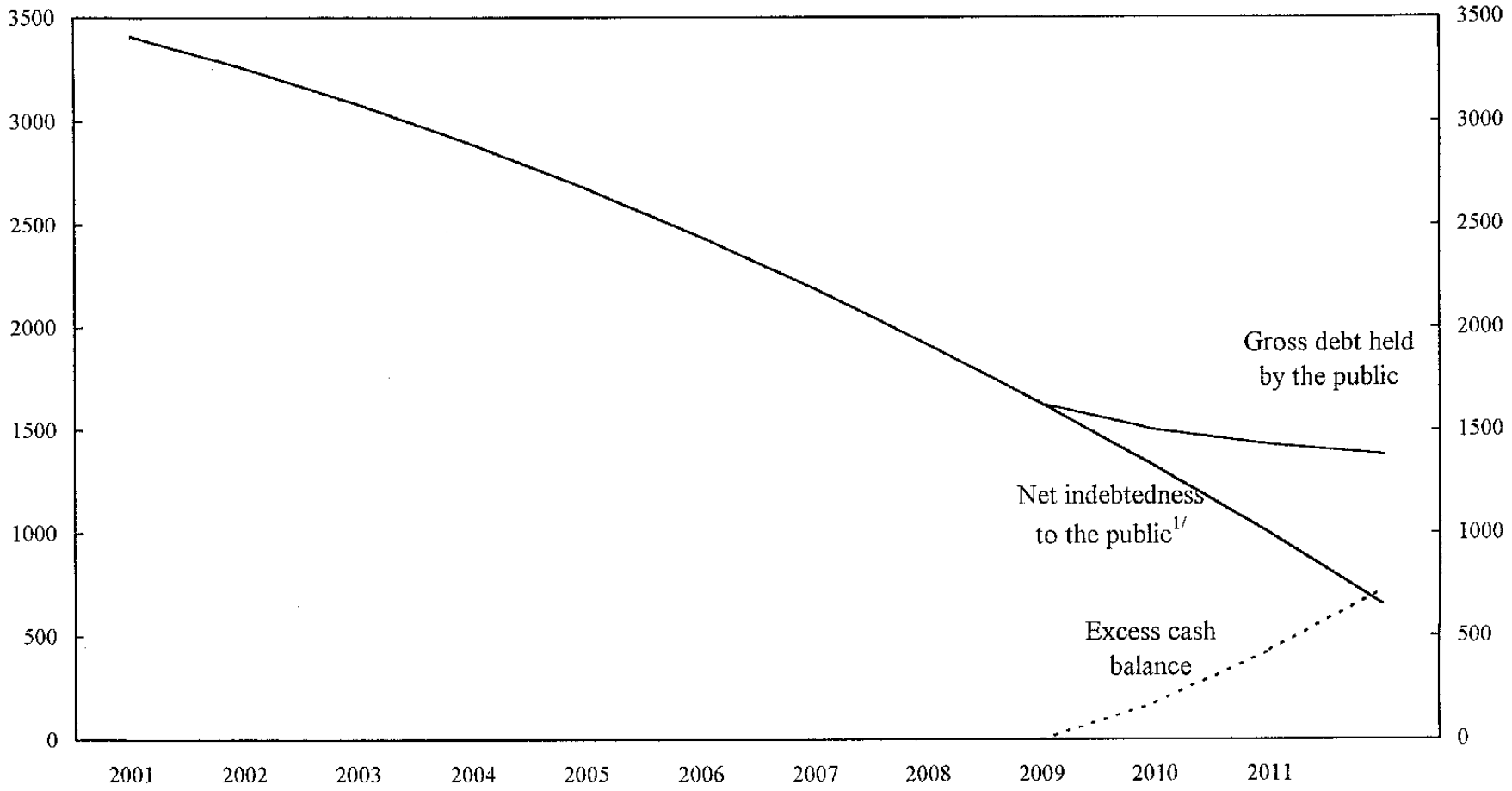

Sources: World Economic Outlook; WEFA; and official national statistical sources.

Figure 2. United States: Treasury Securities




Source: U.S. Treasury Bulletin.

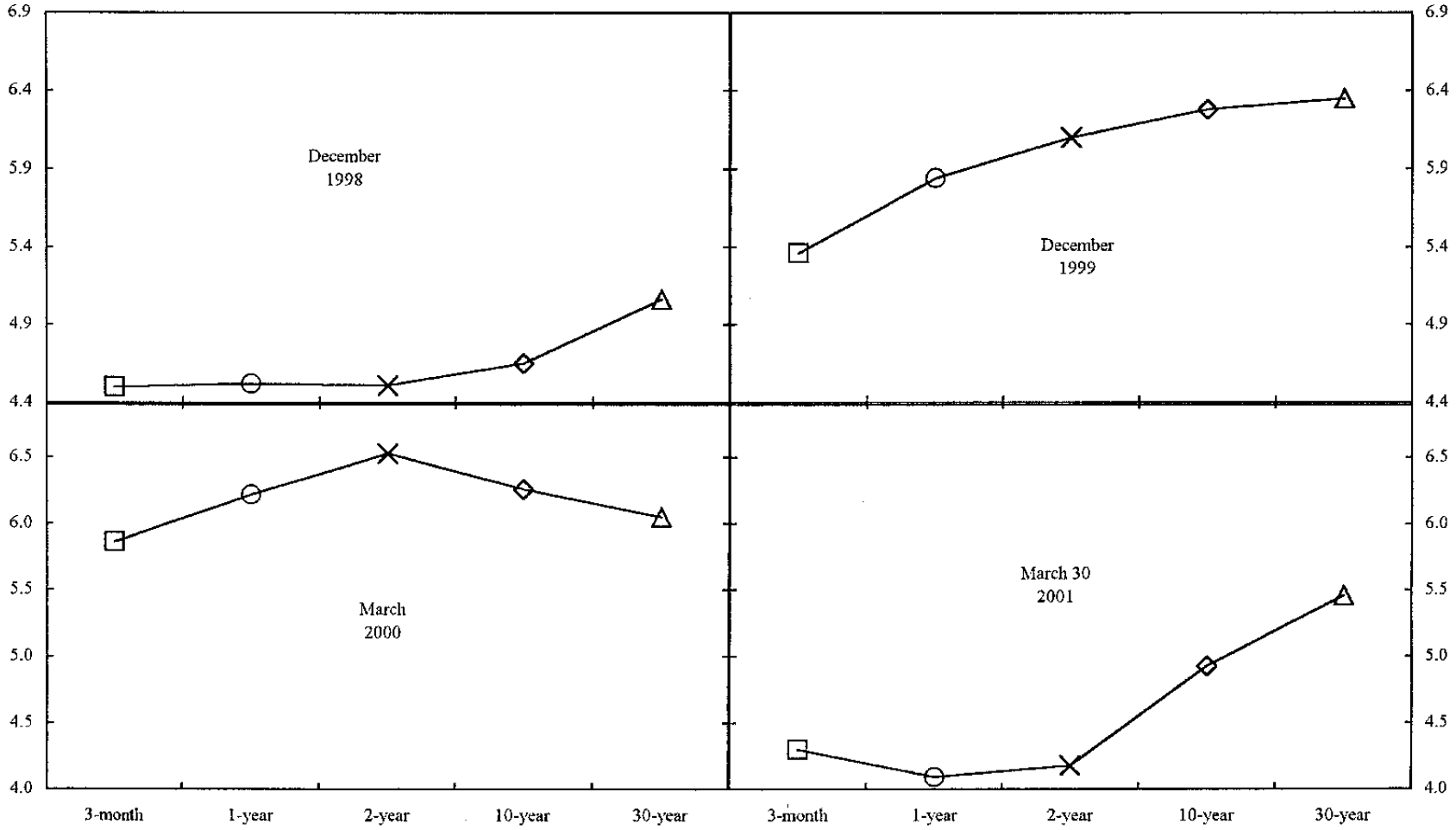
Figure 3. United States: Outlook for Federal Government Debt
(Fiscal years, in billions of dollars)




Sources: U.S. Office of Management and Budget, "*Budget of the United States Government, Fiscal yYar 2002,* " April 2001; U.S. Congress (Joint Committee on Taxation) *Estimated Budget Effects of the Conference Agreement for H.R. 1836 [1]* , May 26, 2001; and staff calculations.

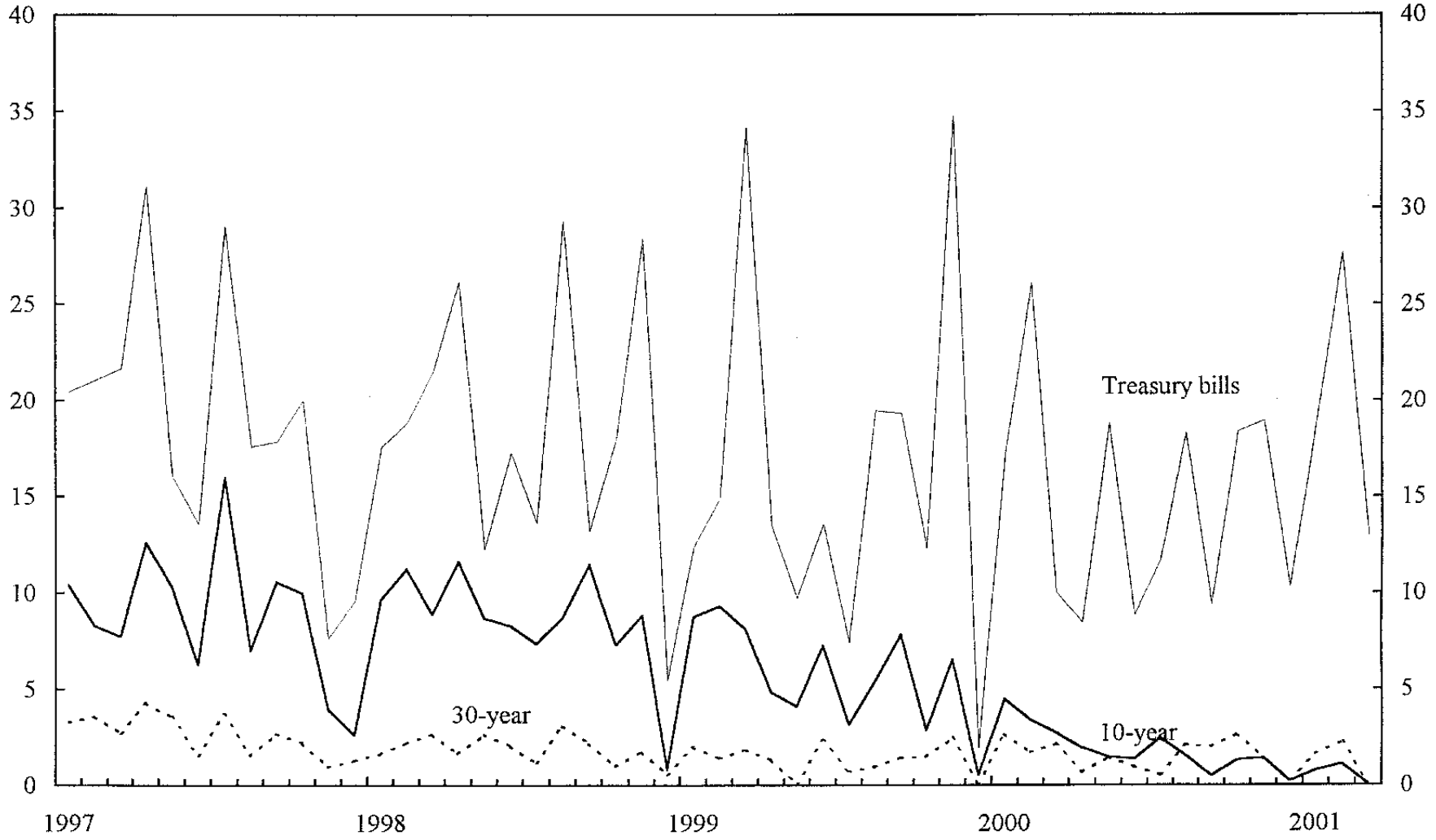
1/ Gross debt minus excess cash balance.

Figure 4. United States: Yield Curve, 1998-2001




Source: Federal Reserve.

Figure 5. United States: Treasury Securities Trading Volumes[1]
(Billions of dollars)




Source: Bloomberg.

1/ Trade volume of all Treasury bill securities transacted through inter-dealer brokers.

Figure 6. United States: One-Month Repo Rates
(Percent)

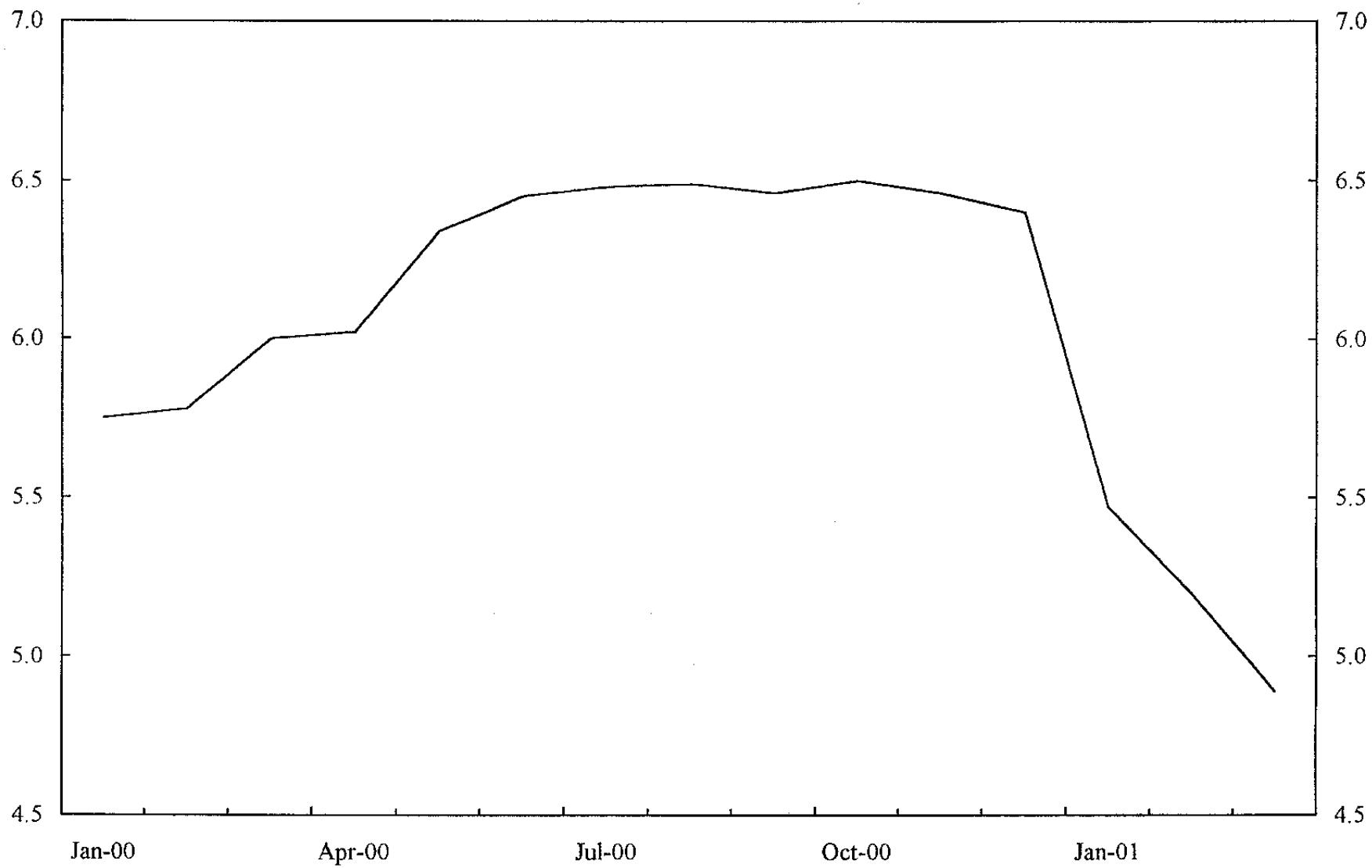
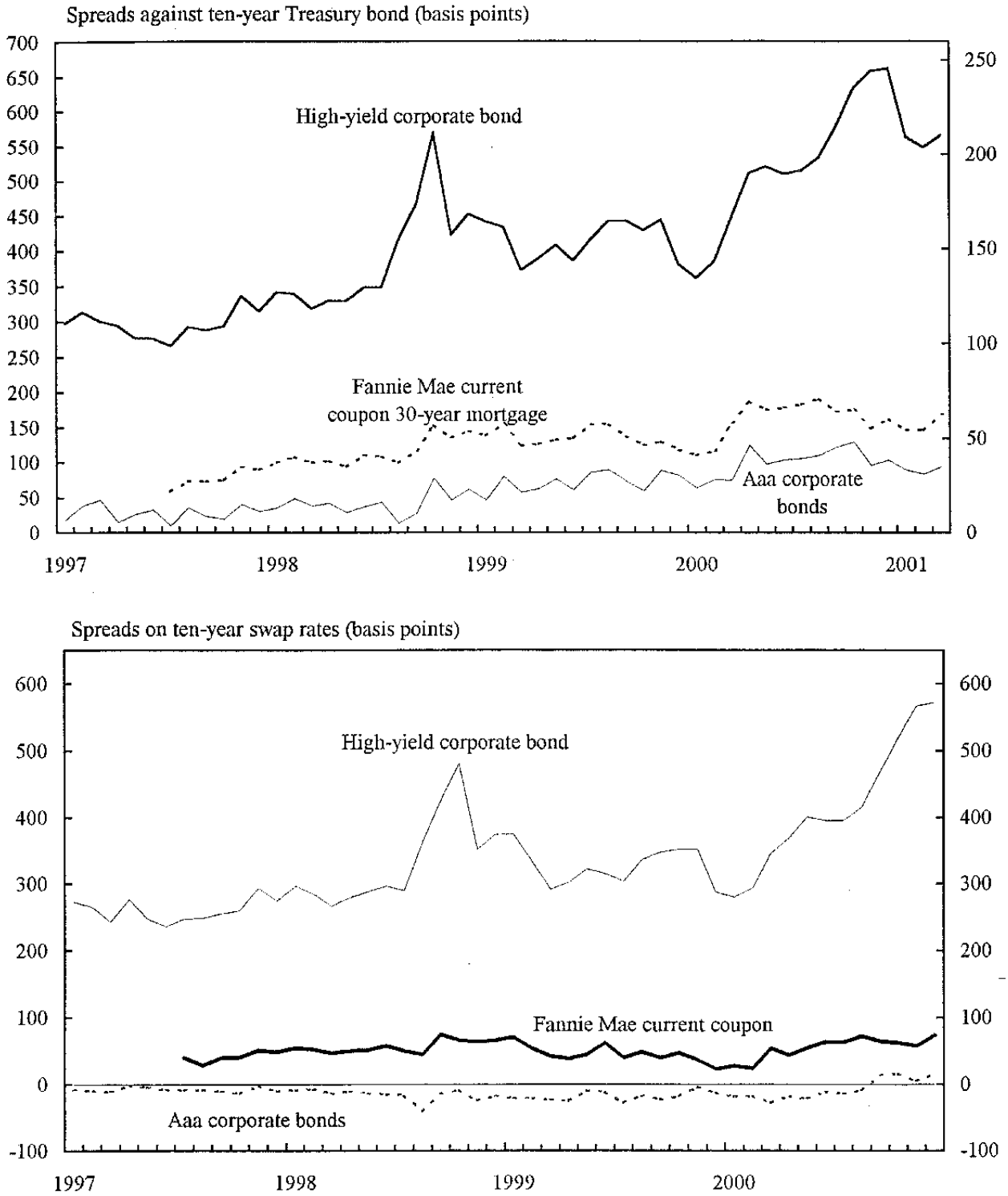
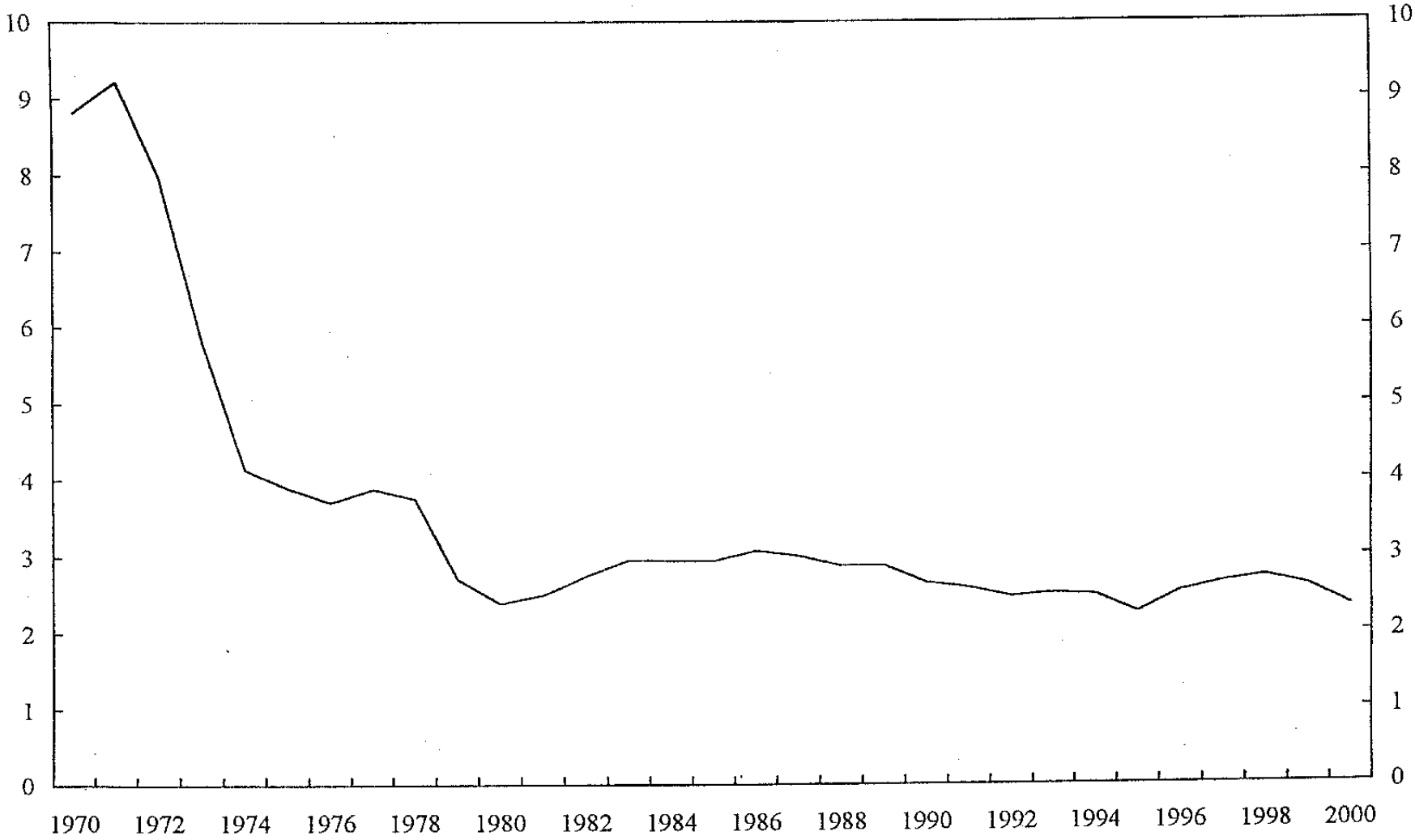


Figure 7. United States: Yield Spreads on Fixed-Income Securities




Sources: U.S. Federal Reserve; and Bloomberg.

Figure 8. United States: Foreign Official Holdings of U.S.Treasuries/Gross Financial Transactions of the Rest of the World
(In percent)




Sources: *U.S. Treasury Bulletin;* and *World Economic Outlook*.

## V. Investing Government Assets in Private Securities: Policy Options and International Experience[1]

1. In its FY 2002 Budget, the Administration projects that during FY 2002–11 the cumulative unified federal budget surplus after tax cuts and other proposed measures would be $3½ trillion, with $2½ trillion of this amount representing the prospective cumulative surplus in the Social Security trust fund. Net federal government debt owed to the public, however, is estimated to be $3 trillion at the end of FY 2001, and only $2 trillion of this is considered by the Administration to be redeemable over the next decade.[2] If at a minimum the Social Security surplus is preserved, then a policy decision has to be made on alternative means of investing the remaining funds (just over $½ trillion). In addition, if the prospective surplus of the Medicare Hospital Insurance (HI) trust fund (another $½ trillion) were also preserved, the total assets that would need to be invested would be just over $1 trillion.[3]

2. Over the coming decade, the prospect of U.S. budget surpluses that exceed the amount of redeemable outstanding Treasury debt raises the question of alternative uses for the excess funds. The main alternatives are to slow the pace of debt reduction by reducing taxes and/or raising government expenditure or to invest the funds in private assets. A slower pace of debt reduction would preclude the concerns raised by government ownership of private assets, but in view of the coming wave of unfunded liabilities associated with the aging of the population, it would require a sharper increase in future taxes and government debt or larger cuts in benefits and other spending in future decades.

3. The prospect of government investment in private assets has raised several concerns, including the vulnerability of such investment to political pressures and its potentially large

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[1] Prepared by Vivek Arora and Steven Dunaway.

[2] The roughly $1 trillion in remaining debt would largely consist of marketable bonds that have not matured ($0.8 trillion) and non-marketable debt such as savings bonds and special bonds for state and local governments. Debt reduction could in principle encompass the non-matured marketable debt through buybacks by the Treasury, but this could entail paying a significant premium to bondholders. Such large premiums are viewed as a cost that exceeds the value of retiring the debt before maturity (Greenspan (2001a)). Estimates of the irredeemable debt depend on a number of assumptions, including the size of future buybacks and when sales of longer-maturity debt cease. Depending on these assumptions, estimates of the irredeemable debt are typically in the $¾–1¼ trillion range.

[3] It is appropriate to focus on the excess of the trust fund surpluses, rather than of the whole budget surplus, over the redeemable debt since the non-trust-fund surplus (and perhaps even a part of the HI surplus) is likely to be used to pay for the Administration's expenditure priorities and possibly for the enacted tax cut.

size relative to the market, which could distort capital allocation and reduce the efficiency of capital markets.[4] This paper lays out the main options and discusses the experience in other instances where government funds have been invested in private securities. It also discusses the pros and cons of the government investing these funds, for example through the Social Security system, compared with the alternative of allowing private individuals to invest them through voluntary personal retirement accounts within Social Security.[5]

### A. Government Investment in Private Assets: Some Key Concerns

4. The prospect of government investment in private assets has raised concerns, primarily relating to the vulnerability of such investments to political pressures and their prospective size relative to the market for financial assets. Also open to question is the mechanism through which such investment should be carried out.

#### Vulnerability to political pressures

5. The vulnerability of government investment to political pressures could arise from several sources, as noted recently by Federal Reserve Chairman Greenspan (2001c). Since decisions on how to invest government assets would have to be made through the political process, some groups could try to use the process for obtaining funding on terms not available to them in private markets. Furthermore, it may be more difficult to insulate the surplus funds of a defined-benefit program (such as Social Security) from pressure to make politically attractive investments. Since such programs guarantee benefits irrespective of losses, there may be less incentive for prospective beneficiaries to police their investment policies. However, sufficient incentive should remain for beneficiaries and taxpayers to see that the program's funds are invested appropriately, since program losses would have to be made up by cuts in benefits or increases in taxes.

6. Several mechanisms have been proposed and tried in other countries to insulate decisions on investing public funds from political pressure. A commonly used mechanism is the creation of an investment board to handle these assets, with the board held publicly accountable by periodic public reporting and review of its operations by public auditors. In addition, the investment board may be required to follow a passive investment strategy, with its asset holdings broadly replicating the composition of key private market indices. Such a strategy might effectively prevent political pressures, but it has been argued that it could have other implications. In particular, since indexed funds cover only publicly traded securities, smaller non-publicly traded businesses may receive less financing (Greenspan (2001b)). The weight of this concern would be influenced by the potential size of government investment in private assets, as well as by the efficiency of the private financial market, particularly the extent to which arbitrage equilibrates the risk-adjusted cost of funds across market segments.

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[4] See Greenspan (2001a and 2001b).

[5] See Gramlich (2001a) for a discussion of related issues.

In addition, political pressures could distort the decisions on the domestic/foreign split of investments and could affect decisions when it comes time to run down earlier asset accumulation.[6]

**Capital market disruption**

7. Concerns that government investment in private securities could disrupt the functioning of capital markets arise mainly as a result of the potential size of government investment relative to the market (see Office of Management and Budget (2001a)). With a sizeable government share, government decisions to buy and sell securities could cause significant fluctuations in markets and add to market uncertainty.

8. In the United States, the projected size of government funds to be invested (around $1 trillion by 2011) is not unduly large in relation to the size of the overall economy, total stock market capitalization, or assets managed by some of the large institutional investors. In 1999, assets managed by the largest U.S. fund manager, Fidelity Investments, amounted to nearly $1 trillion, which was also roughly equivalent to the combined domestic assets managed by the next two largest fund managers, Barclays and State Street Global Advisers. Under the conservative assumptions that all of the government's prospective excess funds are invested in domestic equities and that stock market capitalization grows only at the rate of inflation (considerably slower than in recent years), projected government holdings of stocks would be equivalent to 4.7 percent of market capitalization (6.3 percent of GDP) (Figure 1).[7] In 1999, domestic equities managed by Fidelity Investments were equivalent to 3.7 percent of capitalization (10.3 percent of GDP). Domestic equities held by state and local government pension plans accounted for 10 percent of the market (Sarney (2001)).[8]

**Intergenerational redistribution, risk sharing, and rates of return**

9. Some arguments against investing the government's prospective excess funds in equities have been raised on intergenerational redistribution and risk-sharing grounds, although the literature is inconclusive.[9] For example, equity holdings are unevenly

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[6] Leidy (1999) argues that some of the disruptions associated with the drawdown of assets can be overcome by clearly communicating the schedule for the drawdown well in advance of when it actually occurs.

[7] If market capitalization is assumed to grow with nominal GDP, projected government investment by 2011 would be 3.4 percent of capitalization.

[8] Investments in private securities by the Federal Thrift Retirement Investment Board were just over $60 billion, equivalent to 0.7 percent of GDP or 0.3 percent of market capitalization. See Arthur Andersen (2000).

[9] See Bohn (1997) for a summary.

distributed across households, partly reflecting differences in risk aversion. But investment of public funds in equities would expose all individuals to equity risk in proportion to their tax liabilities, without regard to their risk preferences. On the other hand, several arguments favor diversifying the government's holdings. For example, a portfolio comprising only fixed-income securities has higher inflation risk. In addition, the risk-adjusted rate of return of an exclusively fixed-income portfolio may be low relative to that of a more mixed portfolio (Diamond (1997, 1998)). Overall, however, considerations of intergenerational redistribution and risk sharing do not make a strong case for or against investing trust fund assets in private securities.

10. Rate of return considerations are similarly inconclusive. On the one hand, private securities provide higher rates of return than government bonds. On the other hand, the implications for intergenerational equity need to be considered. It has been argued that in a pay-as-you-go system with defined benefits, the investment of trust fund assets in private securities essentially represents a zero-sum transfer from the current generation of workers to future workers and/or the government sector (Leidy (1997)). This is because, with higher rates of return on trust fund investments, the tax burden on future workers necessary for financing the pay-as-you-go system would be lower. In addition, in the absence of an increase in national saving (as in the case of a pay-as-you-go system), a shift in the trust fund portfolio from low-yielding government bonds toward high-yielding private securities would be mirrored by a shift in private portfolios in the opposite direction. The improvement in the trust fund's longer-term financial position thus would come at the expense of expected returns on the private portfolios of current workers.

**Operational mechanism**

11. Investment of government assets in private securities might be accomplished through the Social Security system and could be implemented through the use of either a consolidated government account or private individual accounts. It has been argued that private accounts are less susceptible to political tampering (e.g., Gramlich (2001b)), although some mechanisms adopted in other countries and by the U.S. Federal Thrift Investment Board suggest that there are ways to limit political interference in the investment decisions of a consolidated government account.

12. Private individual accounts would entail additional transaction costs, and there is a tradeoff between these costs and the benefits of private accounts. A system would need to be established for administering and supervising private accounts. In the case of Social Security, the potential number of individual accounts is very large (about 150 million), in comparison with, for example, the number of individual retirement accounts (IRAs) that currently have multiple investment options (10 million). The largest number of individual accounts handled by a single U.S. firm is 6 million.[10] A system would be needed for ensuring a flow of

[10] See Diamond (1999).

deposits into these accounts and for investing, reporting, and managing portfolio choices. These administrative and regulatory costs would rise significantly depending on the amount of control individuals have over their accounts. Losses in individual accounts could, in principle, confront the government with significant contingent liabilities, although much would depend on how large a part of the social security pension the losses represented.[11] Diamond (1999) estimated that while individual accounts managed through a consolidated government trust fund would cost $40–50 per worker per year on average to administer, fully private accounts would cost twice as much. The extra cost would imply a 20 percent reduction in assets relative to the other accounts. The Congressional Budget Office in a forthcoming study estimates that the costs of a defined-contribution plan, in which holders have a wide choice of investment options, would be equivalent to about 30 percent of the average value of investments. The cost of a plan similar to the Federal Thrift Savings Plan, with only a few options, would be in the 5–8 percent range, and the costs of a single-option plan, in which private accounts are administered through the already existing Social Security system, would be 1–2 percent.

13. Private individual accounts would entail several additional complicated issues, which remain to be settled. A key question is how to insure against the possibility that some investors may not have sufficient resources for their retirement, either due to an overly rapid consumption of their accumulated funds once they retire or due to losses on their investments leading to an insufficient accumulation of assets. One approach is annuitization, whereby retirees receive a monthly payment stream throughout their retirement instead of a lump-sum payout. However, this in turn raises several issues, including those of equity. As a result of shorter longevity, lower-income people would tend to receive a lower rate of return. Decisions would need to be made regarding the use of excess funds that may accumulate in annuity accounts, for example whether to increase payments to existing retirees (which would tend to reinforce the regressive element) or to boost the payout to lower-income retirees (a social policy choice). An additional issue concerns the financial health of annuity companies and the policy response in the event that some companies fail or are otherwise unable to deliver the promised payouts.

### B. Experience in Other Countries

14. There is a fair amount of international experience with government assets being invested in private securities, generally through a central fund rather than individually managed accounts (Table 1). In other countries, the size of government funds has been smaller than in the U.S. case, although they have been large in relation to the size of domestic

[11] In Chile, for example, where the pension system is a defined-contribution scheme based on individual accounts, there is a concern that the contribution rates may be lower than necessary to provide workers, especially those earning the minimum wage, with an adequate pension and that up to two-fifths of contributors may eventually need state assistance, presenting the government with substantial contingent liabilities (Heller and Gillingham (1999)).

markets. The public assets invested in private securities generally arise from two sources: the assets of partially or fully funded publicly managed pension plans and earnings from a non-renewable resource sector. In either case, the key issue has been how to ensure the security of the assets while providing an acceptable return at a reasonable cost. This has entailed several considerations, including clarity about the objectives of the investment strategy, independence from political interference, public accountability, sound governance, low operating costs, and prudent investment.

15. A relevant example for the United States would be the Canada Pension Plan (CPP), even though the CPP started investing in private assets relatively recently and its investments are small in relation to the economy (¼ percent of GDP as of March 2000).[12] The CPP began operation in 1966 as a pay-as-you-go program, but major reforms enacted in 1997 to address its long-term financial shortfall turned it into a partially funded program, as contribution rates were raised substantially above current CPP expenditures. It was also decided to invest a portion of the plan's funds in private securities in an effort to raise returns.[13]

16. An independent body, the CPP Investment Board, was set up to manage the CPP's cash flow in line with sound investment practices. Its statutory provisions require the Board to follow broadly the same investment rules that govern private pension funds. The Board invests the CPP's assets in domestic equities, bonds, and real estate, and foreign equities and bonds. It is also subject to concentration limits on its investment in the securities of any single entity and in real estate. New flows have been all invested in equities. The share of foreign equities, initially restricted to 20 percent, was raised to 25 percent in 2000 and 30 percent in 2001. The Board originally was required to follow a passive investment strategy, with its domestic equity investment broadly replicating the composition of the Toronto Stock Exchange (TSE) 300 index.[14] Since December 1999, it has been authorized to invest actively up to 50 percent of the assets it allocates to domestic equities.

17. The design of the CPP Investment Board paid careful attention to the factors needed for a successful system, including clear objectives and freedom from political influence. The explicit objectives specified in the CPP Investment Board Act—mainly to maximize investment returns without incurring undue risk—provide a benchmark against which the performance of the Board can be measured. Several features of the system attempt to safeguard it from political influence. As noted, investments during the initial period followed

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[12] Tamagno (2000) discusses the CPP investment experience, including international comparisons.

[13] Until 1999, the CPP's surplus funds were entirely invested in non-marketable bonds of the federal and provincial governments.

[14] There was no statutory limitation requiring a passive strategy for the board's investment in foreign equities.

a passive strategy. In addition, major policy decisions of the Board require the agreement of the federal government as well as most provinces, which, given the different political parties involved, reduces the risk of partisan pressures. The Directors of the Board are selected through a process that includes consultations between the federal and provincial governments and the private sector.[15]

18. The legislation that established the CPP Investment Board requires that the Board publishes an annual report which must be submitted to Parliament and made public. The report must contain information on areas such as investment policies, financial statements, and compensation. In addition, the management of the CPP Investment Board includes attention to good governance, low operating costs, and prudent investment. A governance committee oversees operations to prevent conflicts of interest and financial improprieties. Operating costs as of March 2000 were equivalent to 0.3 percent of assets under administration, compared with 0.7 percent for private pension plans in Canada and 0.5 percent for large defined-benefit plans in the United States in recent years. Over time, however, costs could increase as the Board moves toward more active investment strategies.

19. In contrast to the CPP, the administration of the assets of the Quebec Pension Plan (QPP) illustrates some of the problems that can be encountered in investing public funds in private assets. The QPP, like the CPP, began operations in 1966 on a pay-as-you-go basis. An independent fund manager—the Caisse de Dépôt et Placement du Québec (CDP)—was established to manage the QPP's surplus assets and other public funds in Quebec.[16] The CDP invests in a variety of private assets, including bonds, domestic and foreign equities, and real estate. In 2000, total assets managed by the QPP were equivalent to an estimated 8½ percent of provincial GDP. The CDP as a whole is relatively large in relation to Quebec's and even Canada's capital markets, with managed assets equivalent to over 50 percent of provincial GDP and 12 percent of Canadian GDP, raising some concerns that its investment decisions can lead to market instability. Furthermore, the CDP's objectives include, in addition to achieving optimal financial returns, that it contribute to Quebec's economic vitality, which has sometimes been interpreted as a directive to concentrate investment in local businesses. Industrial strategy has also played a role in guiding the investments of the Quebec Pension Plan toward local firms.

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[15] Government employees as well as sitting members of the federal or provincial legislatures cannot be appointed to the board.

[16] In addition to the QPP, the CDP's depositors include other public pension plans, such as the Government and Public Employees Retirement Plan for unionized public employees; public insurance plans, such as those covering industrial and traffic accidents; and other depositors, such as the commission that oversees the securities market. See Caisse de Dépôt et Placement du Québec (2000).

20. In some countries, the objectives of public pension plans' investments in private securities have sometimes also been influenced by factors not directly related to risk-return considerations, including, for example, subjective ethical criteria, stock market stabilization, and industrial policy.[17] In the United Kingdom, pension funds are required to disclose whether their portfolio decisions take into account environmental and social effects. In Hong Kong SAR, Japan, and Taiwan Province of China, public funds have been used, or actively considered, for stabilizing the stock market.[18]

21. Singapore and Hong Kong SAR provide examples of "overfunding" of the government budget, where government bonds are issued in the absence of a financing need in part to provide liquidity in key benchmark assets to facilitate the development of local financial markets.[19] As of mid-2000, the Singapore government and the Hong Kong Monetary Authority had built up outstanding balances of US$20 billion and US$14 billion of government and Exchange Fund paper, respectively, partly to serve as benchmarks. The proceeds of this overfunding in both cases have been placed in foreign currency assets.

22. In Norway, the difference between the government's net oil revenues and the non-oil fiscal deficit (i.e., the surplus on the central government budget) accumulate in the State Petroleum Fund (SPF).[20] The assets of the SPF are managed by the central bank under delegation from the ministry of finance. The assets are invested in foreign securities in order to prevent oil exports from leading to excessive exchange rate appreciation ("Dutch disease"). Investing in foreign securities also precludes any political pressure that may arise from investing SPF monies onshore. Formally, the SPF is a local-currency account in the central bank, and the central bank manages a portfolio of foreign assets against this account. The central bank uses a mix between internal and external management of the portfolio. The currency composition of the foreign portfolio is based on a combination of import weights, GDP weights, and market capitalization weights. The portfolio initially comprised only fixed-income securities, but in order to provide more stable long-term returns it has been broadened since 1998 to include equities, which account for 30–50 percent of SPF assets. Equity investments are based on a mix between active and passive management, with passive management replicating the stock indexes in major equity markets.

23. A key operational principle of the Norwegian SPF is transparency. The central bank is required by law to provide information on the fund's management to the public.

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[17] See, for example, MacLean (2000).

[18] MacLean (2000) notes that political pressure to stabilize the stock market may be related to the size of public pension funds invested in equities. However, as noted, this is envisaged to be relatively small in the United States.

[19] See McCauley and Remolona (2000).

[20] See Davis et al. (2001).

Comprehensive accounts and data on the SPF's operations are regularly available, and quarterly and annual reports provide detailed financial information. The SPF's accounts are regularly audited, and the reports are made public. Transfers to and from SPF need parliamentary approval, and SPF operations are incorporated into the fiscal accounts.

24. The experience of the Alberta Heritage Savings Fund (AHSF) in Canada, before its reform in 1997, illustrates some of the problems that can arise with public trust fund investments.[21] The AHSF was established in 1976 to manage Alberta's resource-based revenues. Until 1997, its objectives included several social goals in addition to the generation of revenues in preparation for any future decline in resource-based income. A small part of the AHSF was invested in private securities with the expectation of earning a commercial rate of return, but the bulk of the fund was invested in local public and private securities with the objective of strengthening the provincial economy rather than earning a commercial return. In addition, some assets were lent to provincial governments or government agencies at concessional rates, as well as invested in long-term public works projects of benefit to the local community but without emphasis on financial return. During 1987–97, all income (including capital gains) was transferred to the provincial budget to finance government programs and services, which, together with the investment in public projects, led to a steady erosion in the value of the fund. In 1997, the mandate of the AHSF was streamlined to focus on improving financial returns, and the fund was no longer used to finance government investment or social projects. Its assets subsequently have been invested in bonds, real estate, domestic and foreign equities, and other financial instruments.[22]

### C. Experience in the United States

25. In the United States, there are examples of public funds being invested in private assets in the form of state resource-based trust funds, state and local pension plans, and a federal employees' pension plan. The Alaska Permanent Fund (APF) was established in 1976 to manage the government's oil and gas royalties.[23] The objectives were in part to generate income and capital gains to provide for the time when oil revenues diminished and to distribute some of the wealth gains to the people of the state. The APF derives revenue mainly from dedicated oil revenues and legislative appropriations, and it distributes dividends each year to Alaskan citizens. The performance benchmarks cover rates of return and risk management, and require public transparency and accountability. Its asset allocation targets cover real estate (9 percent), U.S. equities (37 percent), foreign equities (19 percent), and bonds (37 percent). APF is managed by a board of trustees, two-thirds of whom are members of the public, which is accountable for meeting the fund's objectives.

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[21] See Warrack and Keddie (1999).

[22] See Alberta Revenue (2001).

[23] See Warrack and Keddie (1999).

26. State and local pension plans in the United States allocate their portfolios across a range of assets, and have a substantial presence in U.S. equity markets.[24] In 1999, two-thirds of their aggregate portfolio of $3 trillion was allocated to equities, with bonds accounting for roughly one quarter, and real estate, cash, and other assets for the remainder. The pattern of the aggregate portfolio is broadly reflected in the asset allocation of the five largest state and local pension plans (Table 2). In 1999 (the latest year for which full information is available), state and local pension plans accounted for 10 percent of U.S. holdings of domestic equities, 24 percent of U.S. foreign equity holdings, and 11 percent of all U.S. equity holdings. Domestic and foreign equities represent 80 percent and 20 percent, respectively, of state and local pension plans' equity holdings.

27. Rates of return in state and local pension plans have been somewhat less than that of private pension plans. However, returns on equity investments have been roughly similar (17 percent) in the two kinds of plans during the past decade, suggesting that the weaker overall performance of state and local plans owes to a smaller equity allocation than to poorer asset management.[25] There is some weak statistical evidence that the potential for political interference, as proxied by the number of political appointees on a state pension fund's investment board, negatively affects investment performance.[26]

28. The Federal Thrift Savings Plan represents an example of relatively successful private investments by a U.S. federal government entity.[27] An investment board, the Federal Retirement Thrift Investment Board, was established in 1986 to manage the funds that federal employees deposited in the savings plan. Plan participants choose their own asset allocations among the various investment possibilities. The board invests the funds in private equities and debt following a passive index strategy in which it does not pick and choose among specific companies or sectors, as well as in government securities. It is financially independent of the government, securing its operating funds from a small charge on the investments it oversees.

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[24] See Sarney (2000).

[25] See Wilshire Associates (1999).

[26] See Romano (1993).

[27] See Orszag and Greenstein (2001).

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Table 1. Asset Management of Selected Public Sector Funds

| Country/State | Managed By | Foreign/Domestic Asset Split | Size of Assets 1/ (In Percent of GDP) |
|---|---|---|---|
| Alberta (Canada) | Treasury's Investment Management Division | Mainly domestic | 10 2/ |
| Alaska | Alaska Permanent Fund Corporation (private) | Mainly non-Alaskan, including foreign | 105 2/ 3/ |
| Canada Pension Plan | Independently appointed investment board | 30 percent of cash flow allocated to foreign equities; rest domestic | 0.2 4/ |
| Quebec Pension Plan | Independent fund manager (CDP) | 25–30 percent foreign equities | 1.8 5/ |
| Norway | Central bank, using private investment managers | Effectively foreign. Local currency account at central bank, which manages a counterpart portfolio of foreign assets | 19 |
| U.S. Federal Retirement Thrift Savings Plan | Independently appointed investment board | Domestic | 1.0 |

Sources: Davis et al. (2001); CPP Annual Report; CDP Annual Report; Arthur Andersen (2000).

1/ End-1999, unless otherwise noted.
2/ In percent of gross state or provincial product.
3/ End-1998.
4/ March 2000.
5/ End-2000.

Table 2. United States: Asset Allocation of Five Largest State and Local Pension Plans, 1999

(In percent)

| Plan | Holdings (In $ Billion) | Asset Allocation (In Percent) | | | |
|---|---|---|---|---|---|
| | | Equities | Real Estate | Bonds | Cash/Other |
| California Public Employees' Retirement System | 160 | 64 | 5 | 26 | 4 |
| New York State Common Retirement Fund | 111 | 60 | 3 | 35 | 3 |
| California State Teachers' Retirement System | 100 | 70 | 2 | 25 | 3 |
| Florida Retirement System | 96 | 71 | 4 | 24 | 0 |
| New York State Teachers' Retirement System | 86 | 75 | 4 | 20 | 1 |

Source: Sarney (2000)

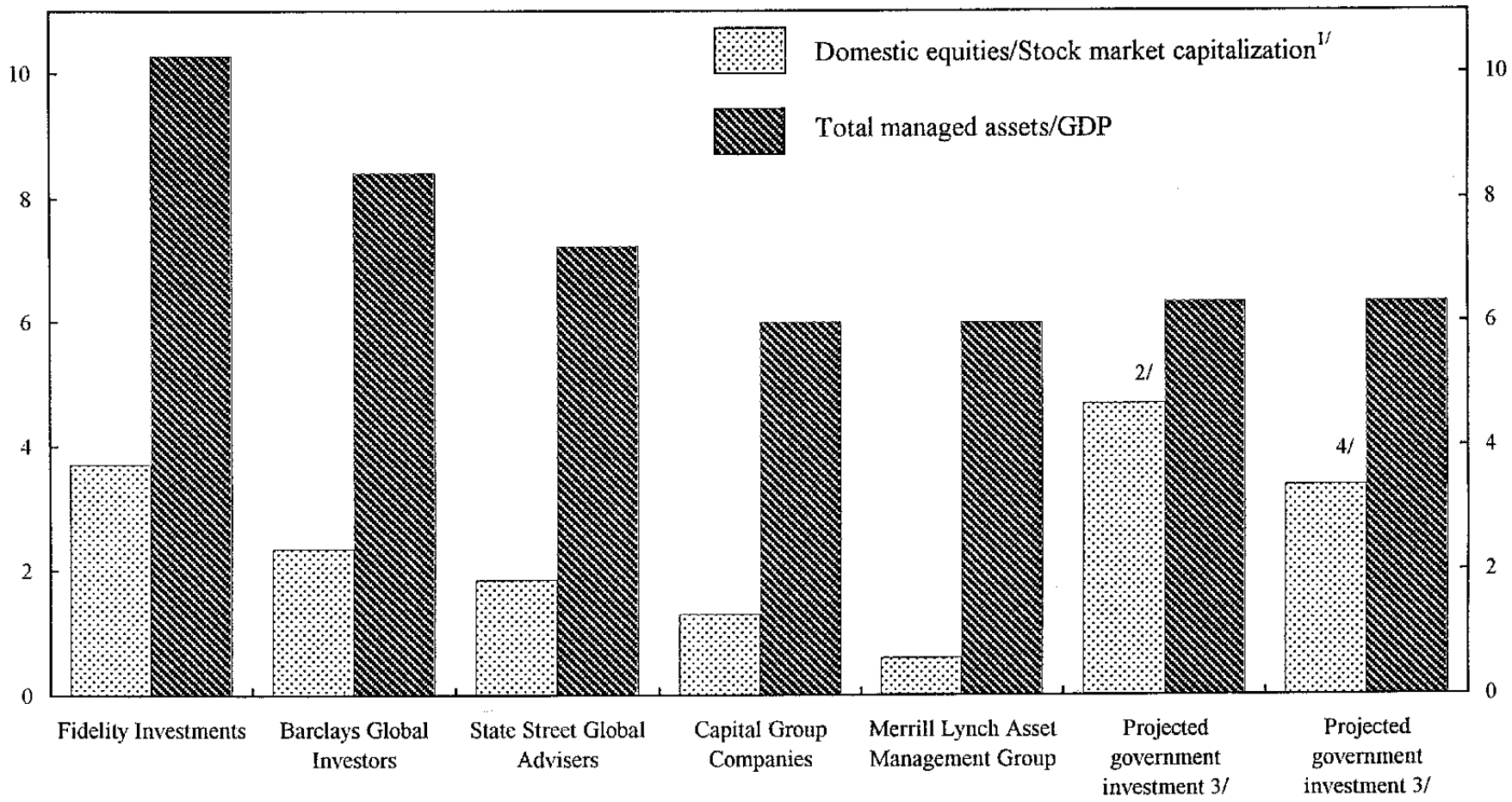
Table 3. United States: Equity Holdings of all State and Local Pension Plans, 1999

(In billions of dollars)

| Type of Equity | Market Value of Total U.S. Holdings | Holdings of State and Local Plans | |
|---|---|---|---|
| | | In Billions of Dollars | In Percent |
| All | 18,876 | 2,042 | 11 |
| Foreign | 1,683 | 408 | 24 |
| Domestic | 17,194 | 1,634 | 10 |

Source: Sarney (2000).

Figure 1. United States: Assets Managed by Selected Private Firms, 1999
(In percent)




Sources: Institutional Investor; Office of Management and Budget; Bloomberg; and staff calculations.

1/ NYSE plus Nasdaq.

2/ Stock market capitalization is assumed to grow only at the rate of inflation.

3/ Excess balance of Social Security trust fund plus Medicare HI surplus (FY 2011).

4/ Stock market capitalization is assumed to grow with nominal GDP.

## VI. Recent Changes in U.S. Agricultural Support Policy and Their Impact on Other Countries[1]

1. Although the agricultural sector (including forestry and fishing) accounted for only 1.3 percent of U.S. GDP in 1999, U.S. agricultural exports account for a significant share of global agricultural trade. As a result, changes in U.S. agricultural policy can have important effects on other countries. In recent years, the United States has enacted major legislation to reform government support—most notably the Federal Agricultural Improvement and Reform (FAIR) Act of 1996. The aim of the FAIR Act was to increase the efficiency and transparency of government support for major crops by shifting away from price supports, which distorted supplies and prices, toward a transitional program of income support. However, the FAIR reforms have not been implemented as originally intended; bumper crops and falling world prices have led to the provision of substantial "emergency" government assistance to grain and seed farmers over the past four fiscal years. The large and prolonged nature of this assistance, along with the unfinished reform agenda from the 1996 FAIR Act, has raised concerns in other major grain-producing countries that U.S. policies have contributed to global overproduction and artificially depressed prices for selected crops.

### A. The Federal Agricultural Improvement and Reform Act of 1996

2. Prior to 1996 and dating back to the 1930s, U.S. agricultural policy centered on providing assistance for agricultural producers through price supports or quota arrangements. The 1996 FAIR Act was designed to break the link between support payments and market activities of major field crop producers (wheat, corn, rice, cotton, and oilseeds). These rules represent a dramatic move to decouple farm support from production, reducing distortions. To provide greater responsiveness to market signals, the FAIR Act replaced price supports on these crops with seven-year Production Flexibility Contracts (PFCs). The PFC set a reimbursement schedule based on the amount of eligible crops planted in *previous* years (1991 to 1995). Overall reimbursements were fixed and scheduled to decline over time. Total expenditures on PFCs were set at $5.6 billion in 1996, rising to $6 billion in 1997, and then declining to $4 billion in 2002.

3. To allow for greater production flexibility, the FAIR Act eliminated most crop planting restrictions on farmers with PFCs (the "Freedom to Farm" provision), with the only restriction being that producers could substitute between the major field crops but not into alternative crops (such as fruits or vegetables). The FAIR Act also restructured the export promotion programs to cap annual expenditures and focused crop reduction programs on conservation.[2] In addition, the FAIR Act reduced—but did not eliminate—some of the distortions in the sugar, peanut, and dairy programs. Government-set peanut quotas are now

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[1] Prepared by Chris MacDonagh-Dumler.

[2] ERS (1996) summarizes the legislation, and USDA (1996) provides comprehensive details.

meant to impose "no net cost" to U.S. tax payers, and the peanut quota is supposed to reflect food use demand (as opposed to a minimum level for price support). In addition, the FAIR Act had declining dairy price supports aimed at ending the government purchase programs.[3]

4. However, the FAIR Act also allowed wheat, feed grains, and oilseeds to qualify for a version of the commodity loan program similar to one that had previously been used to support prices. This crop-loan program provides short-term (nine to ten months) financing at the beginning of the planting season for major field crops, with future production used as collateral.[4] The producer repays the loan at maturity (harvest time), using a crop-specific "loan rate" (or target price).[5] If the market price is less than the loan rate, the producer can default on the loan with almost no cost, and the government takes title to the crop. Previously, when the government was the "buyer of last resort" and willing to store the crop, the loan rate set a price floor. Under the new version of the commodity loan program, however, the government immediately sells any collateral it receives when a producer defaults on a loan, depressing the market price.

5. When crop prices fall beneath the loan rate, the new loan program offers a significant benefit. If the producer chooses to forgo the loan program at the beginning of the planting season, the producer can receive a "loan deficiency payment" as a subsidy. When the 1996 FAIR Act was under consideration, crop prices were forecast to remain at high levels, and the FAIR Act set loan rates based on these levels (Table 1). However, prices declined dramatically beneath the loan rates.

6. In the face of declining prices for major crops since 1997 and strong pressures for "temporary" measures to aid farmers, the U.S. Congress passed four emergency appropriations bills in FY 1998–2001, totaling $23.1 billion (Table 2). Approximately two-thirds of this aid came in the form of "supplements" to the PFCs. In 1998, producers received an additional 50 percent to their PFC payment; in 1999 and 2000, their PFC payments were doubled. Other measures enacted included an expansion of the loan-deficiency program, crop-loss assistance, and new crop subsidy programs for fruit and vegetable producers.

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[3] Even though the price supports have been extended to 2001 (originally meant to end in 1999), Gardner (2001) esimates that the FAIR Act has reduced the deadweight loss from the dairy programs by $1.3 billion.

[4] The interest rates are at the cost of funds to the U.S. Treasury plus 100 basis points.

[5] The Secretary of Agriculture has limited discretion to adjust these rates using a legislated formula (85 percent of a five-year crop average, excluding the highest and lowest priced years). The rates are also subject to crop-specific minimums and maximums. The loan rates have not been adjusted since 1996.

## B. Impact of the FAIR Act on U.S. Agriculture

7. While the intent of the 1996 FAIR Act was to reduce government intervention in agriculture, two aspects of recent farm policy have undermined reform progress. First, the FAIR Act made it easier to receive loan-deficiency payments and substantially increased its benefits because loan rates did not adjust downward with the fall in crop prices. Because of the method used to calculate the deficiency payments, the final sale price of the crop plus the payment can exceed the loan rate.[6] In 1999, subsidies for soybean and wheat production provided an effective producer price that was *above* the crop loan rate. Because the FAIR Act eliminated many crop production limitations, the loan-deficiency payment can also provide an incentive for producers to shift production into those crops that have had the largest price declines, adding to oversupply. While the FAIR Act permitted the Secretary of Agriculture to adjust loan rates in response to changing economic conditions, the rates have not been adjusted. Indeed, the loan rates for soybeans *increased* 7 percent between 1996 and 1998; at the same time, soybean prices *fell* 27 percent.

8. Second, the provision of emergency assistance has helped economically inefficient producers to remain in business, contributing to oversupply in selected crops. The four supplemental appropriation bills appear to have caused producers to expect large payments in compensation for declining prices; government payments comprised 49 percent of net farm income (for all products) in 2000. These payments also appear to have helped to boost agricultural real estate values by an estimated 31 percent during 1999 to 2001 (Figure 1).[7]

9. One of the most significant changes in the FAIR Act was the "Freedom to Farm" provision that permitted producers to substitute among a range of crops and still qualify for the PFC payments. The number of crops that could qualify for loan deficiency payments also expanded, resulting in a significant shift in crop production. Between 1996 and 1999, the total acreage of wheat planted declined by 12.9 million acres (or 17 percent), while planted soybean acreage increased 9.5 million acres (or 15 percent).[8] In addition to inducing crop

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[6] The loan-deficiency payment is calculated as the difference between the loan rate and a "posted county price," which is a county-specific price meant to reflect the cost of transporting a crop to market. However, the difference between the spot price and the posted county price can be large.

[7] Morehart, Ryan, and Green (2001) describe how to estimate the current value of agricultural real estate prices, assuming that producers received no government support. Their methodology is reproduced here with slightly updated data.

[8] See Gardner (2001). Anderson, Richard, and Smith (2001) estimate a similar impact. When FAIR was passed, the estimate of the impact was much smaller; soybean acreage was expected to increase 1.4 million acres and wheat was expected to decline only 0.9 million acres (Lin, et al. (2000)).

substitution, loan-deficiency payments are estimated to have expanded overall major field crop acreage by 4–5 million acres in 2000.[9] The large increase in planting of field crops and the shift into soybean production (a crop with some of the largest price declines in the past five years) illustrate the perverse effects of the emergency agricultural assistance. The additional production due to U.S. government programs added to downward pressure on global prices caused by subsidization in other countries and higher-than-expected global production. Figure 2 shows the dramatic price declines for both wheat (45 percent from peak to trough) and soybeans (37 percent from peak to trough). The soybean loan rate for the loan-deficiency program has been set high enough so that soybean producers are forecasted to receive a significant benefit through 2007.[10] In fact, as Figure 2 shows, producers may even receive larger support for 2001 crops than they did for crops planted in 1999.

10. While U.S. support to agriculture has increased sharply, payments remain concentrated in a narrow range of crops and producers. Over 90 percent of payments go to producers of a few crops that represent only 26 percent of total agricultural production.[11] U.S. agricultural policy has also been criticized by some observers for providing extensive protection to the largest farms. Direct payments are highly concentrated; the bottom quartile (by gross agricultural output) of producers receive only 14 percent of government payments, while the top quartile receives 71 percent.[12] U.S. price support measures are even more concentrated, with the top quartile of producers receiving 97 percent of the benefits.[13]

### C. International Implications of Recent U.S. Agricultural Policy

11. While the 1996 FAIR Act represented a major reform effort, the supplemental emergency measures and increase in deficiency payments reversed much of the progress achieved toward more market-related price signals for a number of major crops. Because the United States is an important agricultural exporter (accounting for 32 percent of global grain

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[9] See ERS (2000). Since total planted acreage for major field crops has fluctuated between 220 million and 250 million acres during the 1990s, this substitution represents approximately 2 percent of the overall *stock* of agricultural land.

[10] If the soybean loan rate is adjusted (as the law allows), then the USDA forecasts that the loan rate will equal the farm price of soybeans sometime at the end of 2004.

[11] Production as measured in total value of crops sold in 2000. See FAPRI (2001).

[12] OECD (1999) provides cross-country comparisons and calculates the benefit at all levels of government. ERS (2000) makes a similar point, noting that 64 percent of all farms did not receive government payments in 1997, and 60 percent of the total payments go to farms with gross sales of at least $50,000 in 1999.

[13] See OECD (1999); in that report, the top quartile of producers in the median OECD country received 65 percent of the benefit from price supports.

exports and 42 percent of global soybean exports in 2000), its policies have had a significant effect on global markets.

12. Other major economies, such as the European Union (EU) and Japan, subsidize their producers to a greater extent than in the United States (Table 3).[14] Indeed, the EU provides over twice as much subsidization as the United States ($115 billion vs. $54 billion in 1999), while Japan provides nearly 10 percent more ($59 billion vs. $54 billion in 1999). In terms of total subsidies as a proportion of production, subsidies are more than twice as large in the EU and Japan, and even higher in Korea.[15]

13. However, few countries reversed their trend as dramatically as the United States. Between the late 1980s and 1996, U.S. agricultural support fell by nearly one-half. Subsidies fell from 26 percent to 14 percent of production. But by 1999, the rate of subsidization had more than doubled, to levels higher than before the FAIR reforms were initiated. Of OECD countries, only Canada and New Zealand achieved a similar decline in the level of support payments during the 1980s and early 1990s. New Zealand has kept agricultural support low. Subsidy levels have been rising in Canada, from 15 percent of production in 1997 to 21 percent, but by less than the United States.

14. This dramatic increase in both the absolute value and relative size of U.S. subsidy payments has meant that U.S. producers have benefited from relatively increasing protection. To the extent that these subsidies delay exit from the industry, the subsidies contribute to global overproduction and depressed prices. Gardner (2001) and Westcott and Price (1999) estimate that the prices of corn, wheat, and soybeans were 3 percent lower and the price of cotton 10 percent lower than they otherwise would have been in 1998 because of loan-deficiency payments. However, the total effect was likely much more significant because subsidies increased dramatically in 1999 and 2000. The economies most effected would likely be: India, the EU, Brazil, and Argentina. Indeed, since soybean payments increased the relative attractiveness of soybean production to U.S. farmers, Brazilian and Argentinean soybean exporters are likely experiencing greater price pressure than these results suggest.

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[14] The OECD's estimate, the producer-support estimate, approximates the total value of government support programs to agricultural producers. This estimate includes both the value of direct government payments and imputed value of price supports, and other price or quantity restrictions that may not involve government outlays but benefit producers.

[15] In a study of the effects of agricultural policies on Argentinean production, Casaburi and Sánchez (2000) provide direct evidence that EU and Japanese subsidization policies introduce substantially more distortions than those caused by U.S. PFC payments.

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Table 1. United States: Prices and Subsidies for Selected Crops

When the loan rates were set under FAIR, they appeared to be safely below crop price forecasts...

| | Corn | | Wheat | | Soybeans | | Rice | |
|---|---|---|---|---|---|---|---|---|
| | Loan Rate | Forecast 1/ | Loan Rate | Forecast 1/ | Loan Rate | Forecast 1/ | Loan Rate | Forecast 1/ |
| 1996/97 | 1.89 | 2.46 | 2.58 | 3.37 | 4.92 | 6.26 | 6.50 | 9.25 |
| 1997/98 | 1.89 | 2.31 | 2.58 | 3.43 | 4.97 | 5.74 | 6.50 | 9.70 |
| 1998/99 | 1.89 | 2.23 | 2.58 | 3.43 | 5.26 | 5.57 | 6.50 | 9.85 |
| 1999/00 | 1.89 | 2.29 | 2.58 | 3.45 | 5.26 | 5.54 | 6.50 | 10.00 |
| 2000/01 (f) | 1.89 | 2.33 | 2.58 | 3.24 | 5.26 | 5.68 | 6.50 | 10.15 |

...After a strong start in 1997, prices collapsed in 1998 and continued to fall sharply...

| | Corn Price | Wheat Price | Soybean Price | Rice Price |
|---|---|---|---|---|
| 1996/97 | 2.43 | 3.38 | 6.47 | 9.90 |
| 1997/98 | 1.94 | 2.65 | 4.93 | 9.64 |
| 1998/99 | 1.90 | 2.55 | 4.75 | 8.83 |
| 1999/00 | 1.97 | 2.87 | 4.78 | 6.11 |
| 2000/01 (f) | 1.92 | 2.83 | 4.37 | 6.00 |

...Resulting in increased subsidies and producer prices that were above the loan rate.

| | Corn | | Wheat | | Soybeans | | Rice | |
|---|---|---|---|---|---|---|---|---|
| | Subsidy | Effective Producer Price | Subsidy | Effective Producer Price | Subsidy | Effective Producer Price | Subsidy | Effective Producer Price |
| 1997/98 | 0.01 | 1.95 | 0.01 | 2.66 | 0.01 | 4.94 | 0.00 | 9.64 |
| 1998/99 | 0.14 | 2.04 | 0.19 | 2.74 | 0.45 | 5.20 | 0.08 | 8.91 |
| 1999/00 | 0.26 | 2.23 | 0.41 | 3.28 | 0.88 | 5.66 | 1.94 | 8.05 |
| 2000/01 (f) | 0.31 | 2.23 | 0.46 | 3.29 | 1.25 | 5.62 | 1.97 | 7.97 |

Sources: ERS (2001), pp. 32, 43 and McCaw (1996), Table III.

1/ Price forecasts are from the February 1997 USDA Agricultural Baseline (forecasts through 2005).

Note: Prices in dollars/bushel (rice: dollars/cwt). Subsidies are an average of subsidized and unsubsidized crops. The 2001 subsidy forecast assumes the subsidy increases in proportion to price declines.

Table 2. United States: Direct Government Payments

(In billions of U.S. dollars)

| | 1997 | 1998 | 1999 | 2000 1/ | 2001 1/ |
|---|---|---|---|---|---|
| Total direct payments | 8.1 | 12.1 | 20.6 | 22.1 | 14.1 |
| Production flexibility contracts | 6.1 | 6.0 | 5.0 | 4.9 | 4.0 |
| Loan deficiency | | 1.8 | 5.9 | 6.4 | 4.5 |
| Crop Reduction Program and other | 2.0 | 1.6 | 1.8 | 2.0 | 1.9 |
| Emergency assistance | | 2.8 | 7.8 | 8.9 | 3.6 |

Source: Economic Research Service (USDA). Data are for calendar years.

1/ Forecast.

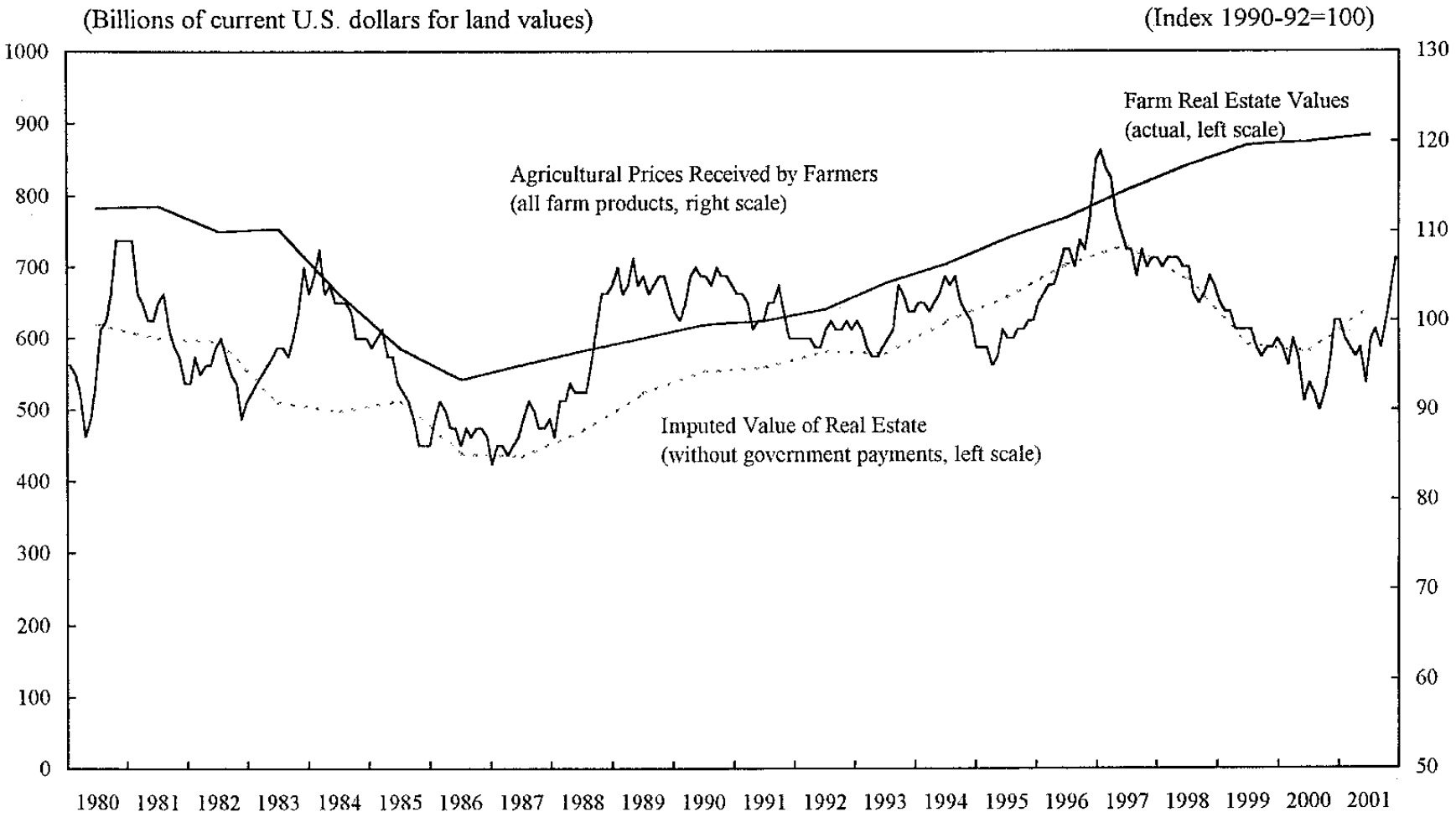
Table 3. International Comparisons of the Importance of Subsidies to Producers

Selected OECD Countries

| | Australia | Canada | EU | Hungary | Japan | Korea | Mexico | New Zealand | USA | OECD |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Subsidy as percent of production | | | | | |
| 1986–1990 | 8.1 | 38.6 | 46.8 | 35.4 | 67.6 | 74.9 | 17.6 | 8.4 | 25.5 | 41.8 |
| 1991–1995 | 8.9 | 28.1 | 51.0 | 17.9 | 66.6 | 78.7 | 24.0 | 2.1 | 18.0 | 41.5 |
| 1996 | 7.0 | 17.7 | 42.5 | 9.4 | 64.8 | 71.9 | 8.6 | 1.9 | 14.1 | 34.4 |
| 1997 | 7.5 | 15.0 | 45.7 | 7.4 | 60.7 | 67.8 | 17.3 | 1.9 | 14.6 | 34.7 |
| 1998 | 7.0 | 19.0 | 54.6 | 13.9 | 65.0 | 58.2 | 18.2 | 1.4 | 24.9 | 41.4 |
| 1999 | 6.6 | 21.3 | 60.0 | 21.7 | 68.2 | 76.2 | 24.1 | 1.7 | 28.5 | 45.8 |
| | | | | | Producer Support Estimate (in billions of U.S. dollars) | | | | | |
| 1997 | 1.6 | 3.1 | 112.5 | 0.4 | 50.5 | 21.1 | 4.8 | 0.1 | 30.5 | 246.3 |
| 1998 | 1.3 | 3.6 | 123.4 | 0.7 | 50.0 | 12.4 | 4.5 | 0.1 | 48.4 | 271.0 |
| 1999 | 1.2 | 3.9 | 115.4 | 0.9 | 59.0 | 19.0 | 5.7 | 0.1 | 54.0 | 283.1 |

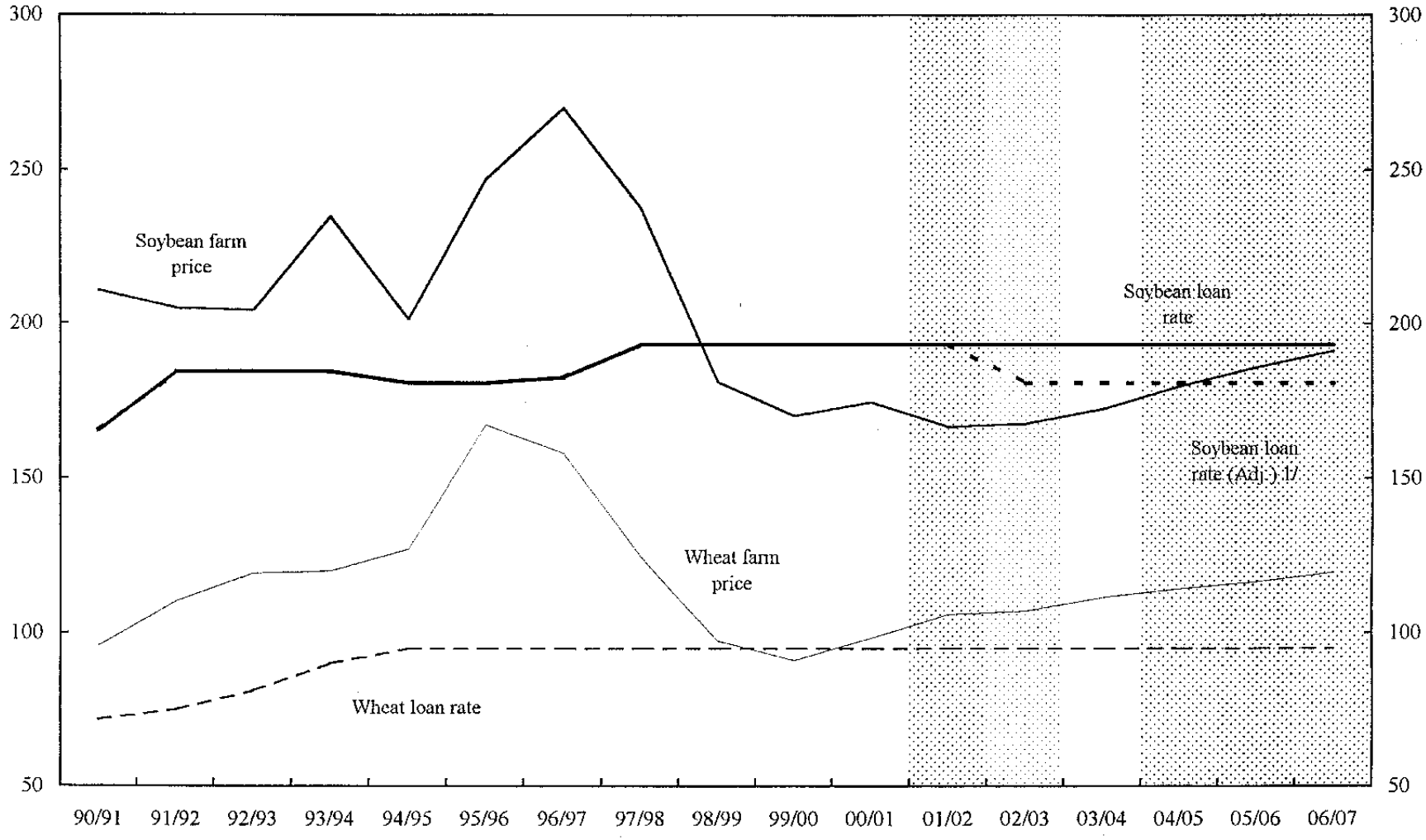
Source: OECD (2000). The Producer Support Estimate is an approximation of the total value of government support programs to agricultural producers. This estimate includes both the value of direct government payments and imputed value of price supports, and other price or quantity restrictions that may not involve government outlays but benefit producers.

Figure 1. United States: Effect of Government Payments on Farm Real Estate Values and Agricultural Prices[1/]




Source: National Agricultural Statistical Service (USDA) for price received by farmers, Economic Research Service for balance sheet data needed to compute real estate values.
1/ Forecast.

Figure 2. United States: Soybean and Wheat Prices, 1990-2006 (f)
(U.S. dollars per metric ton, annual data per crop year)




Source: FAPRI (2001).
1/ Assumes that the soybean loan rate is adjusted according to optional guidelines.

## VII. Returns to Human Capital and Investment in New Technology[1]

1. The sharp acceleration in output and labor-productivity growth in the latter half of the 1990s has been attributed to a surge in technological innovations and the adoption of new technologies across the economy. The fact that the U.S. economy has been a leading innovator and has adopted many of the technological changes that took place more rapidly than other major industrial countries has been credited in part to the high degree of flexibility in U.S. product and labor markets. The flexibility in the U.S. labor market, in particular, has been singled out as a potentially important factor since it has allowed firms to more easily reorganize work processes to take full advantage of the productivity-enhancing features of the new technologies.

2. However, there is another avenue through which labor market flexibility has contributed to the strong U.S. productivity performance. This flexibility has allowed a substantial differential between the wages of skilled and nonskilled workers (referred to here as the wage premium) to develop. With the change in technology having a significant skill bias, the demand for skilled workers has increased, bidding up the wage premium, and in turn, the amount of skilled workers has increased and further stimulated investment in new technologies. The link between the wage premium, the acquisition of skills (investment in human capital), and investment in equipment and software embodying new technologies (physical capital) can be illustrated in a simple theoretical model of an economy. Allowing explicitly in the model for the existence of skill-biased technology change, and for a positive feedback loop between investment in human capital and productivity growth, the model can be used to illustrate the negative effects of policies that serve to limit the wage premium (and returns to human capital) and how these effects may be partially offset by measures to subsidize education.

3. In the 1990s, the United States experienced a substantial increase in the wage premium and rising employment of skilled workers in both absolute and relative terms. The increase in the wage premium was reflected in a significant widening in the income distribution (pre-tax basis) in the United States. Other major industrial countries (with the exception of the United Kingdom) did not experience similar widening in their income distributions, suggesting that these countries did not see a substantial increase in their wage premia and in human capital investment, contributing to the slower pace of adoption of new technologies in most of these countries. The more limited differentiation in wages in these countries is related to economic policies and/or institutional arrangements affecting labor market behavior; such practices to some extent may reflect social choices and cultural differences.

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[1] Prepared by Martin Kaufman, Rodolfo Luzio, and Steven Dunaway

## A. Theoretical Model

4. A theoretical model can be used to illustrate the dynamic interplay between technological progress, the wage premium, and investment in human capital.[2] In the model, individual workers face a choice between supplying unskilled labor or investing in education in order to supply skilled labor at a higher wage. Skilled labor commands a higher wage because of its higher marginal productivity. The choice of whether to acquire skills is dependent on the cost of education and the wage premium for skilled labor; a fall (rise) in education costs will increase (decrease) investment in human capital and an increase (decrease) in the wage premium will raise (reduce) human capital investment. With the assumption that technological change tends to be (at least in its initial phases) skill-biased such that higher-skilled labor becomes more productive relative to lesser-skilled labor, the model can illustrate a positive link between investment in human capital and technological progress. An improvement in technology increases the demand for skilled labor, leading to a rise in the wage premium and stimulating investment in human capital. Positive spillover effects arise as a growing pool of skilled workers fosters conditions conducive to the diffusion of technology across the sectors of the economy and spurring further innovation.[3]

5. The model also can illustrate the impact of policies or institutional arrangements (such as centralized "cooperative" wage bargaining) that serve to limit the differential in wages across groups of worker with different skill levels. For example, the skill premium can be reduced by the introduction of an income tax (especially one with very progressive marginal rates). Such a policy would basically be equivalent to a negative shock to the relative productivity of skilled versus unskilled workers. It would reduce incentives to acquire education by lowering the after-tax/transfer wage premium. Income disparity between skilled and unskilled labor would be reduced, but at the cost of lower economic output growth.

6. The effect of policies or institutional arrangements that effectively cap the wage premium can be offset to some extent by subsidies that reduce the cost of education. Such subsidies would encourage skill acquisition; however, this would be accomplished in a less efficient manner than if there were sufficient flexibility in the wage premium. While education costs are an important element in determining investment in human capital, they tend to be small in relation to the opportunity cost of foregone wages during the period

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[2] The model follows the basic framework of Blankenau (1999) and extends it using the approach developed by Galor and Moav (2000) to capture the positive link between investment in human capital and investment in new technologies. The model is described in a forthcoming IMF working paper by Kaufman, Luzio, and Dunaway.

[3] Acemoglu (1998) characterizes this positive feedback loop as the result of a high proportion of skilled workers inducing a large demand for skill-biased technologies, which in turn encourages faster upgrading of the productivity of skilled workers.

during which skills are acquired. Nevertheless, some subsidization of education costs is a key feature of the education system in all countries in recognition of the potentially great social benefit from skills acquisition.

### B. Experience in the United States

7. In the last 60 years, the wage premium in the United States between college-educated (used here as a proxy for "skilled" workers) and high-school graduates (an "unskilled" proxy) has shifted dramatically. In the 1940s, the premium fell significantly, before recovering in the 1950s and 1960s. The premium narrowed again in the 1970s, but it subsequently has risen sharply, increasing to an unprecedented level in the late 1990s (Figure 1). For heads of households, the premium has doubled in the last two decades, while for the work force as a whole it has increased by more than 50 percent (Figure 2). At the same time, the supply of skilled workers has increased both absolutely and in relation to unskilled workers (Figure 3). This joint increase in the skill premium and the relative supply of skilled workers can be traced back to the very strong relative demand for skilled workers during the 1990s.[4]

8. This rise in the skill premium has coincided with a rapid acceleration in technological progress. Expenditures on new information technology equipment and software in the United States have increased sharply during the period (Figure 4). In turn, the increases in investment in new technologies, in employment of skilled workers, and in the wage premium have been accompanied by sustained rapid growth in the United States and strong labor productivity growth (Figure 5).

### C. International Comparisons

9. Data on information technology investment during the 1990s show that, as a share of GDP, such investment rose sharply in the 1990s in the United States, the United Kingdom, and Canada, while it remained broadly unchanged in France and Germany (Figure 6). The United States also led all of the major industrial countries in spending on research and development (Figure 7). Machin and Van Reenen (1998) demonstrate that skill-biased technological change and research and development intensity were associated with increased demand for skilled labor. They find that these factors are especially important in explaining the significant increases in the demand for skilled labor during the 1990s in the United States and the United Kingdom.[5]

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[4] See, for example, Autor, Katz, and Krueger (1998) and Katz (1999). These studies conclude that the prime cause of the rise in the skill premium was a shift in the skill structure of labor demand brought about by skill-biased technological changes.

[5] Prasad (2001) also finds evidence of increased relative demand for skilled workers in the United Kingdom during the 1990s.

10. A substantial widening of the income distribution in the United States during the 1990s can be linked to the rise in the wage premium. In contrast, with the exception of the United Kingdom, income distribution was largely unchanged in other major countries, whether measured in terms of the ratio of incomes of the top to the bottom 20 percent of the population or the Gini coefficient (Figure 8). Time-series data on the wage premia in these countries comparable to that in the United States is not available; however, movements in the wage premium can be inferred from changes in the income distribution. A widening in the income distribution would be expected to be, at least in part, associated with an increase in the wage premium, as illustrated by the behavior of the income distribution and the wage premium in the United States. Hence, given little change in income distribution, there is reason to suspect that wage premia in other countries have not increased substantially. This situation might reflect economic policies or institutional arrangements that have limited the rise in the relative wages of skilled worker, and in a time of significant skill-biased technological change, investment in human capital has been hindered, adversely impacting on the pace of adoption of new technologies.

11. Education subsidies can have an important effect on net returns to skill acquisition. Data on total government spending for higher education shows that all of the major countries spend broadly comparable amounts, with the exception of Canada which spends significantly more than the others (Figure 9). Thus, although Canada has not experienced a comparable widening of income distribution as the United States, its higher level of education spending may explain in part its more favorable performance in skill acquisition and adoption of new technologies in relation to most of the other major countries.

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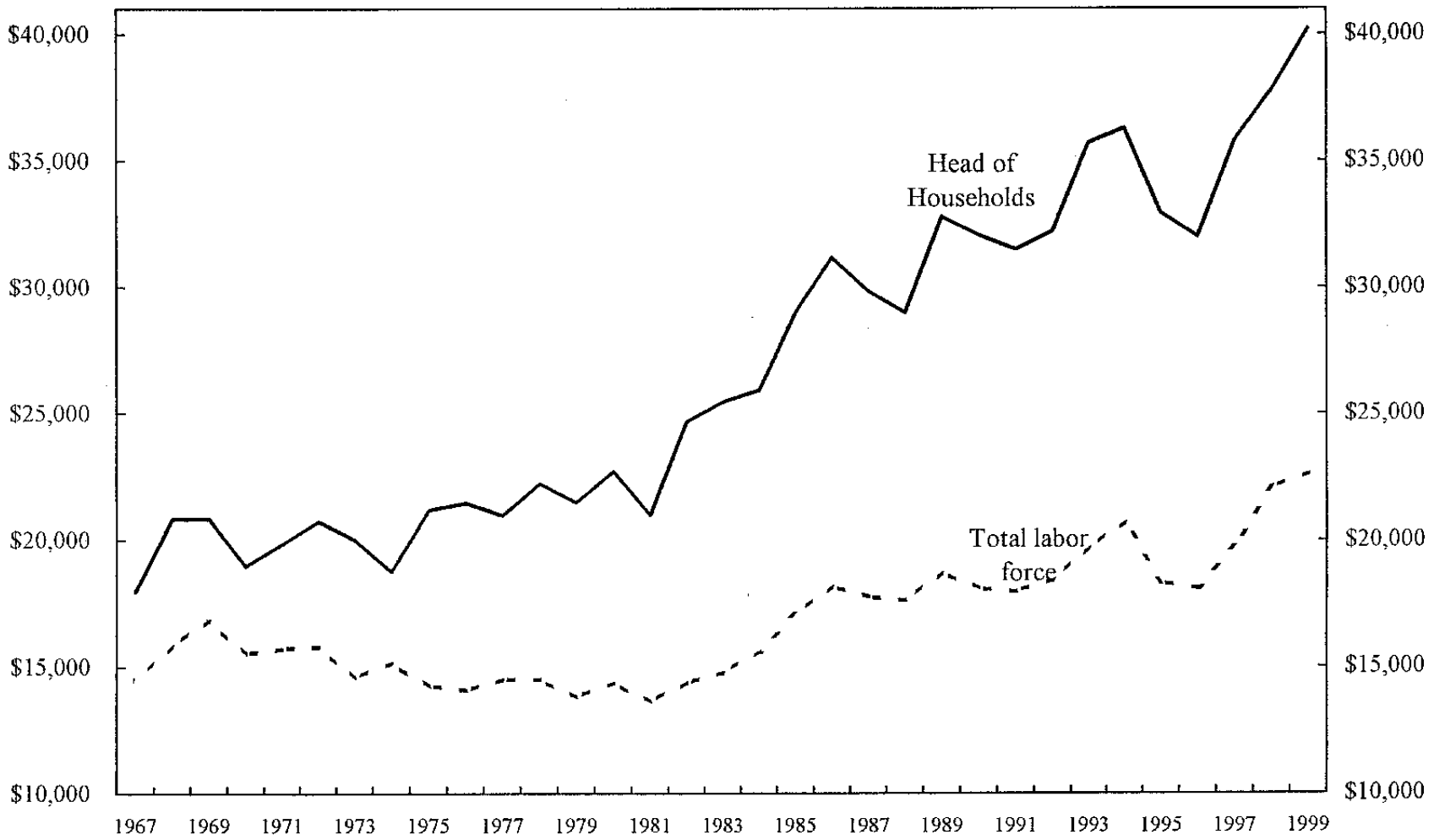
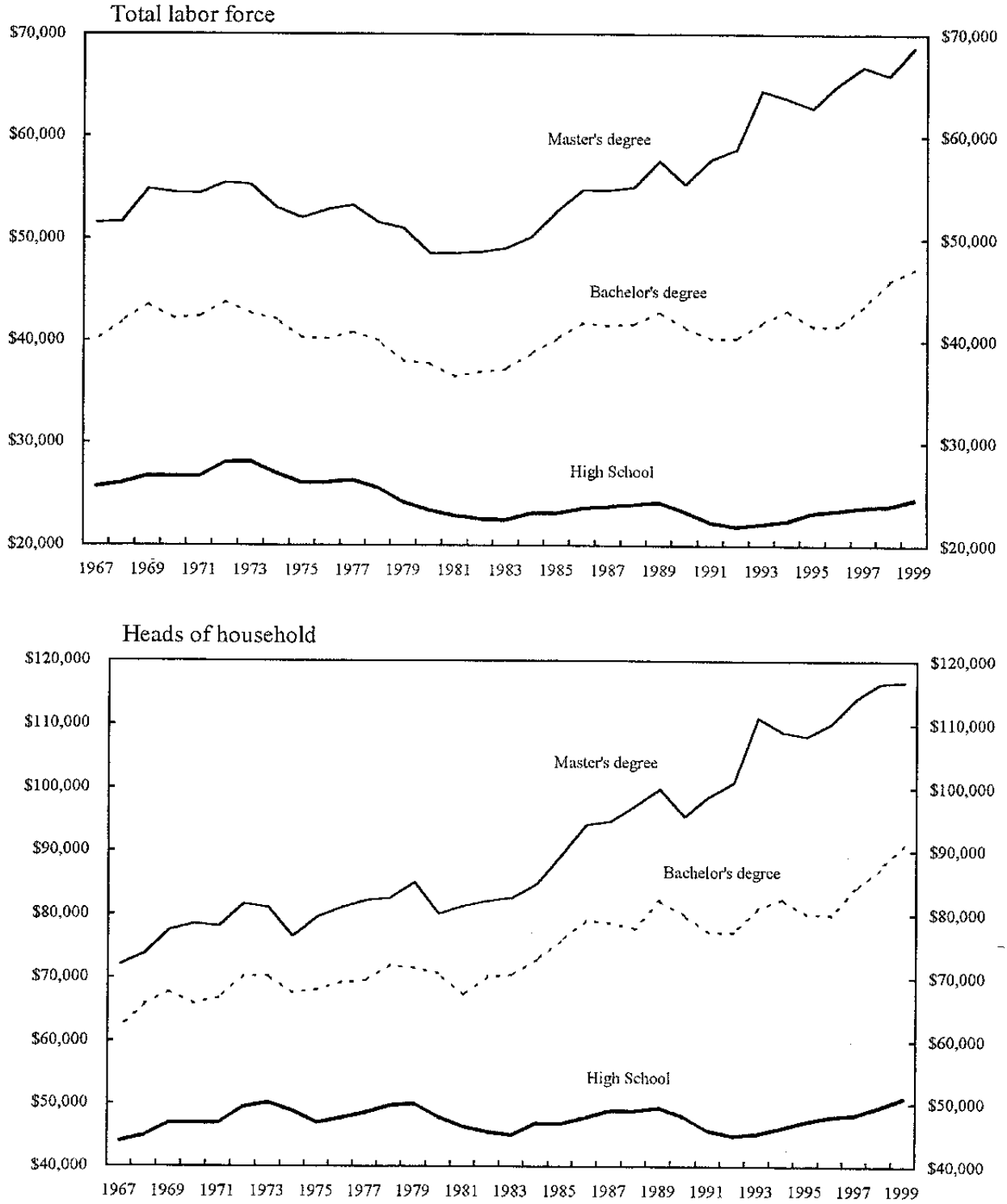
Figure 1. United States: Skill Premia[1]
(1999 dollars)



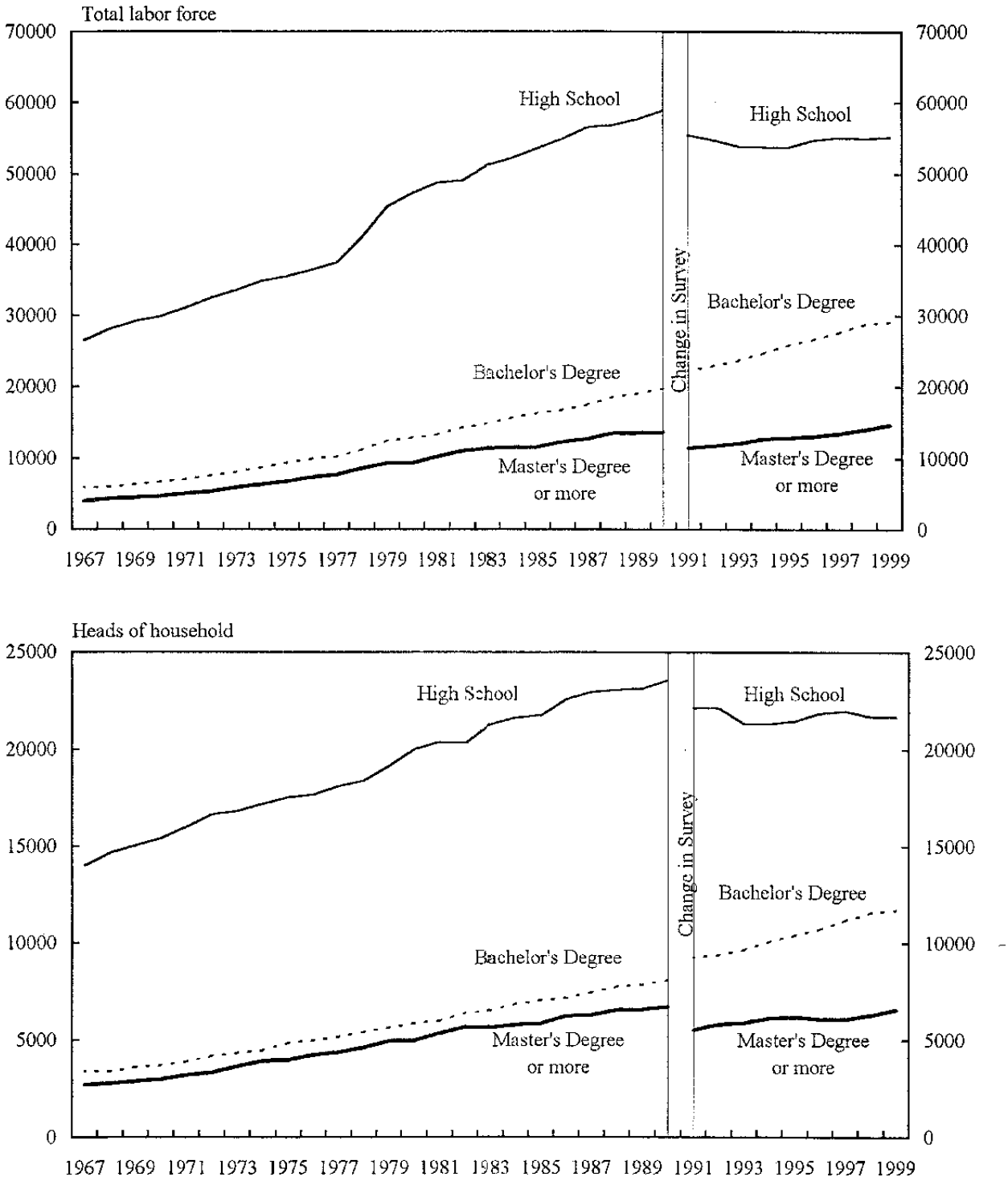

Source: U.S. Census Bureau. Current Population Survey.
1/ Wage differential between college and high school graduates.

Figure 2. United States: Average Wages by Skill Level
(1999 dollars)



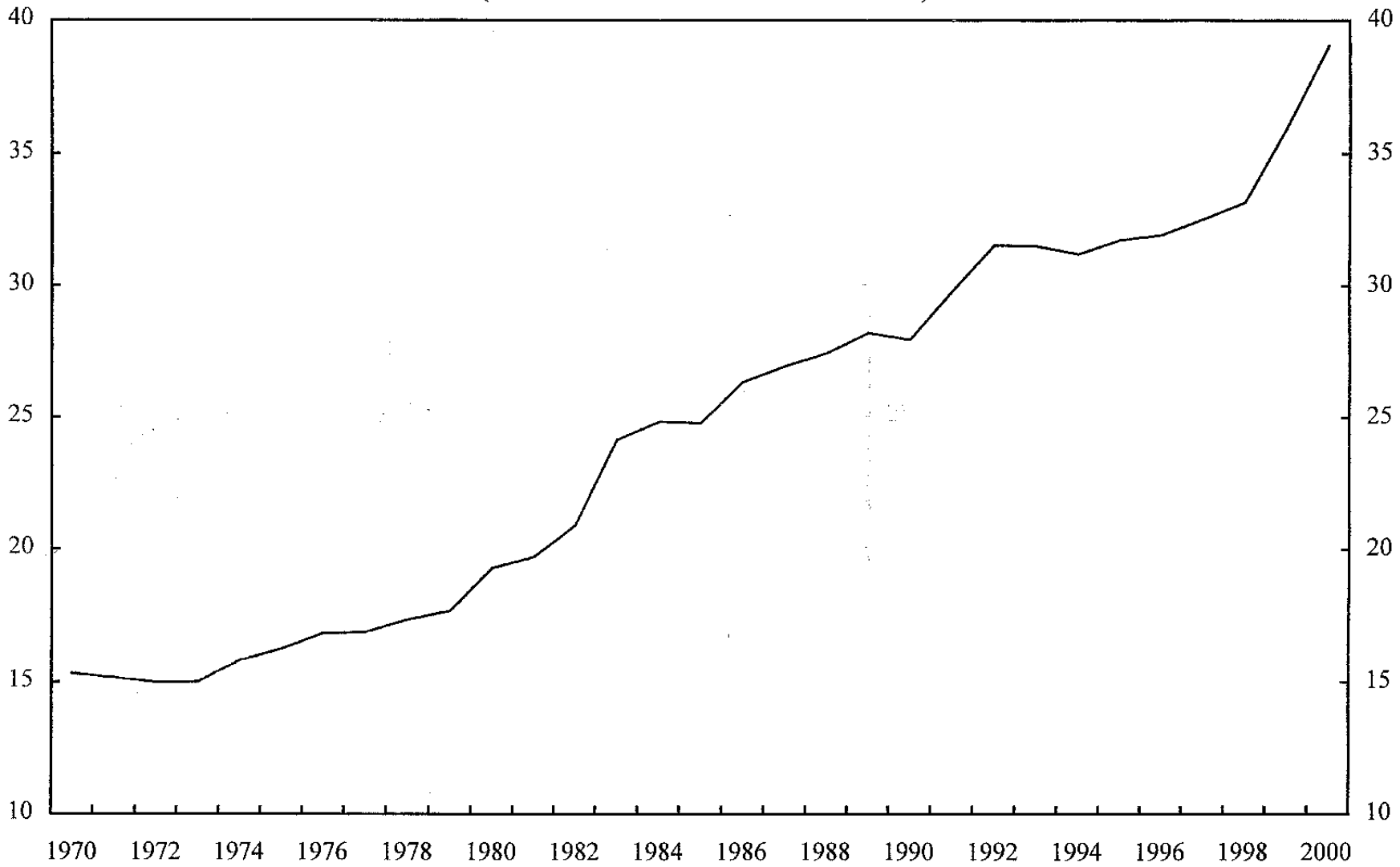

Source: U.S. Census Bureau. Current Population Survey.

Figure 3. United States: Employment by Skill Level
(Thousands of people)



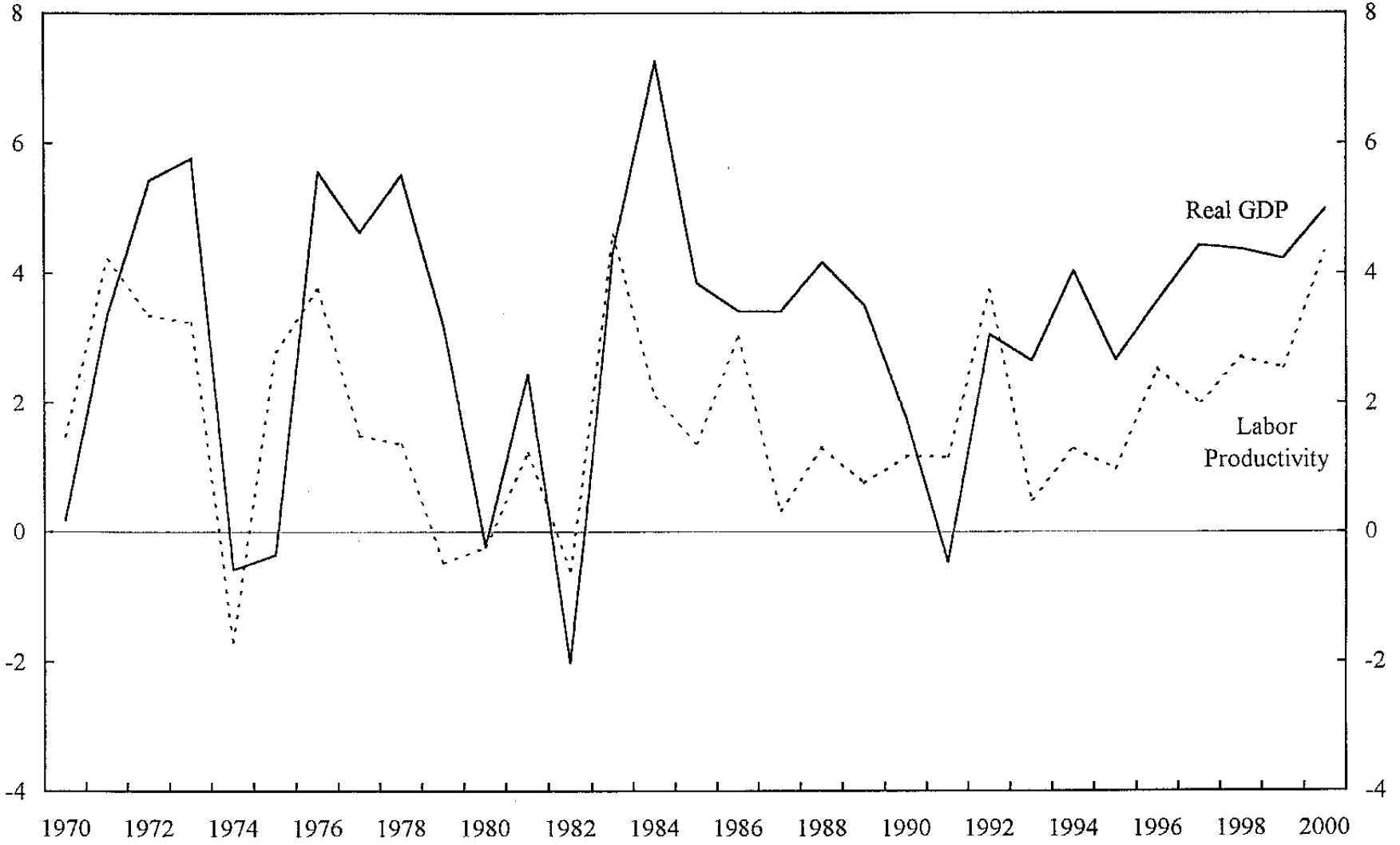

Source: U.S. Census Bureau. Current Population Survey.

Figure 4. United States: Investment in Information Technology Equipment and Software
(Percent of nonresidential fixed investment)



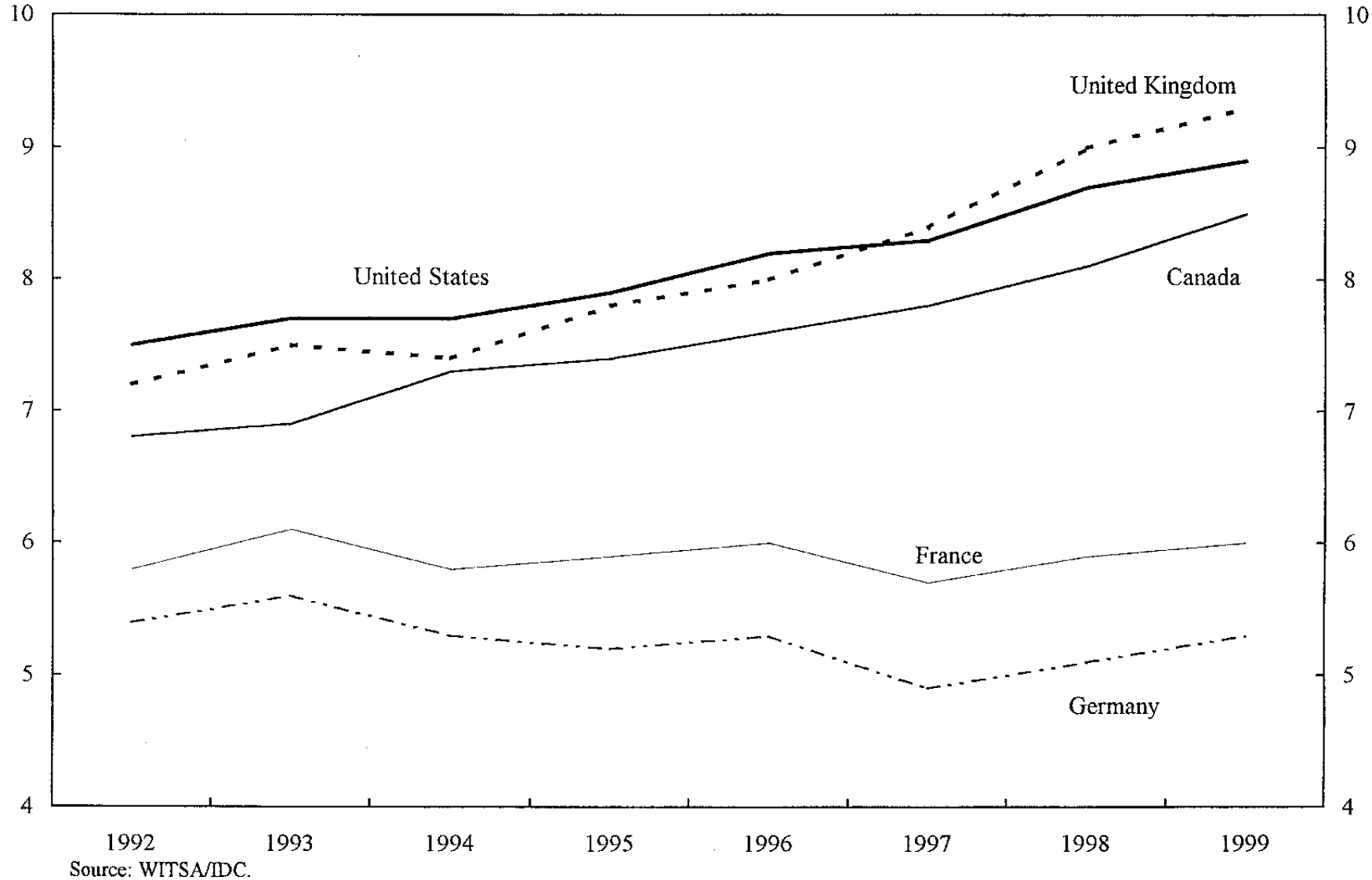

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Figure 5. United States: GDP and Labor-Productivity Growth
(Percent change)



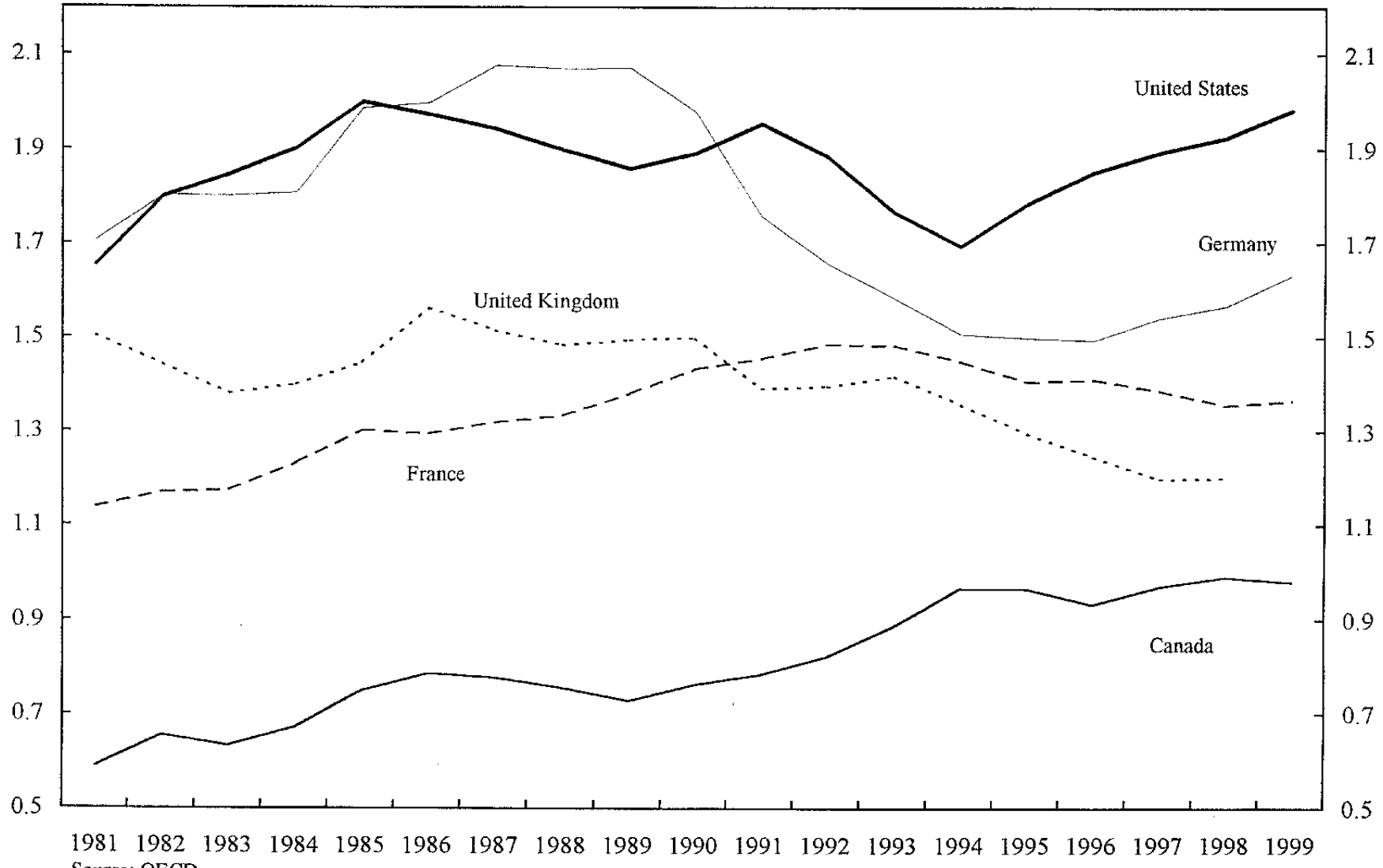

Sources: U.S. Department of Commerce, Bureau of Economic Analysis; and Bureau of Labor Statistics.

Figure 6. International Comparison: Information Technology Investment
(Percent of GDP)



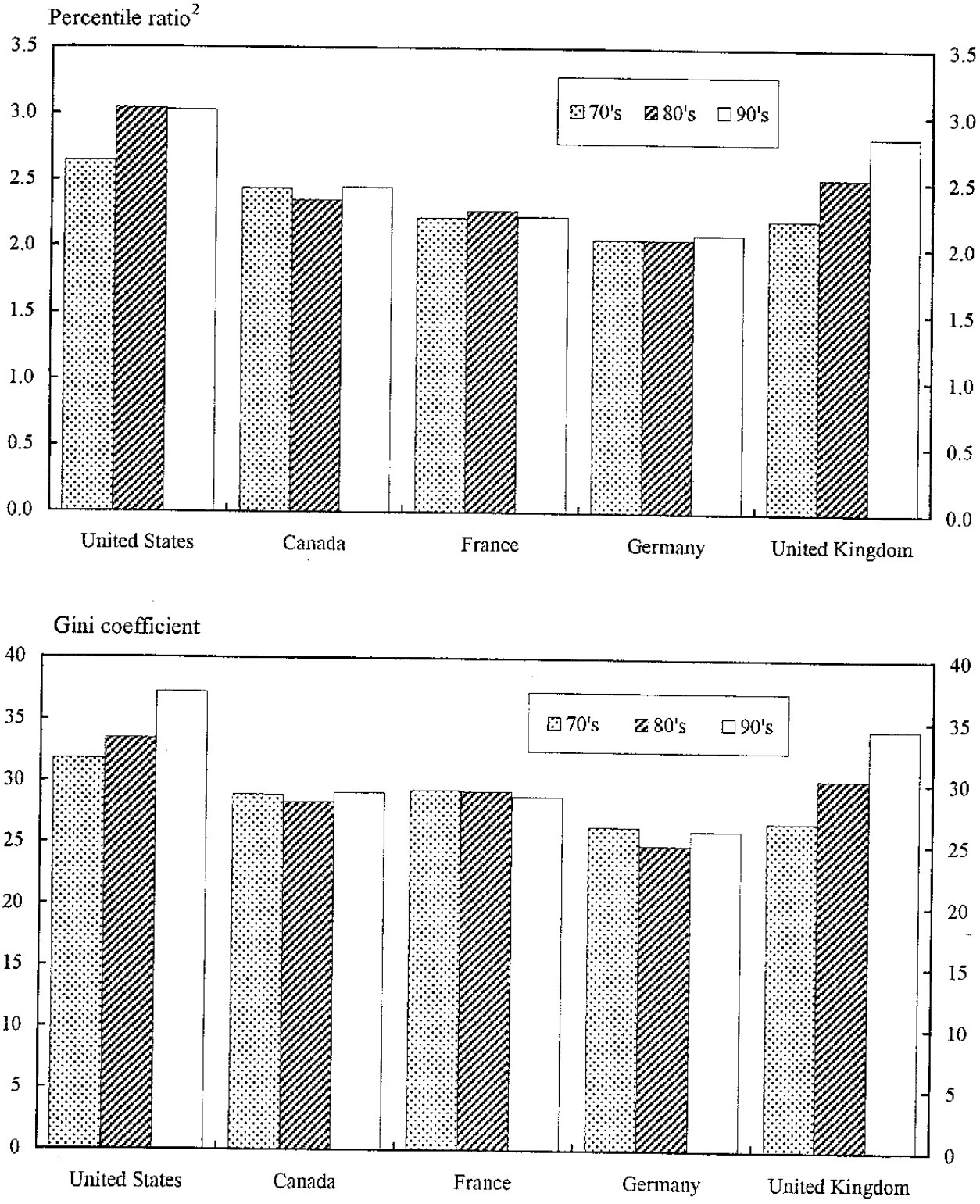

Source: WITSA/IDC.

Figure 7. International Comparison: Private Business Expenditure on Research and Development
(Percent of GDP)




Source: OECD.

Figure 8. International Comparison: Income Distribution[1]

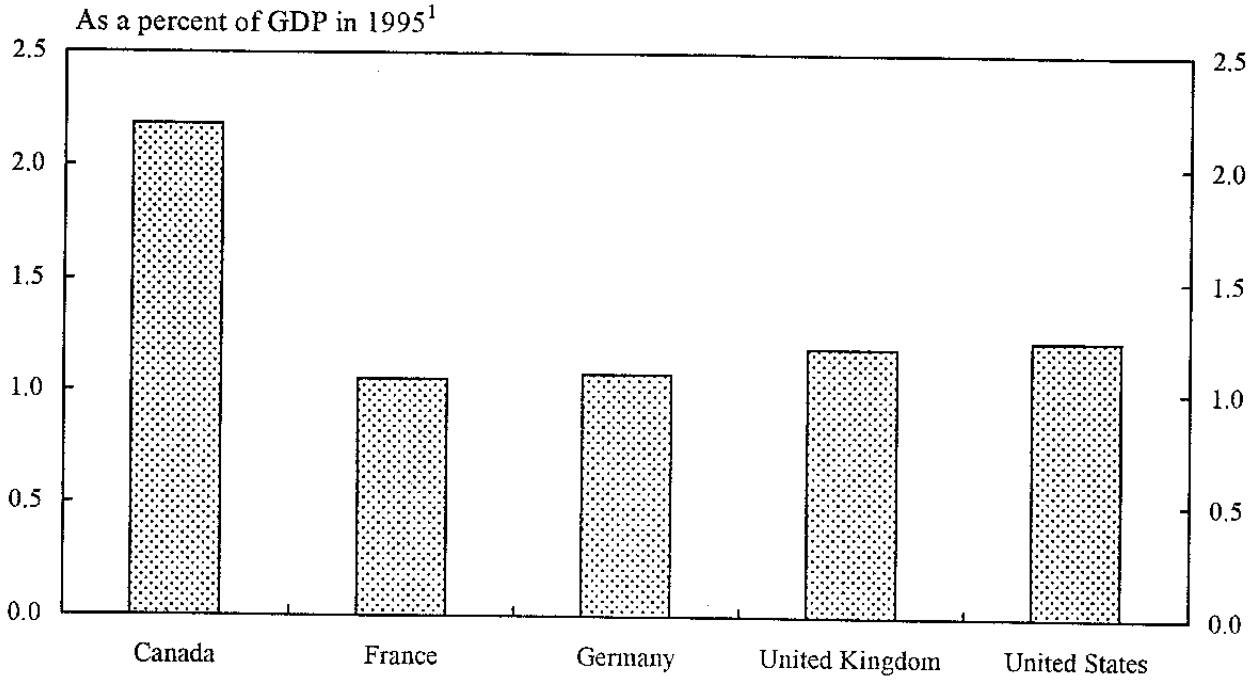



Source: Luxembourg Income Study (LIS Database).

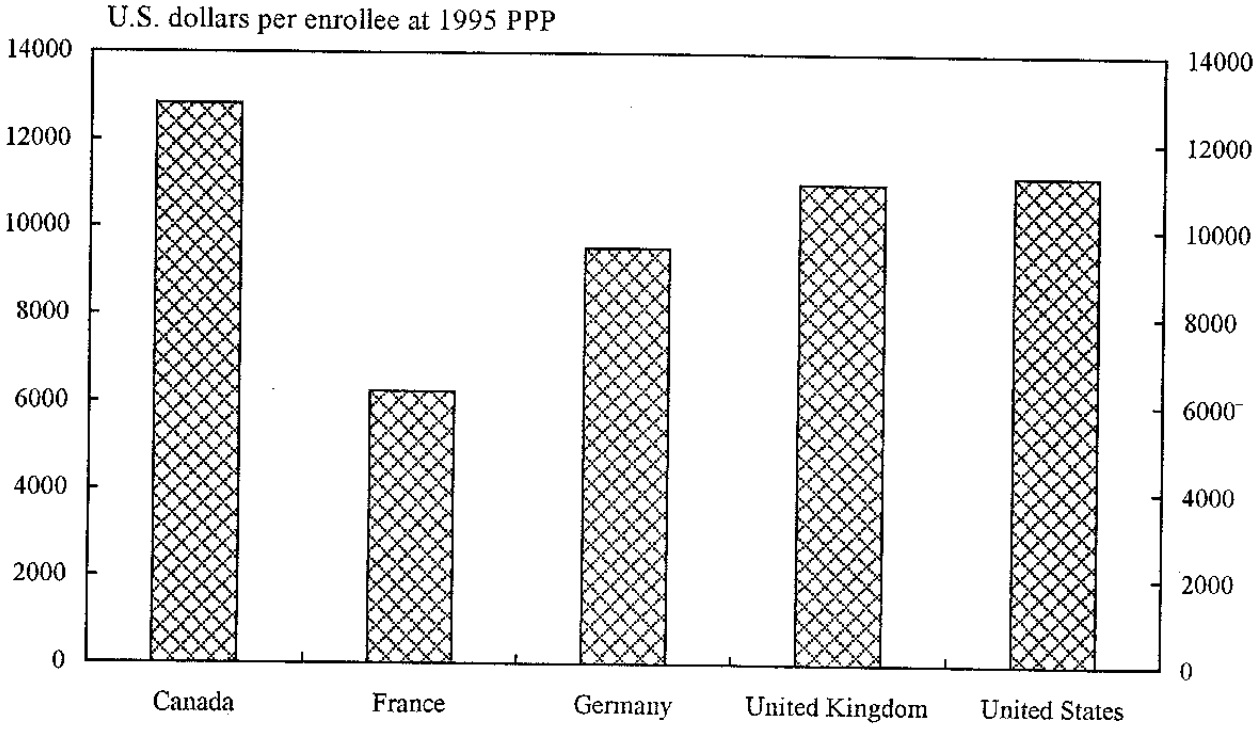
1/ Based on pre-tax income.

2/ Ratio of the highest 20th percentile to the 20th lowest percentile.

Figure 9. International Comparison:
Total Government Expenditure for Higher Education




1/ Includes all spending for education beyond the secondary level.




Source: OECD.