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UNITED STATES OF AMERICA

Selected Issues

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Approved by the Western Hemisphere Department

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Contents Page

I. MEASURES OF POTENTIAL OUTPUT, NAIRU, AND CAPACITY UTILIZATION[1]

1. Traditionally, measures of resource utilization have been used as indicators for the potential build up of inflationary pressures, and hence as guides for the formulation of macroeconomic policy. The most commonly used indicators of resource utilization in the United States are the output gap (measured as the difference between actual and potential output), the employment gap (measured as the difference between the natural rate of unemployment—or NAIRU—and actual unemployment), and capacity utilization in industry (Figure 1). To varying degrees, all of these indicators are difficult to estimate with a high degree of precision. Over the course of the current expansion, each of them has at times suggested that inflationary pressures might begin to emerge, but inflation has remained remarkably quiescent. In light of such favorable inflation performance, estimates of the traditional measures of resource utilization have been reexamined.

2. Using a variety of techniques, revised estimates suggest that the annual growth rate of potential output is in the range of 2½ to 2¾ percent for the period 1990–98, roughly ¼ to ½ of 1 percentage point higher than most previous estimates. With stronger growth in potential than previously estimated, the resulting output gap in 1998 was between -¾ to 1¼ percent. New estimates for NAIRU suggest that it has declined from about 7 percent in the 1980s to about 4¼ to 5¾ percent in recent years. Therefore, with regard to the employment gap, the current rate of unemployment of 4¼ percent lies below nearly all of these estimates. With both the output and employment gaps suggesting that the economy is operating at a very high level of resource utilization, the absence of inflationary pressures is striking. The diminished predictive power of the traditional leading indicators for inflation may in part reflect the large possible margins of error in measuring potential output and the NAIRU. In addition, it may also reflect the effects of the adaptation of new technologies and changes in the structure of the economy that may have boosted (at least on a transitory basis) productivity growth. The supposed "breakdown" in the relationships between these measures and inflation is also related to the favorable price shocks experienced by the United States in recent years that have helped to hold inflation down.

A. Potential Output Growth and the Output Gap

3. There is a wide variety of methodologies for estimating potential output, ranging from atheoretical approaches, involving various detrending techniques, to more structural methods, such as the production function approach. Since none of the commonly used methods is free from difficulties, four different methodologies were used to determine a range of reasonable estimates of potential growth. The results suggest that the growth rate in the recent period is roughly 2½ to 2¾ percent (Table 1).

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[1]Prepared by Paula R. De Masi, Jorge Chan-Lau, and Alex Keenan.

Table 1. Estimates of Potential Output Growth

Method/Source	Average Annual Growth Rate
Staff estimates:	
Segmented trend	2.7 percent (1982–98)
Hodrick-Prescott	2.8 percent (1973–98)
Blanchard-Quah	2.5 percent (1990–98)
Production function	2.6–2.9 percent (1990–98)
Other estimates:	
Congressional Budget Office	2.7 percent (1998–2009)
Office of Management and Budget	2.8 percent (1999–2002)
OECD	2.6 percent (1992–98)
	2.8 percent (1998)

4. Among the detrending techniques, the segmented trend approach attempts to identify points at which the trend rate of growth in GDP may have shifted. The potential rate of growth is assumed to be constant and roughly equivalent to the average growth rate over the interval between break points. Recursive residual tests were used to identify break points in the chain-linked real GDP series over the period 1959 to 1998. Two break points were found; one occurring in the first quarter of 1975, corresponding to just after the first oil price shock, and the other in the first quarter of 1982. Using these breakpoints, and based on log-linear regressions, potential output growth is estimated to have slowed from about 4 percent during the period 1960–75, to about 3¼ percent during the period 1975–82, and to 2 ¾ percent in the period thereafter.[2]

5. The Hodrick-Prescott (H-P) filter also was used to detrend GDP. This technique identifies a trend output which minimizes a weighted average of the gap between output and trend output and the rate of change in trend output.[3] Although the H-P filter is less restrictive than the segmented-trend approach—in that the growth rate of potential can vary continuously—one disadvantage is that the end points of the H-P filtered trend output series tend to be quite sensitive to the last few observations in the series. To attempt to handle this

[2] The estimation periods for the log-linear regressions were specified from cyclical peak to cyclical peak in an attempt to eliminate the distorting effects associated with end-point years which are at different points in the cycle. Earlier work suggested that there were break points in the fourth quarter of 1973 and the fourth quarter of 1989. Accordingly it was estimated that potential GDP growth slowed to 2¾ percent after the first break point, and slowed further to 2¼ percent after the second break point.

[3] See Hodrick and Prescott (1997).

problem, potential output was estimated to be about 2¾ percent per year over the period from the peak in output in the fourth quarter of 1973 to the end of 1998.

6. Another technique for estimating the growth rate of potential output is the Blanchard-Quah bivariate decomposition, in which output is divided into its cyclical and trend components. Rather than use only the information contained in the real output series—as in the case of the H-P filter—this technique also incorporates additional information from highly cyclical aggregate variables such as consumption and the unemployment rate.[4] This approach allows for a stochastic trend of output without forcing the trend component to be modeled as a random walk. Thus, it is consistent with the widely held belief that the dynamics of the permanent component of output are driven partly by technological innovation. Based on the Blanchard-Quah decomposition, potential output growth was estimated to be about 2½ percent for the period 1990–98.

7. The main drawback to the detrending techniques is that they are mechanistic, in the sense that the productive limits of the economy are not estimated based on available factors of production. In contrast, the production function approach explicitly models output in terms of underlying factors of production, expressing output as a function of capital, labor, and total factor productivity (TFP). This approach requires the assumption of a functional form for the aggregate production function and the construction of series for potential capital, potential labor, and TFP. Following established practice, a constant returns to scale Cobb-Douglas type production function was assumed, with constant shares over time for labor and capital.[5]

8. The series of potential inputs and TFP were estimated using three different methods. The first method assumed that factor inputs and total factor productivity were at their potential level in the years 1981 and 1990, which were cyclical peaks. The growth rate of TFP, as well as that of potential capital stock was assumed equal to the growth rate between those peak years. Potential labor was estimated to grow at the same rate as the historical population growth rate. The second method estimated the trend growth rate of TFP as in the previous method, but the series for potential inputs were obtained using the H-P filter. Finally, the third

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[4] More specifically, the Blanchard-Quah approach assumes that there exist two types of uncorrelated shocks associated with a structural VAR model that includes the growth rate of output and a cyclical variable (in this case the consumption-output ratio was used). In addition, the variance of the shocks is assumed equal to one. The long-run restriction imposed on these shocks is as follows: the first type of shock is permanent and has a long-run effect on output while the second type is temporary and does not have a long-run effect. In this framework, potential output is the component related to the permanent shock series. The structural shocks are unobserved but they can be recovered from a reduced VAR representation under the long-run restriction assumptions, and be used to construct the potential output series.

[5] The shares for labor and capital were based on their share in national income, 70 and 30 percent, respectively.

method extracted the potential series of factor inputs and trend TFP using the H-P filter. The growth rate of potential was estimated to be about 2.9 percent using the first two methods and 2.6 percent with the third method over the period 1990–98.

9. Based on these four different techniques for estimating the growth rate of potential output, 2½ to 2 ¾ was chosen as a range of reasonable estimates on which to establish the level of potential output and, therefore, the output gap (Figure 2). The level of potential output was determined by applying the annualized growth rate of potential to the full employment level of output which occurred in the third quarter of 1990. The output gap derived from this potential output series was in the range of -¾ to1¼ percent in 1998.

B. NAIRU and the Employment Gap

10. The NAIRU is the rate of unemployment that would keep the rate of inflation constant, and the employment gap is simply the difference between NAIRU and the actual unemployment rate. These concepts are derived from the Phillips curve, which captures the inverse relationship between inflation and unemployment. Empirically, the rate of inflation has tended to increase (decrease) when the rate of unemployment lies below (above) NAIRU. For the past several years, the U.S. unemployment rate has remained below most estimates of NAIRU, but inflation has remained quiescent. This puzzle has led economists to hypothesize that changes in the U.S. economy have reduced the NAIRU allowing the economy to reach a lower level of unemployment without sparking inflation. More recent estimates suggest that NAIRU has declined to 4¼–5¾ percent, from a peak of about 7 percent in the early 1980s (Table 2).[6]

11. Following Adams and Coe (1990), NAIRU was calculated using an approach in which cyclical and structural variables were used to explain the unemployment rate. NAIRU is derived from the estimated long-run values of the employment-population ratio (E/P) and the labor force participation rate (L/P), that is:

$$NAIRU = 1 - [(E/P)/(L/P)]$$

12. The long-run employment-population ratio was estimated as a function of two structural variables—the unionization rate, and the minimum wage, both of which are

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[6] Some economists view the absence of wage inflation given tight labor market conditions as confirmation that the NAIRU concept is flawed both empirically and theoretically. For example, Eisner (1998) established empirically an asymmetric relationship: when unemployment is above NAIRU inflation accelerates, but when unemployment is below NAIRU there is little impact on inflation.

negatively correlated with the dependent variable—and two cyclical variables—the output gap and the wage gap (which is the change in real compensation per hour relative to output per hour in the nonfarm business sector), both of which are positively correlated with the dependent variable. The long-run participation rate was estimated as a function of a nonlinear time trend, the child-dependency ratio, which is negatively correlated with the dependent variable, and the same two cyclical variables. Based on this approach, NAIRU was estimated to be about 5 percent in 1998.

Table 2. Recent Estimates of NAIRU

Source	NAIRU Estimate (Year)	Methodology
Staff estimates	5 percent (1998)	Structural approach
	4¼ to 5 percent (1998)	Okun's Law
	4 ½ percent (1998)	Phillip's Curve—ordinary least squares
Congressional Budget Office (1999)	5½ percent (1998)	Phillip's Curve—ordinary least squares
Office of Management and Budget (1999)	5¼ percent (1999)	Unavailable
Murphy (1998) 1/	5¾ percent (1993–97)	Time varying—discrete jump
Staiger, Stock and Watson (1997) 2/	4 ¾ to 6½ percent (1994)	Time varying
Gordon (1998) 3/	5 to 5¼ percent (1998)	Time varying

1/ Estimate assumes that discrete jump in NAIRU occurred in 1993, and that the level of NAIRU remained unchanged thereafter.

2/ Range represents the tightest of the 95 percent confidence intervals estimates; point estimate is 5.8 percent.

3/ The lower estimate is based on an equation using the personal consumption deflator, whereas the higher estimates is based on the GDP deflator.

13. Another approach to deriving NAIRU is to use Okun's Law, which establishes an empirical relationship between the output gap and the employment gap.[7] Based on the staff's estimate of an output gap of -¾ to 1¼ percent in 1998, an actual unemployment rate of 4½ percent, and an Okun coefficient of 2½, NAIRU is computed to be in the range of 4¼ to 5 percent.

14. For purposes of comparison, recently published estimates of NAIRU based on different methodologies are included in Table 2. The Congressional Budget Office (CBO) estimate of NAIRU is based on a Phillips-curve equation, which relates the inflation rate to lagged inflation, lagged levels of the unemployment rate, productivity growth, and variables to control for changes in food and energy prices. To derive NAIRU, the estimated equation was solved for the rate of unemployment that would deliver constant inflation. This method yields

[7]More specifically, Okun's Law has been estimated to be that the output gap tends to be 2½ times larger than the employment gap.

an estimate of 5½ percent in 1998. From its own augmented Phillips curve, the staff derives an estimate for NAIRU of 4½ percent in 1998.[8]

15. Other Phillips-curve estimation approaches allow NAIRU to vary over time, rather than to produce a single point estimate, and are therefore designed to track changes in NARIU. For example, Murphy (1998) uses a discrete jump approach. Phillips curves are estimated for subperiods during 1960–97. For each subperiod, a level of unemployment that delivers constant inflation is derived. Murphy finds that NAIRU was about 5¼ percent for the period 1960–72, increased to 6½ percent during 1973–85, and to 7 percent in 1986–92, and then declined to about 5¾ percent for the subperiod 1993–97.

16. Staiger, Stock, and Watson (1997) and Gordon(1998) use a more flexible approach, which allows NAIRU to vary continuously over time, rather than at specific break points. The Phillips curve is estimated jointly with a second equation that allows NAIRU to vary over time. The Staiger, Stock, and Watson results confirm that NAIRU declined from about 7 percent in the mid-1980s, to about 5¾ percent in 1994. For this estimate, the confidence interval ranges from 4¾ to 6½ percent in the best case, and between 2¾ to 7¾ percent, in the worst case. Gordon's results indicate that NAIRU declined from about 6¼ percent in the mid-1980s to between 5 to 5¼ percent in 1998.

17. These recent estimates provide compelling evidence that NAIRU has fallen during the 1990s. A number of factors have been identified as contributing to this decline.[9] First, as the baby-boom generation has aged, the United States now has a more mature labor force and older workers tend to experience less frequent spells of unemployment. Second, the unexpected pickup in productivity growth over the past few years may have temporarily depressed NAIRU, as workers accept wages that are lower than what their higher rate of productivity would indicate. Third, product and labor markets have become more competitive since the early 1980s, as international trade has increased and unionization has declined.

C. Capacity Utilization

18. Another measure of resource utilization commonly used to assess potential inflationary pressures is the rate of capacity utilization published by the Federal Reserve Board. Capacity utilization is the ratio of the actual level of output to an estimated sustainable maximum level of output. The actual level of output is based on the monthly industrial production indexes. The capacity data are based on survey data collected at the plant level for the fourth quarter of each year and alternative sources of data on capacity change (such as, growth in an industry's

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[8]The methodology underlying the staff's augmented Phillips curve is discussed in Chapter II.

[9]For a more detailed discussion, see Stiglitz (1997).

available capital input, or in the case of some industries, capacity measured in physical units). The annual capacity estimates are then interpolated to a monthly frequency.

19. As capacity utilization reaches a high level, inflation rises because the marginal cost of producing goods increases and leads to higher prices. Empirical evidence suggests that inflation begins to accelerate when capacity utilization exceeds a threshold near 82 percent, and this relationship has remained fairly consistent over the last 30 years.[10] Despite the empirical robustness in explaining the acceleration in inflation, there are a number of shortcomings in using capacity utilization as an indicator for economy-wide inflationary pressures. Capacity utilization is based primarily on the goods-producing sector and ignores the rapidly growing service sector.[11] With the rapid adoption of new technology, gains in productivity may not be adequately captured by measured capacity. The capacity utilization rate also does not capture the effect that foreign-produced goods may have on inflation.

20. During the current economic expansion, the capacity utilization rate on an annual basis increased from a low of about 78 percent in 1991, to a peak in 1994 of nearly 83 percent, before falling off to 80½ percent in May 1999. The decline in the capacity utilization rate reflects, in part, the rapid pace of business investment in recent years. The growth of industrial capacity averaged 2¾ percent over the period 1967–90; yet since 1994 growth in capacity has sutstantially exceeded this average, peaking in 1997 at about 5½ percent. The decline in capacity utilization since 1994 also reflects the weakness in activity in the goods-producing sector owing to appreciation of the dollar and the Asian financial crisis.

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[10]Corrado and Mattey (1997).

[11]It has been observed, however, that inflation in the goods and services sectors follow similar cyclical patterns, so that cost pressures in the goods-producing sector may be a reasonable proxy for economy-wide pressures.

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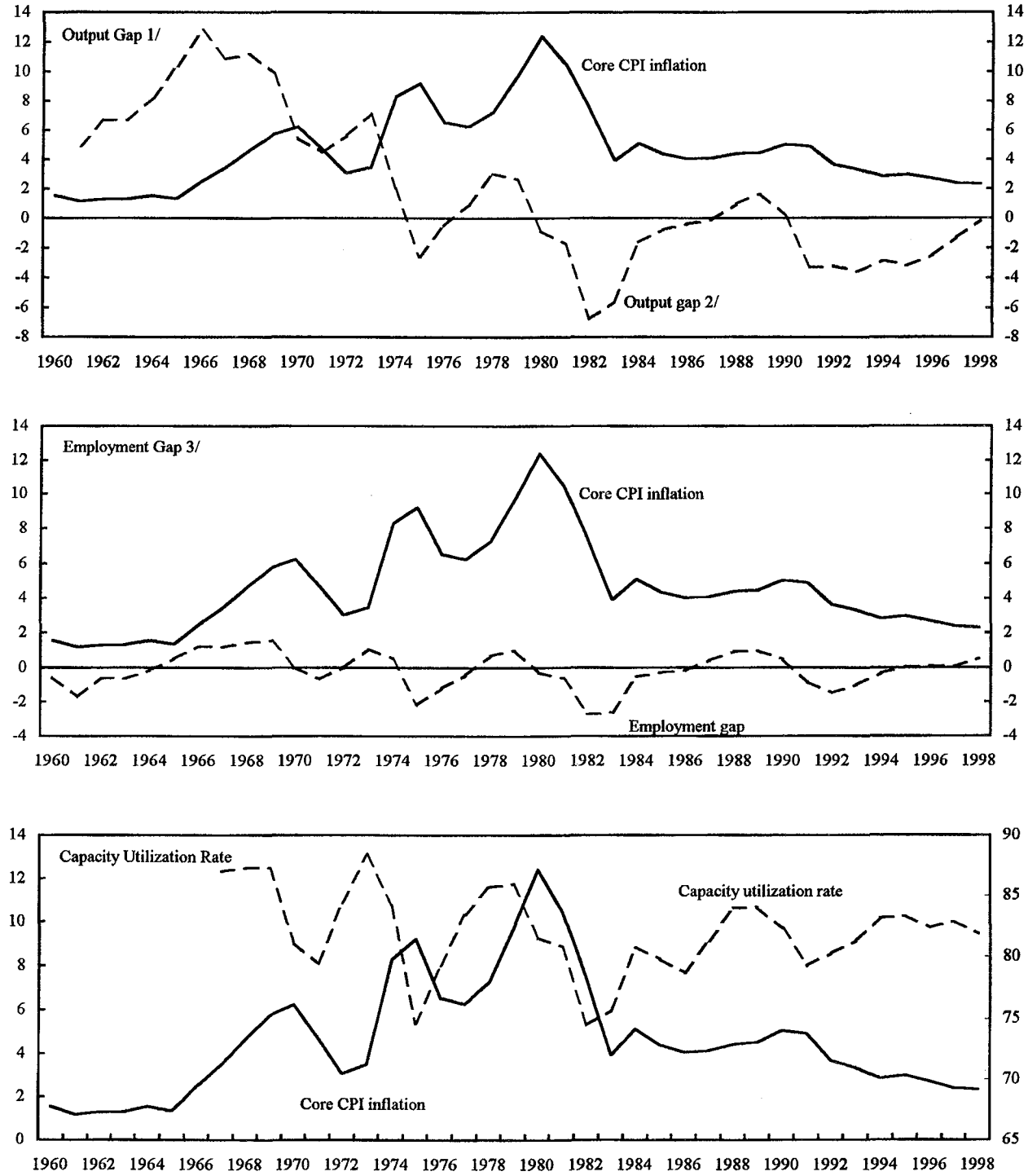
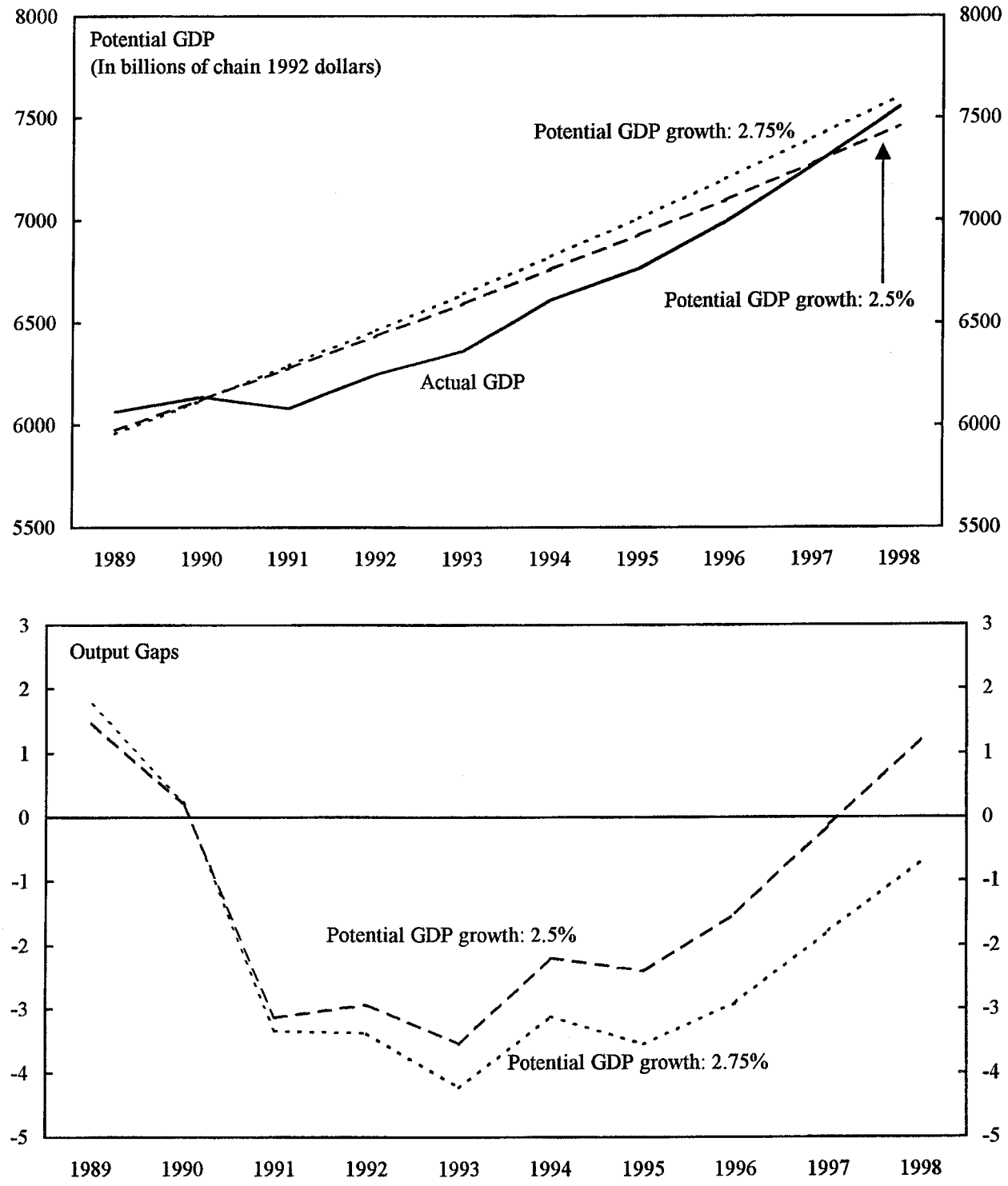
Figure 1. United States: Indicators of Resource Utilization



Sources: Bureau of Economic Analysis, *Survey of Current Business*; Bureau of Labor Statistics, *Employment and Earnings;* Board of Governors of the Federal Reserve; and Fund staff estimates.

1/ Actual GDP minus potential GDP as a share of potential.
2/ Based on the average of the range for potential output growth, which is 2.6 percent.
3/ NAIRU minus unemployment rate.

Figure 2. United States: Potential Output and Output Gaps



Source: Staff estimates.

II. Wage and Price Determination[1]

1. Since the second half of 1996, consumer price inflation in the United States has slowed noticeably. At the same time, growth in real output has accelerated, and the unemployment rate has declined to historically low levels. The confluence of these developments has raised a number of questions about how strong growth in output and employment can coexist without igniting stronger upward pressure on consumer prices. Analysis presented here suggests that, while there have been no fundamental changes in the way in which wages have been determined over the course of the current business cycle, the significant reduction in the rate of increase in nonwage labor compensation since 1995 has played an important role in restraining consumer price inflation. Other factors, such as declines in import prices, have also played a role. The acceleration in real-wage growth that has occurred since 1995 has resulted from slower consumer price inflation and faster growth in labor productivity.

A. Behavior of Labor Costs over the Business Cycle

2. One important factor driving the slowdown in price inflation since 1996 has been the behavior of labor costs over the current business cycle.[2] In particular, Figure 1 shows that growth in wages and salaries, as measured by the Employment Cost Index (ECI), was tempered during the initial phases of the current expansion in 1992, relative to the initial phases of the previous expansion. Since the last quarter of 1996, growth in wages and salaries has picked up, and it now more closely resembles the pattern exhibited over the previous cycle, although recent growth rates are still slower than in the previous cycle.

3. Real wages and salaries (as measured by nominal changes in the wage and salary component of the ECI less inflation) have exhibited strong growth in the current cycle relative to the previous one (Figure 2). Since the latter part of 1996, actual real compensation has exceeded expected compensation (nominal changes in the wage and salary component of the ECI less expected inflation) as a result of the fact that actual inflation was less than anticipated inflation. This stronger-than-expected growth in real wages may have served to temper demands for larger nominal wage increases since 1996. Also, workers may have agreed to accept smaller nominal wage increases in return for enhanced job security, but Kramer (1997) found no strong econometric support for this hypothesis.

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[1]Prepared by Stephen Tokarick, Jorge Chan-Lau, and Gustavo Ramirez.

[2]The current business cycle is defined to be the period from March 1991 to the present, while the previous business cycle is taken to be the period from November 1982 through July 1990. These business cycle dates are taken from definitions adopted by the National Bureau of Economic Research (NBER). The beginning date of each cycle refers to the trough of the cycle. The figures used in the paper depict the behavior of each labor-market indicator six quarters prior to the trough of the cycle and 32 quarters after the trough.

4. To assess whether there has been a fundamental change in the way in which wages and salaries are determined over the current business cycle, a wage Phillips curve was estimated over the period from 1983Q2 to 1995Q4. In this equation, changes in the wage and salary component of the ECI were regressed on lagged consumer price inflation and the level of the unemployment gap, defined as the NAIRU less the actual rate of unemployment (Table 1).[3] Using the estimated equation, an out-of-sample forecast was generated for the period 1996Q1 to 1998Q4 and the results were compared to the actual changes over the specified period (Figure 3). In general, the estimated wage Phillips curve predicts actual wage inflation fairly well, but the equation tends to underpredict actual wage inflation somewhat over the period between 1997Q2 and 1998Q4. Over this period, the unemploy-ment gap was rising, which would suggest higher wage inflation; however, this effect was offset by the decline in consumer price inflation, proxying inflation expectations.

5. While nominal wages and salaries, as measured by the ECI, have behaved in a similar fashion over the current cycle, relative to the previous cycle, growth in overall labor costs has been much slower over the current cycle as a consequence of the sharp slowdown in the growth in nonwage costs (benefits) and faster productivity growth. As shown in Figure 4, the benefit component of the ECI has increased at a substantially slower rate since 1995, compared to the same period of the previous business cycle. This slowdown is mainly attributable to smaller rates of increase in expenditures by employers on health insurance benefits (Table 2), workers' compensation, state unemployment insurance costs, and lower costs of funding employee pensions.[4] Growth in labor productivity (Figure 5) has quickened since 1995, compared to the same period of the previous cycle, owing to the effects of strong capital investment and faster technological progress. This acceleration in labor productivity growth has also contributed to restraining the growth in unit labor costs.

6. As a result of these factors, labor's share in national income has declined quite sharply relative to the previous cycle (Figure 6), and business profitability (as measured by capital's share in national income), has increased. After reaching a peak of more than 74 percent six quarters into the current cycle, labor's share in national income has declined to about 71 percent. This behavior is somewhat uncharacteristic, as the average value of labor's share in national income over the course of the current cycle has fallen below the average value of labor's share in the five previous business cycles.[5] Slower growth in labor costs, as reflected in

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[3]This specification follows the work of Kramer (1997).

[4]See U.S. Department of Labor (1998). Data on health insurance costs were obtained from unpublished estimates of the Bureau of Labor Statistics.

[5]The last five business cycles and the average value of labor's share over the cycle was: November 1970 to November 1973 (74.2); March 1975 to January 1980 (73.1); July 1980 to July 1981 (73.7); November 1982 to July 1990 (72.5); and the current cycle (71.7).

a declining share of labor income, have contributed to significant restraint on consumer price increases since 1996.

B. Model of Consumer Price Inflation

7. One striking development during the current expansion has been the steady decline in labor's share of national income which may suggest that lower labor costs have been a factor in restraining consumer price inflation, in the context of a model where prices are set as a markup over marginal costs of production. To assess this hypothesis, an indicator of real marginal cost is needed because marginal cost is not directly observable. Under the assumption that the aggregate production function exhibits constant returns to scale, if all inputs are increased by the same proportion, output will increase by the same proportion. As a result of this structure, total costs of production equal the cost of producing one unit of output multiplied by the level of output—that is, total cost is just the cost of producing one unit "scaled up" by the level of output. Consequently, total cost is simply a linear function of the level of output, so marginal cost and average cost are both constant and equal to each other. Under the additional assumption that labor is the only variable input, the marginal cost of production, which equals average cost, is just labor costs (the wage rate multiplied by the level of employment) divided by the level of output. Real marginal costs are obtained by dividing this fraction by the output price, so real marginal costs can be represented by labor's share—labor cost divided by the value of output. Gali and Gertler (1998) and Rotemberg and Woodford (1999) emphasize the importance of including a variable that measures real marginal costs of production in traditional price Phillips-curve equations because measures of the output gap and the unemployment gap are unreliable, since estimates of both potential output and the NAIRU are not observable and subject to significant error.[6]

8. To explore the role that declining labor costs and import prices may have played in restraining consumer price inflation, an augmented price Phillips curve was estimated that adds labor's share in national income and the change in import prices as explanatory variables. The labor share variable was included because it captures the changes in labor costs, including the slower rate of growth in benefit compensation, and the important acceleration in labor productivity that has taken place over the current business cycle. In contrast to unit labor costs, which typically measure costs only in the manufacturing sector, labor's share in the

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[6]Lipschitz and McDonald (1991) propose, in a different context, that comparing labor shares in value added across trading partners yields useful information about price competitiveness. They propose using a profit-based indicator of competitiveness based on real unit labor costs, i.e., labor's share in valued added.

corporate sector is a broader measure of labor costs in the economy.[7] The change in import prices was included to capture the effects of external factors in restraining inflation.

9. The results (Table 3) show that the coefficients on the lagged consumer price term and the unemployment gap have the expected signs and are statistically significant. The magnitudes of these coefficients also are broadly similar to those obtained in the studies by Hogan (1998) and Staiger, Stock, and Watson (1996).[8] Import prices and the labor share variables also enter the consumer price Phillips curve with the expected signs. Overall, the estimated Phillips curve generally overpredicts actual inflation (except for a short period in early 1997 (Figure 7)). In explaining the inflation forecast, lagged inflation was the most important variable, followed by changes in import prices, which restrained consumer price inflation as a result of reductions in the prices of basic commodities and the appreciation of the U.S. dollar. Finally, the decline in labor costs, reflected in labor's share,[9] was the third most important variable, while the unemployment gap contributed the least.[10]

10. The inflation forecast derived from the Phillips curve used here outperforms the inflation forecast derived from a traditional Phillips-curve specification that includes only lagged inflation and the unemployment gap as explanatory variables, as well as the inflation forecast derived from a traditional specification augmented with a variable measuring the change in import prices. More specifically, using the traditional Phillips-curve specification, the root mean-square error (RMSE) is 0.29 and the Theil inequality coefficient (TIC) 0.06, while in the case of the traditional Phillips curve augmented with the change in import prices, the RMSE is 0.21 and the TIC is 0.04. For the Phillips curve used in this paper, the RMSE of 0.17 and the TIC of 0.03 are below the corresponding values of these indicators in the other two specifications.

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[7]Hogan (1998) found that adding the change in real unit labor costs to a standard Phillips-curve equation did not improve the predictive power of the equation.

[8]For example, on the unemployment gap variable, Hogan (1998) obtains a coefficient of about 0.26 and Staiger, Stock, and Watson (1996) obtain a coefficient between 0.22 and 0.41, depending on the specification.

[9]Gali and Gertler (1998) also find that a decline in real marginal costs of production, as exhibited by a decline in labor's share, has a significant impact on inflation.

[10]On average, lagged inflation accounted for 104 percent of forecast inflation, the change in import prices accounted for -8 percent, the change in the labor share accounted for 1.9 percent, and the unemployment gap accounted for 1.7 percent.

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Table 1: United States: Estimate of a Wage Phillips Curve 1/

(1983Q2–1995Q4)

Variable	Coefficient	T-Statistic
Constant	1.68	3.14
Inflation(-1)	0.14	1.45
Inflation(-4)	0.31	3.62
Unemployment gap	0.53	3.93
Lagged error term	0.89	20.38
R^2	0.94	
Adjusted R^2	0.93	
Theil Inequality Coefficient 2/	0.03	
Root Mean Square Error	0.21	

1/ Wage inflation is defined to be the four-quarter rate of increase in the Employment Cost Index for wages and salaries. The unemployment gap is defined as the staff's estimated natural rate of unemployment less the civilian unemployment rate. The annual data for the natural rate were interpolated to quarterly frequency.

2/ The Theil inequality coefficient is defined as the square root of the sum of the differences between the actual change in the dependent variable and the change in the predicted value of the dependent variable divided by the sum of the actual change in the dependent variable. If this coefficient is zero, then the forecast is "perfect." The closer the Theil coefficient is to zero, the better the forecast.

Table 2. United States: Employer Costs per Hour Worked
For Health Insurance, Private Industry, from the Employment Cost Index

(In percent change from previous year)

Year	March	June	September	December
1981	14.5	15.6	16.0	17.1
1982	14.7	16.2	18.1	18.3
1983	23.5	22.4	21.3	20.4
1984	17.6	15.9	13.1	12.5
1985	8.5	6.7	6.5	5.2
1986	3.9	3.5	3.6	4.1
1987	4.7	6.1	5.5	6.3
1988	10.5	12.2	13.9	14.7
1989	13.6	13.4	13.7	12.8
1990	12.2	12.0	11.5	11.3
1991	11.5	11.1	10.9	11.2
1992	10.3	9.6	9.2	8.6
1993	8.1	7.8	7.2	6.9
1994	5.7	5.0	4.3	3.9
1995	1.6	0.6	-0.1	0.1
1996	-0.3	0.1	0.7	0.4
1997	0.2	0.7	0.8	0.9
1998	2.2	2.6	2.2	2.3

Source: U.S. Department of Labor, Bureau of Labor Statistics (1998), unpublished estimates.

Table 3. United States: Estimate of a Price Phillips Curve 1/

(1975Q2–1998Q4)

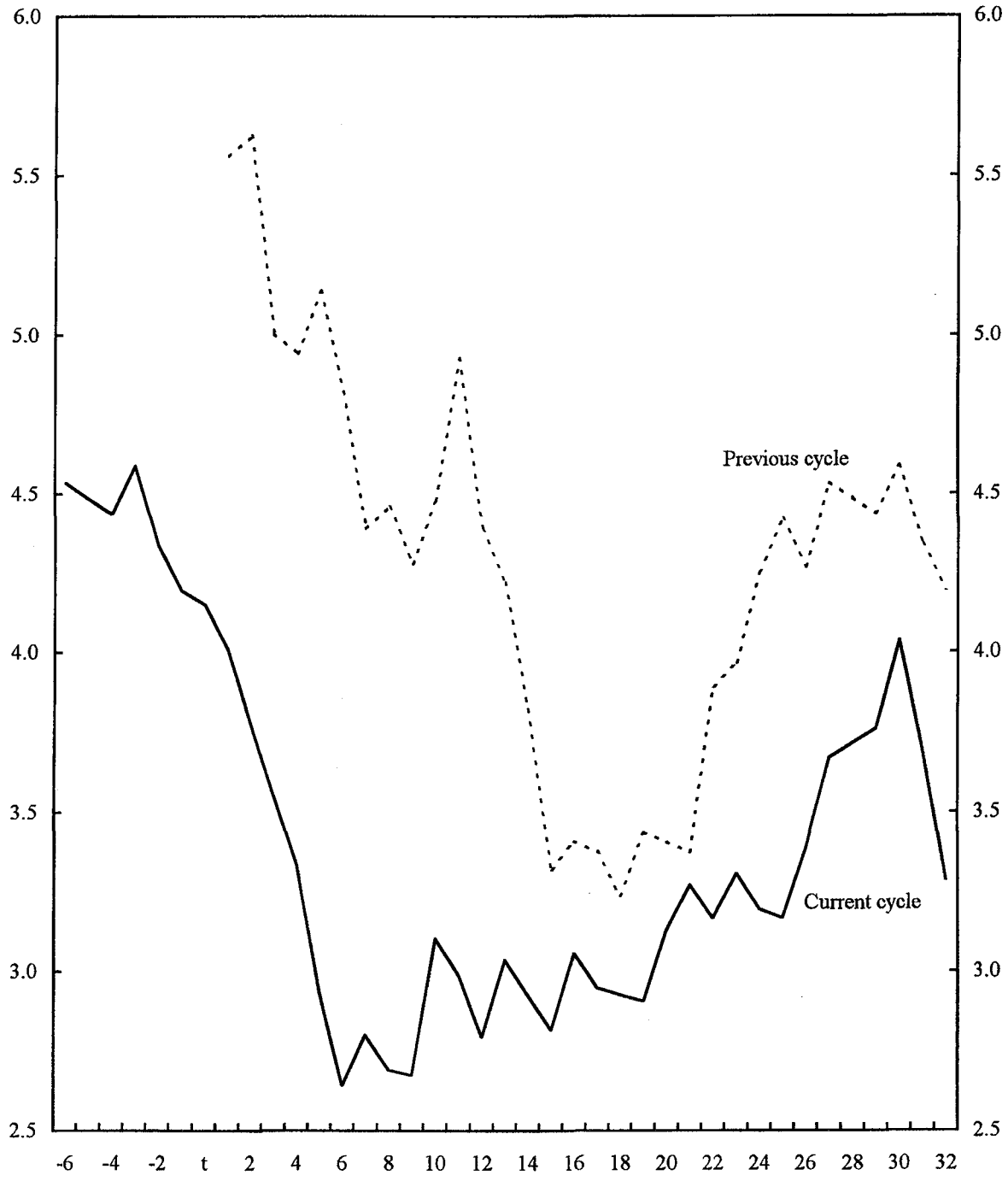
Variable	Coefficient	T-Statistic
Constant	0.37	2.63
Inflation (-1)	0.94	39.03
Unemployment gap	0.22	3.56
Δimport prices	0.03	2.52
Δlabshare (-1)	0.02	1.54
Δlabshare (-2)	0.02	1.08
Lagged error term	0.08	0.72
R^2	0.97	
Adjusted R^2	0.97	
Theil Inequality Coefficient 2/	0.03	
Root Mean Square Error	0.17	

1/ Core inflation is defined as the four-quarter rate of change in the core CPI (the CPI excluding food and energy). he unemployment gap is defined as the staff's estimated natural rate of unemployment less the civilian unemployment rate. The annual data for the natural rate of unemployment were interpolated to quarterly frequency. The change in the labor share variable is defined as the four-quarter rate of change in the ratio of total labor costs to the value of output in the corporate sector.

2/ The Theil inequality coefficient is defined as the square root of the sum of the differences between the actual change in the dependent variable and the change in the predicted value of the dependent variable divided by the sum of the actual change in the dependent variable. If this coefficient is zero, then the forecast is "perfect." The closer the Theil coefficient is to zero, the better the forecast.

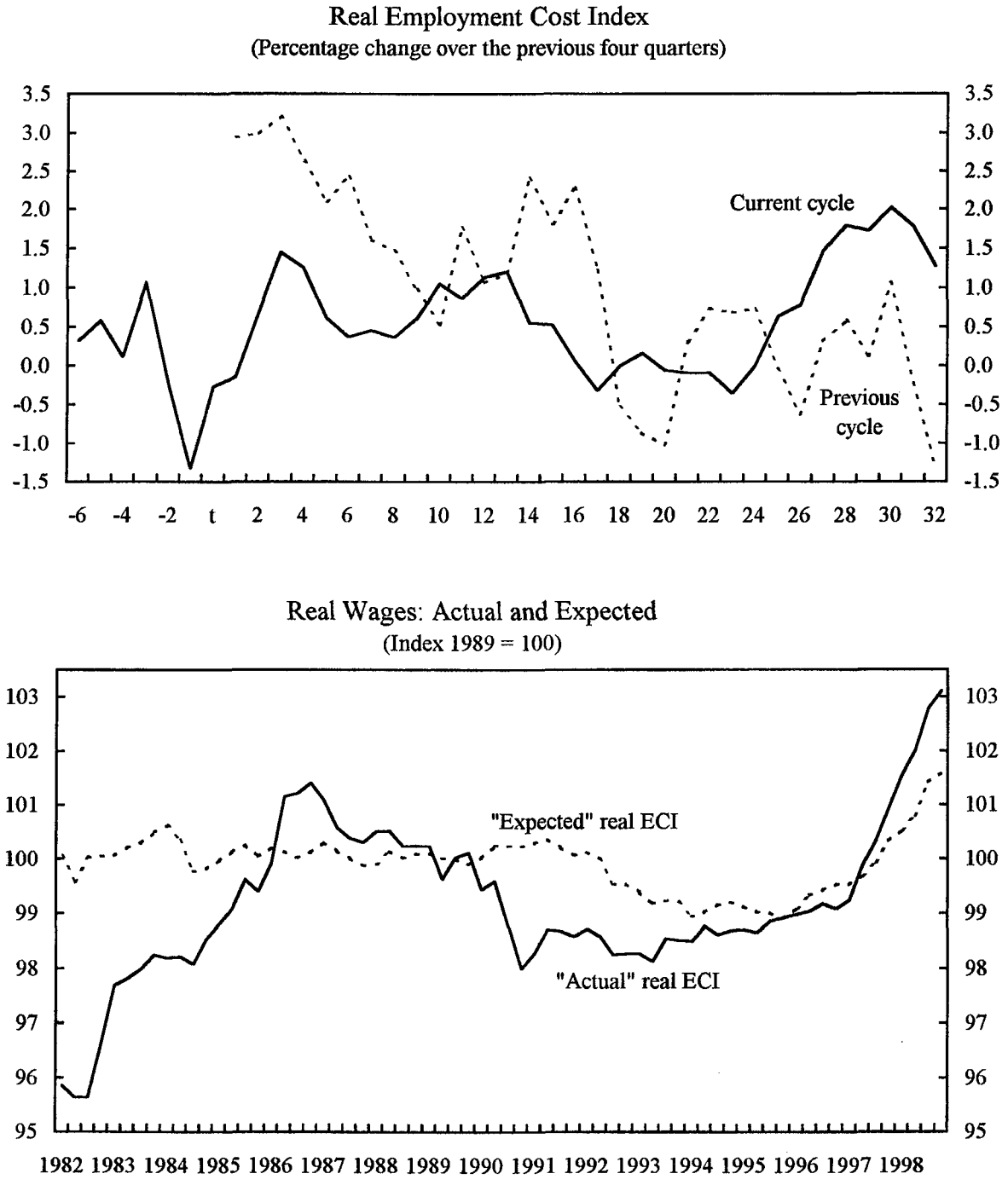
Figure 1. United States: Wage and Salary Component of the Employment Cost Index (ECI)

(Percentage change over the previous four quarters)



Sources: IMF staff estimates; and Bureau of Labor Statistics.

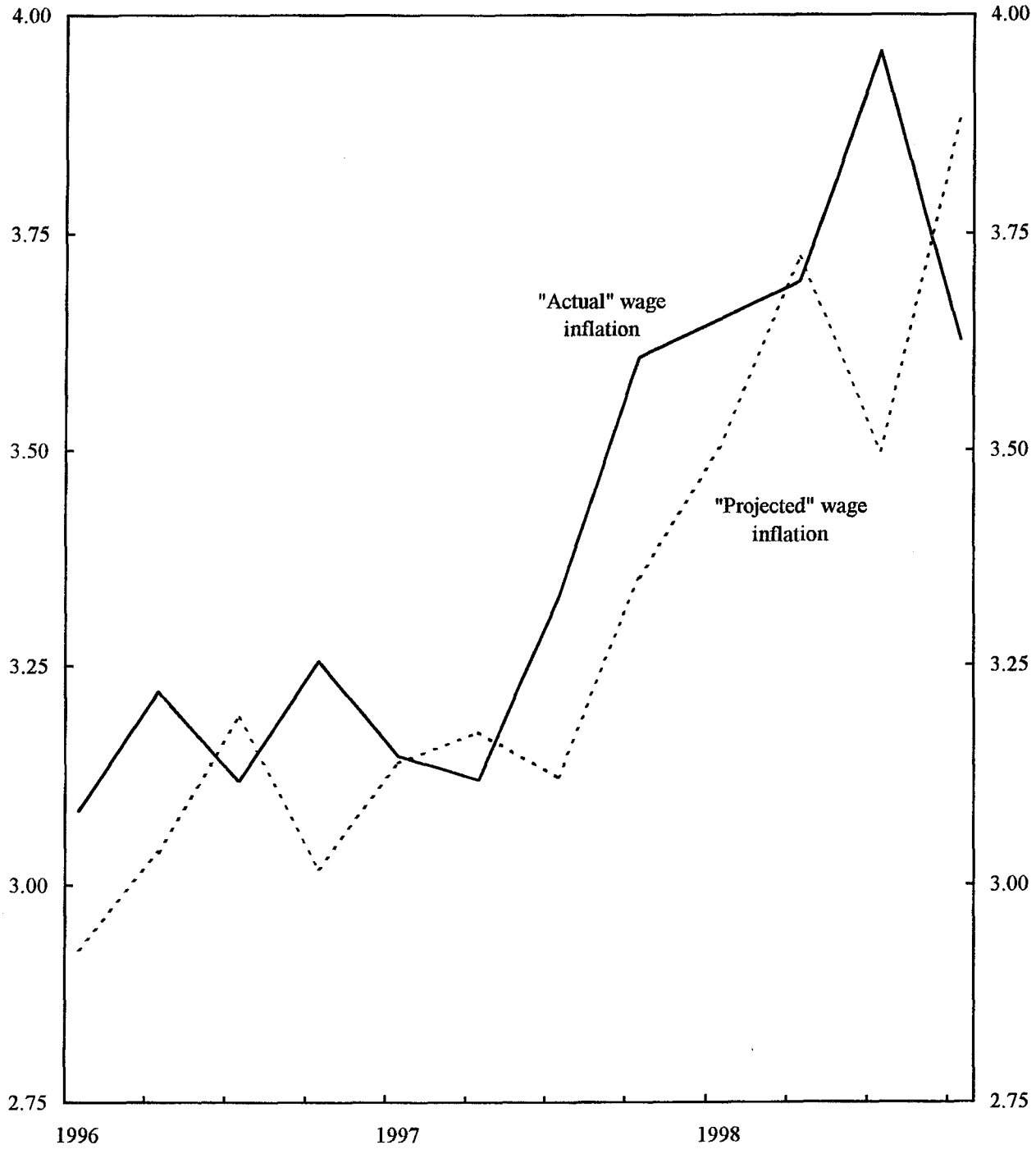
Figure 2. United States: Real Employment and Real Wages



Sources: IMF staff estimates; Bureau of Labor Statistics; and Livingston Survey.

Figure 3. United States: Actual and Projected Wage Inflation

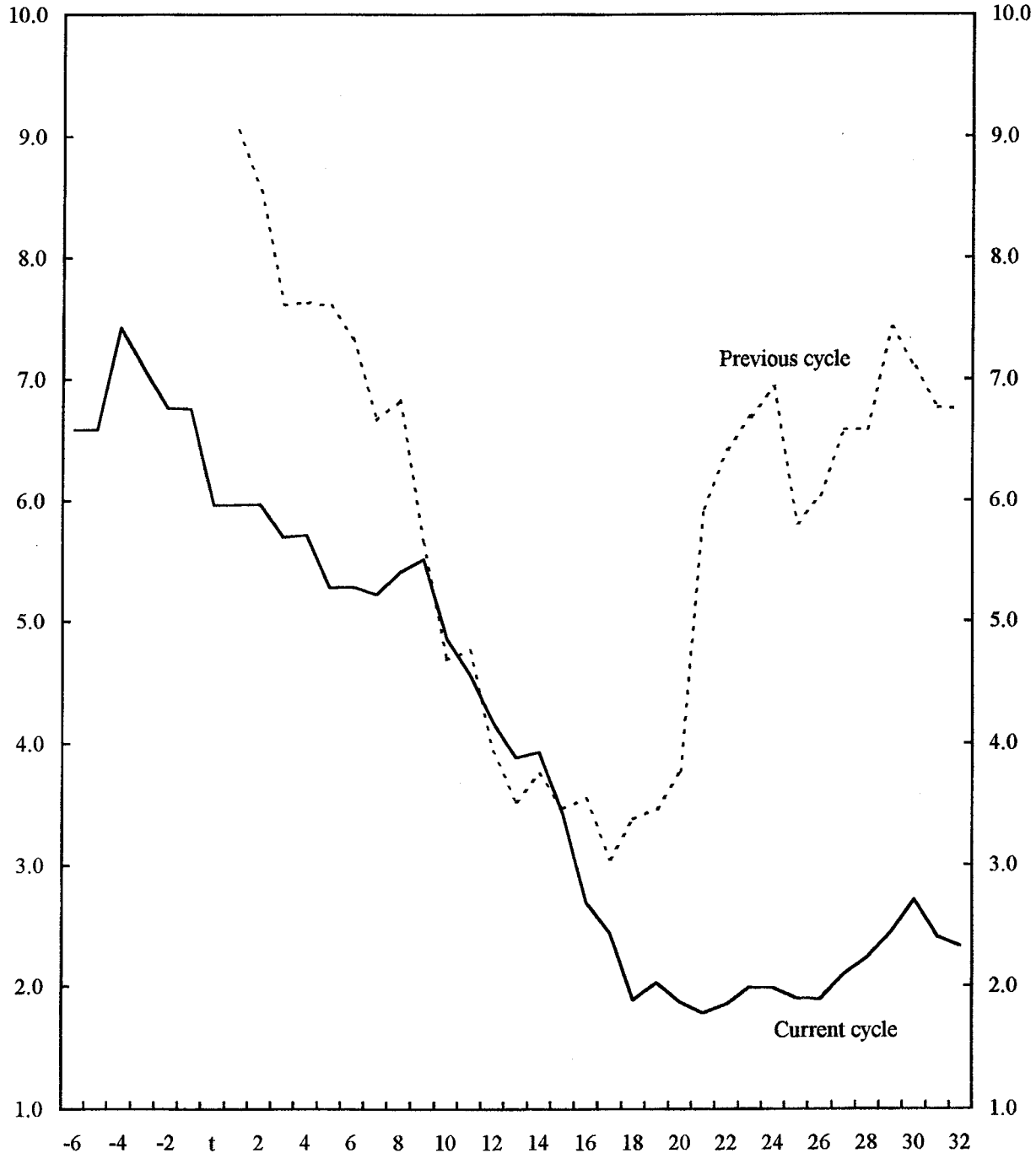
(Percentage change over the previous four quarters)



Source: IMF staff estimates.

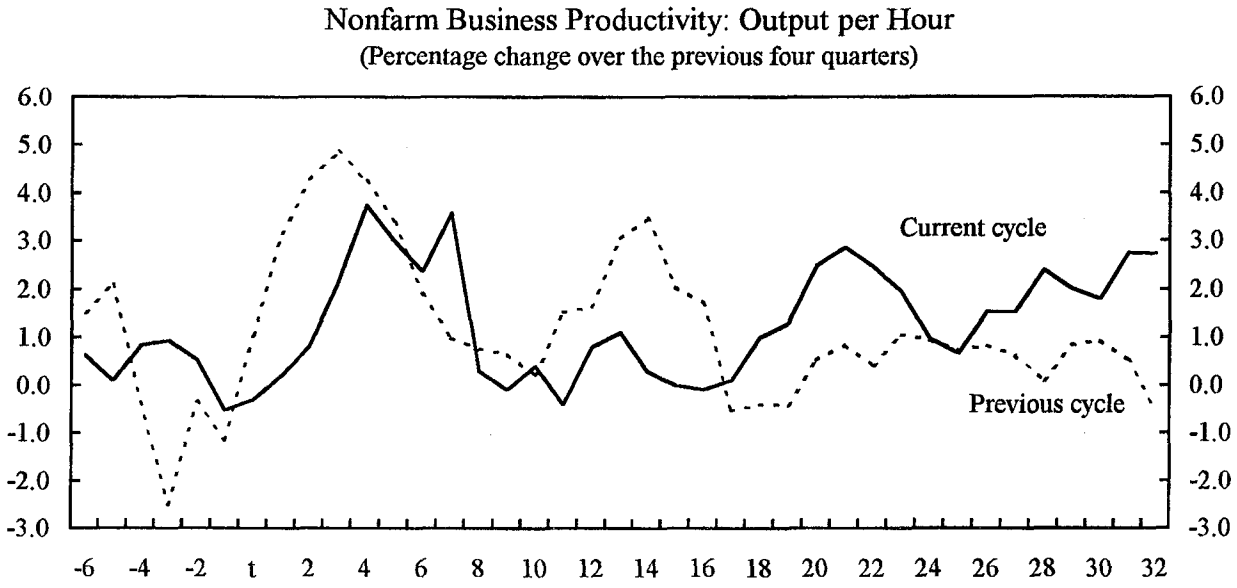
Figure 4. United States: Benefit Component of the Employment Cost Index

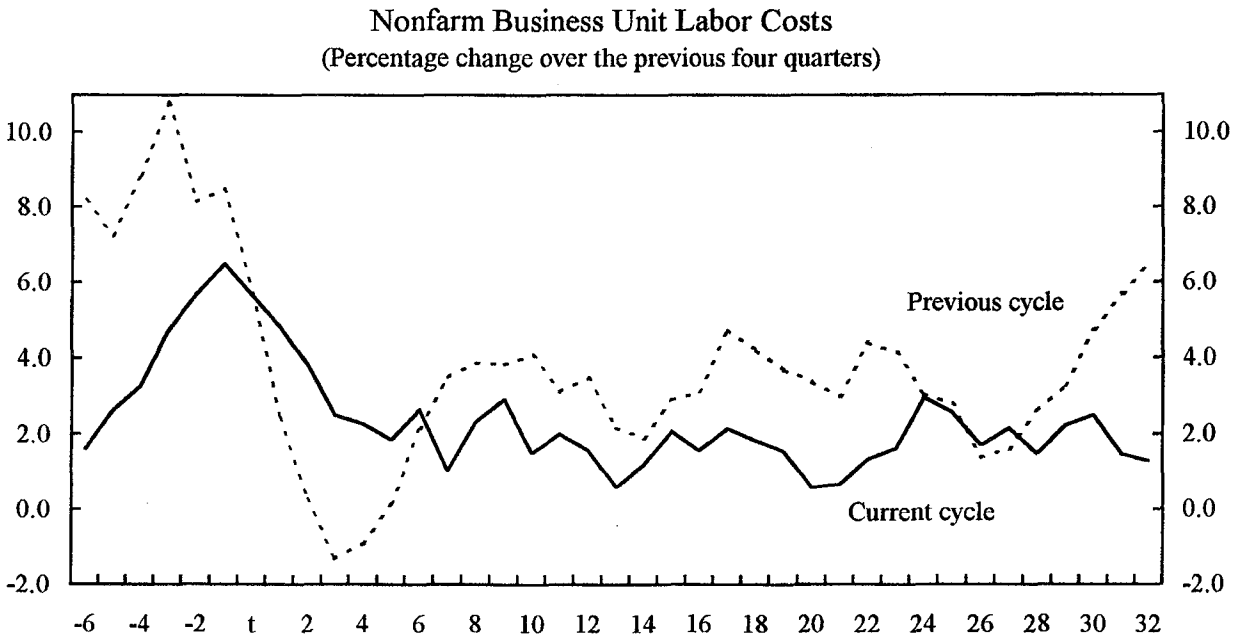
(Percentage change over the previous four quarters)



Sources: IMF staff estimates; and Bureau of Labor Statistics.

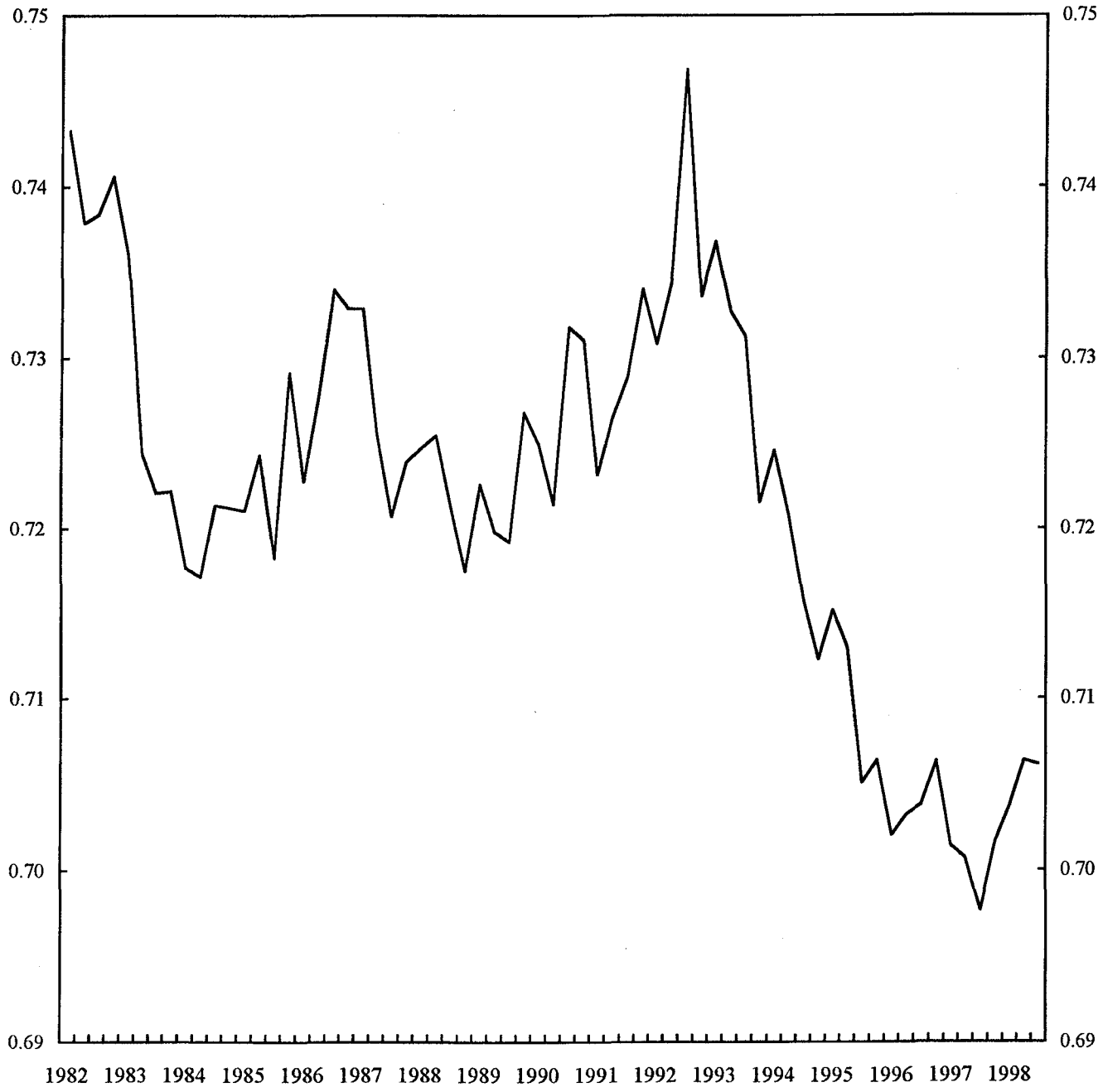
Figure 5. United States: Productivity and Unit Labor Costs





Sources: IMF staff estimates; and Bureau of Labor Statistics.

Figure 6. United States: Labor's Share in the Corporate Sector 1/

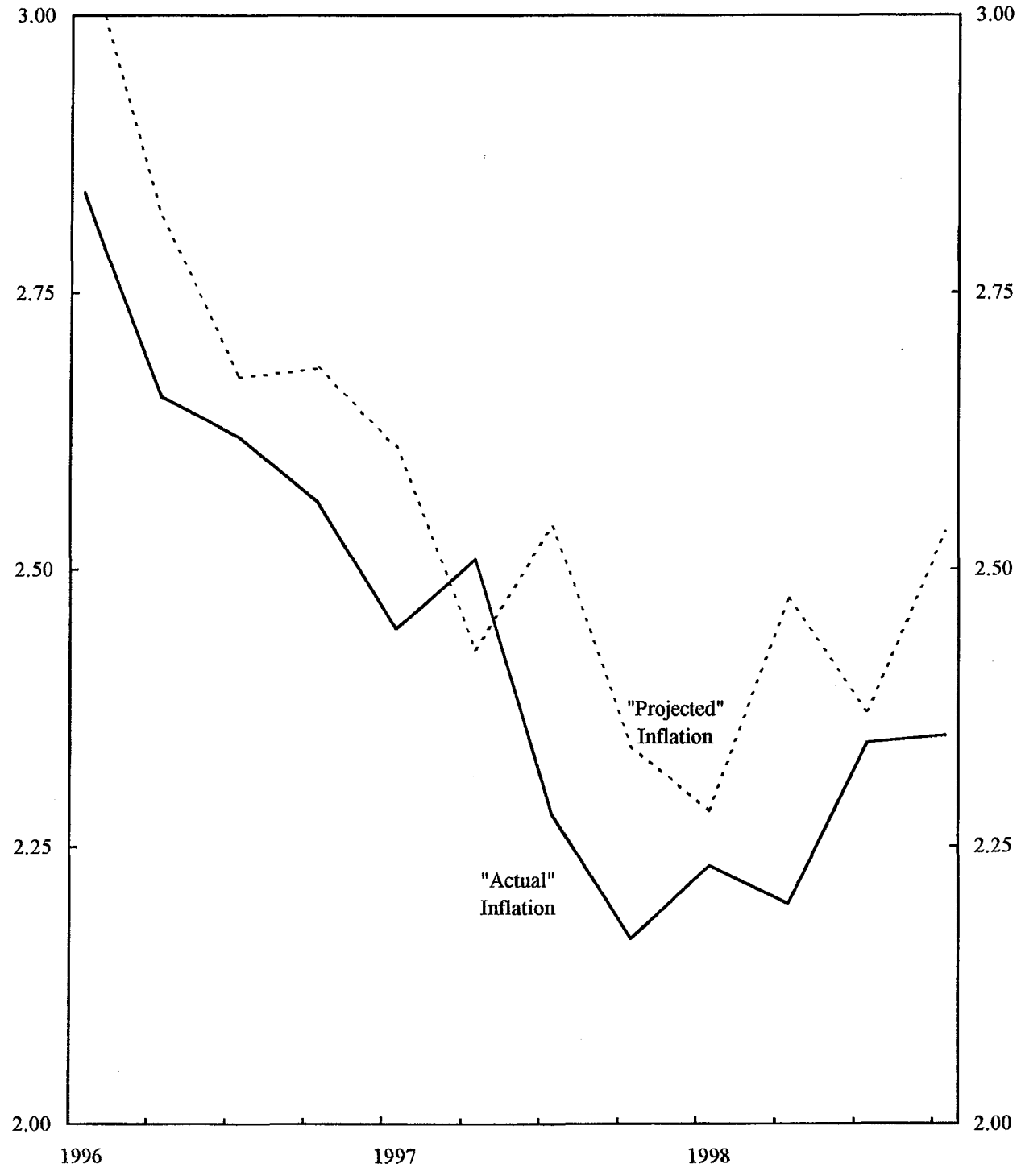


Sources: IMF staff estimates; and Bureau of Economic Analysis.

1/ Labor's share is defined as total renumeration to labor expressed as a percent of the value of output in the corporate sector.

Figure 7. United States: Actual and Projected Inflation

(Percentage change over the previous four quarters)



Source: IMF staff estimates.

III. Productivity Trends in the United States[1]

1. Productivity in the United States has experienced significant gains during the past few years following a prolonged slowdown beginning in the early 1970s, after the first oil-price shock. Standard measures of total factor productivity (TFP) based on the growth accounting methodology indicate that TFP slowed from an average annual rate of increase of 1½ percent in 1960–74 to an annual growth rate of ⅛ percent in 1975–90. During the 1990s, TFP has experienced a recovery, growing at an annual rate close to ½ percent (Figure 1).

2. In order to better understand the nature of the slowdown, it is useful to decompose TFP into two components: investment-specific productivity change (ISP) and technologically neutral productivity change (TNP). ISP captures technological improvements embodied in new equipment and machinery and is closely related to the notion of technological progress. TNP largely captures the changes in productivity associated with the organization of capital and labor in productive activities. This decomposition illustrates the dependence of TFP not only on technical advances but also on how these advances are adopted.

3. A sharp decline in TNP growth after the first oil-price shock in the mid-1970s more than accounted for the slowdown in TFP growth during the period through the 1980s. After increasing at an average annual rate of 1½ percent in 1960–74, TNP growth is estimated to have declined on average by ¼ percent a year during 1975–90. TNP began to grow again at an annual rate of ½ percent in the 1990s, perhaps reflecting efficiency gains from the corporate downsizings and restructuring that took place in the late 1980s and early 1990s. In contrast, ISP growth held relatively steady at an annual rate of 2 percent in the 1960s, 1970s, and 1980s. In the 1990s, however, it has picked up sharply, averaging 3½ percent a year.

4. The growth-accounting framework to measure TFP was first introduced in Solow (1957). The main assumption is that growth in the production of goods is equal to the weighted average of the growth in inputs of the aggregate production function plus the growth of TFP (also referred to as Solow residual). In this framework, TFP captures both the state of technology and innovation, as well as how efficiently capital and labor are organized in the production process.

5. One of the problems associated with the measurement of technical progress in the growth-accounting framework is that all vintages of capital equipment are treated alike in terms of their productivity—one unit of new capital has the same value as one unit of old capital. However, advances in technology tend over time to be embodied in the latest vintages of capital equipment (which is the definition of ISP). Therefore, new machines are more productive than the ones they replace. Consequently, each new unit of investment can be thought of as increasing the capital stock by q units if measured in units of the previous vintage of equipment. The price of a new unit of capital also can be thought of as being

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[1]Prepared by Jorge A. Chan-Lau.

q times the price of an old unit of capital. Thus, growth in ISP can be tracked by movement in the relative price series q. This series can be approximated by the ratio of the implicit price deflator for personal consumption expenditures on nondurable consumption goods and services (excluding housing services) and the implicit price deflator for producer durable equipment.[2] Estimates of ISP were constructed following the methodology developed by Greenwood, Herkowitz, and Krusell (1997).[3] q was estimated using the chain price indexes for personal consumption expenditures for nondurable goods and services and producers durable equipment from the U.S. National Income and Product Accounts.[4]

6. TNP represents sources of productivity growth that affect the organization of capital and labor in the production process, including such factors as the skills of the labor force and the nature of its training (which alternatively can be classified as human capital) and organizational structure and management skills.[5] TNP estimates were obtained after solving a general equilibrium vintage capital model that incorporated ISP in the aggregate production function. At first glance, it appears puzzling that the significant gains in ISP have not been accompanied by corresponding gains in TNP. However, the efficient utilization of newly introduced technologies historically has tended to be preceded by an adoption and learning period during which efficiency decreases as changes in the organizational structure of the production units

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[2]From the definition of ISP and, for simplicity, by assuming a one good economy, one unit of investment can be seen as producing q units of capital in the next period, and the relative price of capital equipment in terms of the consumption good is equal to $1/q$ in a competitive equilibrium. q then can be expressed as the price of nondurable consumption goods and services relative to the price of capital equipment. See Greenwood et al (1997), Greenwood and Jovanovic (1998), and Hornstein and Krusell (1996) for details.

[3]Estimates for ISP in Greenwood, Herkowitz, and Krusell (1997) were made through 1992 and were based on NIPA data prior to the substantial revisions made to the data in 1997.

[4]Alternatively, ISP can be estimated using the Tornqvist index methodology proposed by Gordon (1990) and used in previous studies of ISP (Greenwood et al., 1997, and Krusell et al., 1997). The Tornqvist index is a cumulative exponential index of growth rates, each of which aggregates the underlying subcomponent growth rates by a weighted average of the expenditure shares in the two periods used to compute the growth rate. In contrast, the chain-price index is based on the Fisher formula and equal to the geometric mean of a Laspeyres price index for the previous period and a Paashe price index of the current period. Both indexes avoid the problems related with fixed-weighted indexes. The Tornqvist ISP index grows consistently faster than the chain-price ISP index. Nevertheless, both indexes show that ISP has grown at a higher rate since the late 1980s.

[5]See Lindbeck and Snower (1995) for a review of the economic literature on organizational change.

are being introduced.[6] The learning process can last a considerable period of time during which TFP growth slows down or even declines as the gains in ISP are offset by the losses of TNP,[7] a phenomenon widely documented at the industry level.[8] Hence, it is not surprising that the "downsizing" of firms and the adoption of new information technologies in the late 1980s were associated with negative or stagnant TNP growth.[9] At some later stage of the reorganization and learning period, TNP should start to show signs of recovery, as production processes combine labor and equipment more efficiently, as has generally been the case in the 1990s.

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[6]See Mokyr (1994) for a detailed analysis of the Industrial Revolution in Britain, Gallman (1992) for a similar study of the United States during the Antebellum period, and David (1991) for a chronicle and analysis of the introduction of the electric motor in United States.

[7]Hornstein and Krusell (1996).

[8]Jovanovic and Nyarko (1995) document learning curves for a variety of industries and activities.

[9]Greenwood and Yorukoglu (1997) and Yorukoglu (1998).

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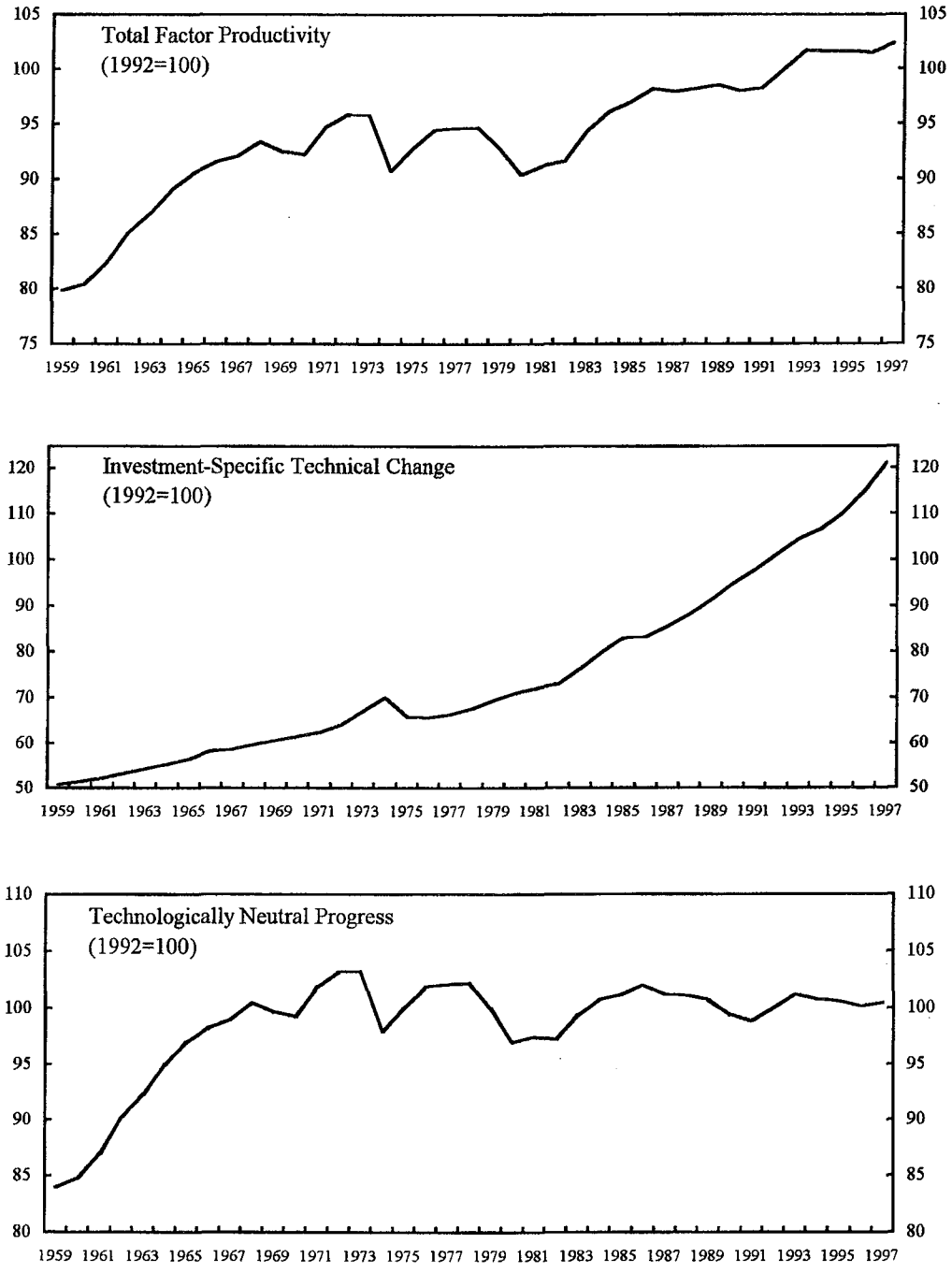
Figure 1. United States: Productivity Measures



Sources: Bureau of Economic Analysis; and IMF staff estimates.

IV. Potential Implications of a Sharp Correction in U.S. Stock Prices[1]

1. The sharp rise in U.S. stock prices over the past four years has raised concerns about a bubble in the market and the potentially adverse consequences for the economy in the event that such a bubble bursts. Following a sharp correction in August–October 1998, stock prices recovered in the latter part of 1998, and they have reached new all-time highs in mid-1999. Concerns about a stock market bubble have also revived the debate as to whether the reforms that have been implemented in the U.S. equity market over the last ten years are sufficient to avoid a repeat of the disruptions that took place during the October 1987 crash in the event of a similar collapse in prices.

2. According to traditional indicators of stock market valuation, reconciling current valuation levels in terms of investors' risk premia or expected real earnings growth is possible, but difficult to justify in terms of the historic averages for these variables. If there were to be a sharp correction in stock prices, it would affect the economy directly primarily through consumption, but the magnitude and length of these effects are subject to considerable uncertainty. Indirect effects through the financial system could have more detrimental effects on the economy. In this regard, structural and regulatory reforms implemented in the securities market since the 1987 crash appear to have significantly improved the ability of the market to withstand the strains associated with a sharp decline in stock prices in a relatively short period of time. Although the experience from the October 1997 stock market correction provides some support to this view, it still remains uncertain whether the existing market infrastructure can withstand more severe and sustained declines.

A. What Do Traditional Indicators Suggest for Stock Prices?

3. Traditional indicators of stock market valuation have generally moved far out of line with historical norms. For instance, in the first five months of 1999, the price-earnings (P/E) ratio for the S&P500 stocks was 35, compared to a post-World War II average value of 17.[2] The dividend yield for S&P500 stocks stood at 1¼ percent, compared to a post-war average of 3½ percent. Deviations in the P/E and the dividend yield from their historical averages have been frequent and highly persistent (Figure 1).

4. The current P/E ratio would suggest that investors may have developed unreasonable expectations as to the future growth of corporate earnings. Since 1994, real earnings per share have grown at a 6 percent annual rate. In contrast, during the post-war period, real earnings

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[1]Prepared by Martin Cerisola and Alex Keenan.

[2]This average is calculated for the period 1954–98, excluding the higher-inflation subperiod 1970–84. This subperiod is excluded because the price/earnings ratio was biased downward, owing to earnings being inflated largely on account of inventory profits.

growth has been in line with the growth rate of real GDP, reflecting the fact that the capital share of national income has been relatively stable over time. The valuation of stocks based on a constant-growth model shows that the current P/E ratio would imply that investors expect real earnings to continue to grow by 6¼ percent a year, if it is assumed that the dividend payout ratio and the equity premium return to their historic averages of 50 percent and 4½ percentage points, respectively (Table 1). If, instead, expectations for real earnings growth were to move back down in line with real output growth, then this would suggest that investors were willing to accept an equity premium of only 1 percentage point. Alternatively, if the risk premium was 6 percent (its average over the period 1985–94) and the dividend payout ratio was 40 percent (its average over the period 1995–98), then a P/E ratio of 35 would suggest that investors expect real earnings growth of 7¾ percent, which would require an unrealistic sustained increase in the share of corporate profits in GDP.[3]

5. The implications for future returns of current dividend-yield levels are less certain given that part of the trend decline in the dividend-yield may have been associated with a shift in corporations' dividend policy. For tax considerations, corporations have increasingly relied on share repurchases rather than on dividends to make cash payments to their shareholders since the mid-1980s. The value of S&P500 stocks repurchased has increased steadily since the early 1980s, rising from US$8 billion in 1983 to about $140 billion in 1998 (Table 2). Gross issues and repurchases have accelerated sharply since 1995, with net repurchases of stocks rising from roughly US$11 billion in 1994 to US$64 billion in 1998. Adjusting the S&P500 dividend yield for an estimate of net repurchases of S&P500 stocks (Figure 2) suggests that its decline has been less severe, but it is still below its adjusted historical average.[4]

6. Whether net repurchases of stocks by corporations help predict future returns is also subject to considerable uncertainty. In principle, corporations would be expected to reveal their superior knowledge about the fundamental value of their equity, and hence of future returns, by repurchasing undervalued stocks and issuing overvalued ones (Nelson, 1999). In these terms, the sharp increase in net repurchases of stocks over the past few years would seem to suggest that corporations perceive stocks to be undervalued. However, the recent

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[3]The results of two multivariate econometric models show that most of the parameters characterizing fluctuations in excess returns become highly unstable after 1995. In particular, these models that aim at explaining fluctuations in the excess return on the S&P500 in terms of deviations of a risk-free interest rate from its trend, the dividend yield, and the payout ratio, and, alternatively; in terms of prices, dividends, and earnings, all normalized by a moving average of earnings, also reveal structural breaks during periods associated with sharp market corrections such as in 1987.

[4]This adjustment implicitly assumes that the dollar value of stock issuance and purchases closely matches the actual number of shares exchanged. However, it may be the case that the issuance and repurchase of certain stocks may have been done at prices different from market values.

upward trend in net repurchases of stocks may also be the result of incentives faced by corporate managers. With corporate compensation increasingly tied to stock options, stock repurchases have increased firms' return on capital and the value of managers' stock options.[5] Managers may have financed stock repurchases by primarily increasing leverage, whose negative effects on firms' cash flows may have been partly offset by the decline in interest rates and rising stock prices that has occurred over the last few years.

7. Another traditional indicator of corporate performance is Tobin's q, which is defined as the ratio of the market value of firms to the replacement cost of their capital.[6] In theory, when q equals or exceeds 1, firms use their capital efficiently, as they have been able to allocate resources in a way that exceeds the alternative-use value of assets, as proxied by the replacement cost. Tobin's q has been rising significantly since 1995, reaching 1.4 in 1998, compared with its historical average of 0.6 (Figure 3). While Tobin's q exhibits a tendency to revert to its historical average, suggesting that a sharp correction in stock prices should take place in the period ahead, deviations from its mean value have been highly persistent in the post-war period.[7] In addition, the increased importance of new technology firms may have contributed to shift the equilibrium value of q upwards, as the value of these firms may depend heavily on the ideas and human capital of their workforce rather than on their capital stock. Nevertheless, current q levels show that use of resources by the nonfarm, nonfinancial business sector is being priced at historically unprecedented levels.

8. Following the October 1997 stock market correction, and the events associated with Long-Term Capital Management's (LTCM) demise in September 1998 and with the turmoil in emerging capital markets last summer, a significant proportion of the rise in equity prices has been attributable to large capitalization stocks. Concerns about the potential implications from these events for mid-cap and small-cap firms' earnings may have induced a "flight to quality," with investors shifting their portfolios toward large-cap stocks. Some observers interpreted this shift as evidence that the U.S. equity market may have been losing momentum, and that it could signal a price correction in the period ahead. In fact, several indicators confirm that the dispersion of returns across stocks with different capitalization levels has increased considerably over the last two years. The ratio of the S&P100 to the S&P500 has increased markedly since the October 1997 market correction, and especially, since the third quarter of 1998 (Figure 4). Likewise, the ratios of the S&P100 and S&P500 to the Russell 2000 has also been

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[5]In addition, Carr Bettis et. al. (1999) explain that managers have increasingly hedged the value of their holdings of stock options against the risk of an adverse stock-price movement through the use of several trading strategies such as zero-cost collars and equity swaps.

[6]Tobin's q is calculated based on the nonfarm, nonfinancial corporate business sector balance sheet, as reported in the Federal Reserve Flow of Funds Accounts.

[7]Tobin's q was above its average between 1958 and 1972 (15 years) and below it from 1973 to 1991 (19 years).

trending upwards sharply since October 1997, and their current levels may suggest that stocks remain vulnerable to potential adverse shocks, as their present levels exceed those prior to the October 1987 crash and the 1991 recession.[8]

9. Additional evidence related to S&P500 value and growth stocks[9] shows that, since 1994, the rise in equity prices for growth stocks has outpaced value stocks, reaching in early 1999 levels not seen over the last 25 years (Figure 4). Part of the relative underperformance of value stocks may be related to the fact that firms in this category have traditionally been more dependent on commodity prices and energy and on higher inflation rates. Also, investors' expectations about technology and telecommunication firms' growth prospects may have improved considerably over the last few years. In fact, computer and technology stocks have increased their share in the S&P500's market capitalization markedly, rising from 8½ percent in 1988 to about 18 percent at present, which has contributed to the sharp rise in the S&P500's P-E ratio.

10. Based on these traditional indicators and models, it would appear that stock prices may have moved significantly out of line with their fundamental determinants, but such a judgement cannot be made with a high degree of confidence.[10] Investors' expectations of high real-earnings growth might be realized over the next few years as firms continue to experience gains in productivity (and profitability) associated with the adaptation of computer technology and other technological advances. It is also possible that the equilibrium-equity premium has fallen. Innovations in financial markets have made it easier and more cost effective for individuals to hold diversified stock portfolios. At the same time, the increased availability of self-directed, tax-deferred retirement accounts has increased the demand for stocks, and changes in favorable income tax treatment afforded to capital gains also may have boosted demand for equities.

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[8]In addition, the ratios of the Dow Jones Industrial Average to the S&P100 and S&P500 companies have recovered sharply since February 1999, following steady declines since the beginning of the Asian crisis in mid-1997.

[9]Value stocks are those that exhibit low price-earnings or price-to-book ratios, while growth stocks are those that exhibit high price-earnings or price-to-book ratios.

[10]Campbell and Shiller (1998) note that valuation ratios may have departed significantly from their historical averages as a result of a trend shift in investors' attitudes toward stocks. In particular, they explain that baby boomers may be driving stock prices up, and such a trend would influence valuation ratios as long as this demographic effect persists. Poterba (1998) finds weak support for demographic factors driving stock returns.

B. The Real-Side Consequences of a Sharp Decline in Stock Prices

11. The real-side consequences of a sharp decline in stock prices takes into account not only the standard effects on aggregate demand—on consumption and investment through a decline in wealth and a higher cost of capital—but also emphasizes dynamic aspects related to credit and collateral and how their interaction poses systemic risks on financial institutions with further potentially severe consequences on economic activity.

12. While empirical analyses suggest that the long-run impact on consumption of an adverse shock to household equity wealth may not be significantly high but subject to considerable uncertainty, more recent theoretical literature seems to suggest that a sharp decline in stock prices could potentially be highly detrimental to economic activity. Recent studies[11] indicate that the estimated marginal propensity to consume out-of-stock market wealth ranges between 3 and 7 percent, and that estimates of wealth effects are highly unstable across periods, and have even declined in more recent periods.[12] Taking the mid-point of this range, a 25 percent drop in stock prices would reduce wealth by about $3 trillion and consumption by around $150 billion (about 1¾ percent of GDP) after two years. However, the effect of such a decline in stock prices could be less than this estimate suggests, because such a decline would return prices to roughly their levels of last year, and a portion of the increase in wealth since that time has probably not yet been reflected in the level of consumption.[13] Moreover, the analysis of personal savings behavior presented in Chapter 5 of this paper, which controls for the effects of improved access to credit by households, suggests that a correction in equity prices would have a significantly smaller effect on consumption. Fixed investment might also be adversely affected, but the effect is likely to be more indirect through business confidence and a higher cost of capital. Equity issuance has not been a major source of funding for investment in the corporate sector as a whole; as explained above, corporations have made large net repurchases of stocks in recent years, while significantly increasing their net debt.

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[11]OECD (1998), Starr-McCluer (1998), and Ludvigson and Steindel (1998).

[12]No evidence of instability or recent change in the marginal propensity to spend out-of-stock market wealth was found in an error-correction model that explains real consumption as a function of real disposable income, a measure of improved access to credit by households, and household real holdings of equity and non-equity wealth.

[13]Runkle (1988) presents some evidence that the strength in economic activity and confidence observed after the 1987 crash was possibly due to the fact that the large increase in stock prices in the year prior to the crash may not have been associated with an increase in permanent wealth. In his view, had price increases during the first half of 1987 been incorporated into permanent wealth, the consumption of durable goods should have increased rather than actually decreased in that period.

13. A sharp decline in equity prices may adversely affect the economy indirectly through the financial sector. Since financial markets are incomplete, the intermediation of claims requires significant market-making and information-gathering services; but as the real costs of these services usually rise at times of distress, the effectiveness of intermediating claims toward certain groups of borrowers is usually significantly impaired, which induces a sharp contraction of credit and output.[14] Kiyotaki and Moore (1997) have also emphasized that the dual role played by durable assets as an input in production and as collateral for loans results in a powerful propagation mechanism by which the effects of certain shocks persist and spread out across the economy.

14. Traditionally, commercial banks in the United States have not directly financed purchases of stocks.[15] However, banks have more recently experienced a sharp increase in equity derivative and swap transactions with other market participants, such as hedge funds. In particular, banks have engaged in total return swaps and have provided indirect financing to hedge funds speculating in stocks related to mergers and in U.S. equity volatility derivatives.[16] A sharp correction in U.S. equity prices could trigger significant losses among some market participants in equity derivatives, heightening liquidity and credit risks. This risk may be particularly important since market makers, specialists, and clearing houses have arranged committed credit lines with domestic commercial banks. However, the magnitude and risk of U.S. banks' exposure is difficult to assess, as most of these transactions are off-balance sheet. Notional values for commercial banks' transactions in equity derivatives have increased markedly over the last few years, although, the actual credit exposure or capital at risk associated with these values is usually significantly smaller. Nevertheless, the decline in personal wealth could confront banks with immediate and considerable adverse selection problems among customers who had faced easier access to credit due to the rise in personal wealth. Such a development could intensify a squeeze in household credit and induce higher default rates, with additional adverse consequences for economic activity.

15. The severity of the disruptions experienced by market participants during the October 1987 crash prompted the U.S. authorities to review the existing equity market microstructure and led to the implementation of several structural and regulatory reforms across U.S. equity

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[14]In a very influential paper, Bernanke (1983) has emphasized the role of financial crises and credit squeezes in inducing protracted declines in aggregate demand and output.

[15]Margin credit at broker dealers has risen from 3 percent of total loans and leases by commercial banks in 1995 to 4½ percent in 1998.

[16]In a total return swap, a hedge fund agrees to receive the return of a portfolio of stocks by paying a floating interest rate to an investment bank. Regulation T limits borrowing against equities to 50 percent, although it does not apply to total return swaps, making leverage primarily a function of a U.S. financial institutions credit risk assessment.

markets, primarily targeted at minimizing systemic risk.[17] These reforms have been broadly concentrated on enhancing the operational and financial capacity of markets and members to accommodate sharp increases in the level and volatility of trading volume. The settlement cycle for equity transactions was reduced and payments are being effected with same-day funds. Information-sharing systems on posted collateral across markets have been developed among participants and procedures for cross margining and guaranteeing transactions among clearance houses extended. Market operations have become more transparent, as the Securities and Exchange Commission (SEC) established execution rules and enhanced incentives for market makers not to withdraw from the market at times of distress. These reforms appear to have improved the market's ability to withstand sharp declines in equity prices. According to the SEC, the experience in the October 1997 market crash demonstrates that the market was able to withstand a three-fold increase in transactions to be settled and cleared without major disruptions. Notwithstanding, it still remains less evident whether the market would be able to withstand more severe and sustained declines in equity prices.

[17]For a more detailed description of reforms in the U.S. equity market infrastructure, see the forthcoming International Capital Markets Report.

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Table 1. United States: Price-Earnings Ratio, Expected Earnings, and Equity Premium for S&P500 Stocks

Price Earnings Ratio	Dividend Payout Ratio (Percent)	Annual Growth Rates: Earnings Growth (Nominal)	Annual Growth Rates: Earnings Growth (Real)	Annual, in Percent: Return on Equities	Annual, in Percent: Equity Premium	Annual, in Percent: Interest Rate	Annual, in Percent: Inflation Rate
Current P/E Level							
35	50	8.8	6.2	10.2	4.5	5.5	2.5
35	40	10.5	7.8	11.7	5.9	5.5	2.5
35	50	5.1	2.5	6.5	0.9	5.5	2.5
Historical P/E Average							
17.1	50	5.1	2.5	8.0	2.3	5.5	2.5

Source: Fund staff estimates.

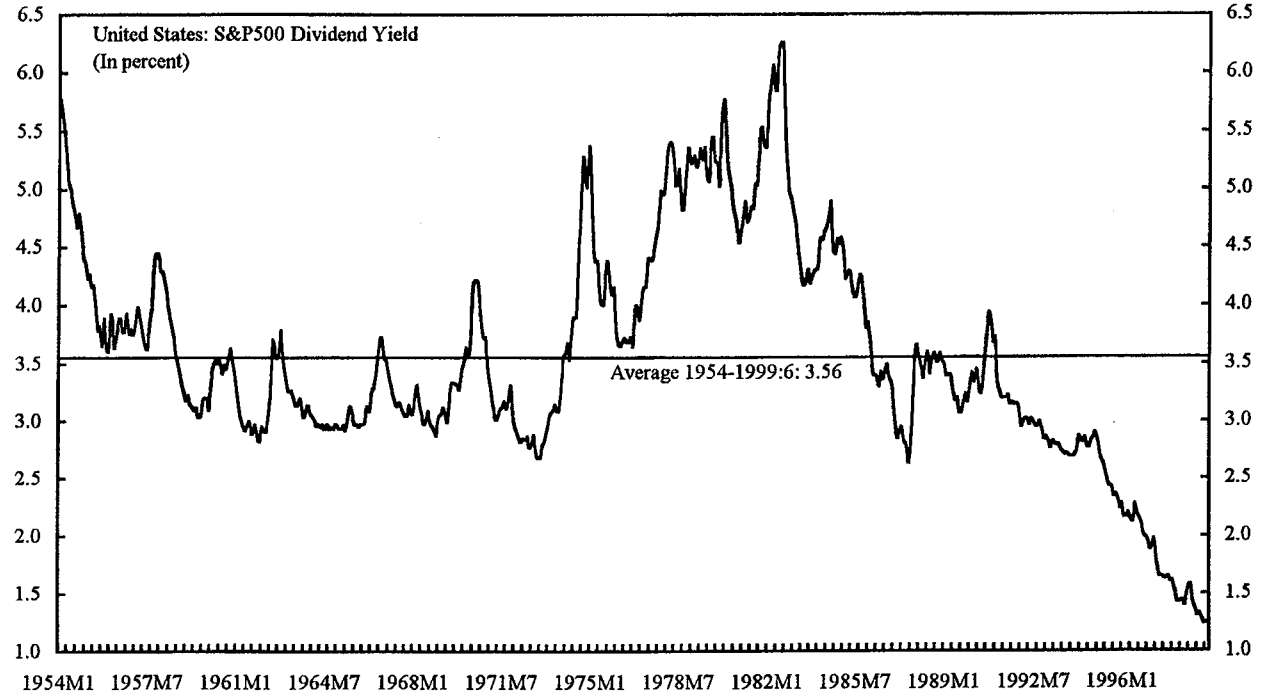
Table 2: Gross Issuance and Repurchases of S&P500 Stocks

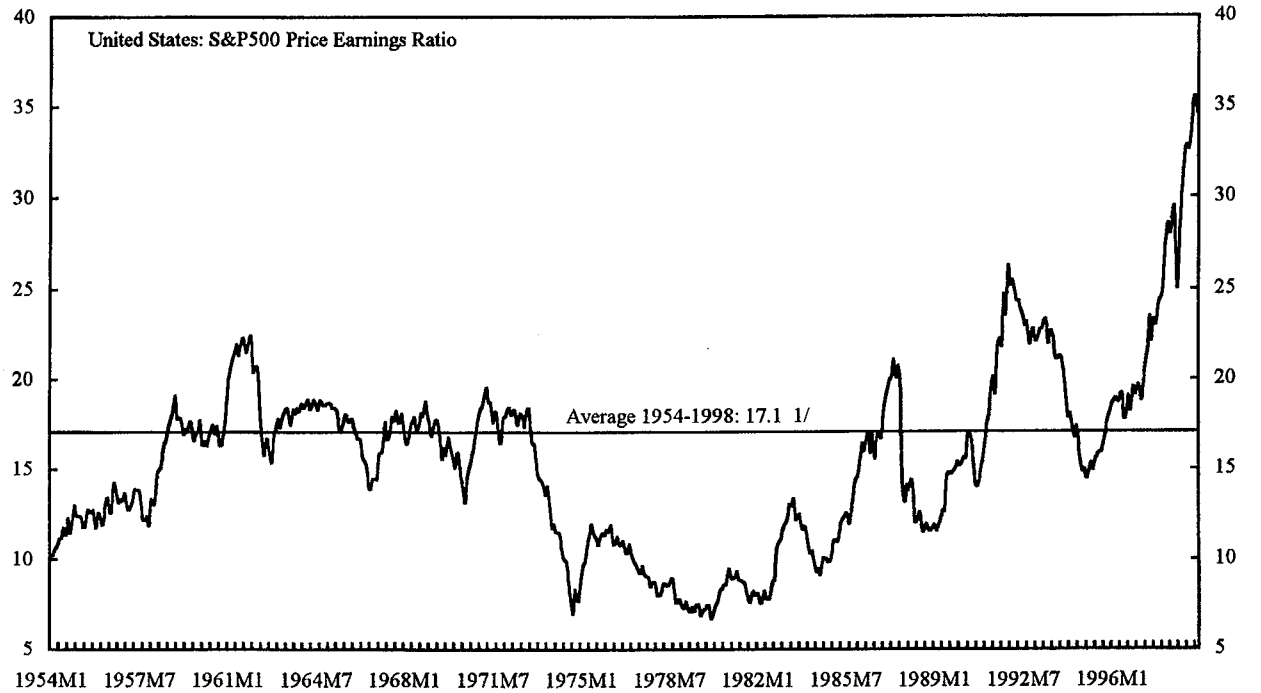
(In billions of U.S. dollars)

	Gross Issuance	Gross Repurchase	Net Repurchase
1975	7.7	0.7	-7.0
1976	9.1	1.1	-8.0
1977	9.9	2.8	-7.1
1978	9.4	2.8	-6.6
1979	13.1	3.4	-9.7
1980	17.4	4.7	-12.7
1981	22.7	4.40	-18.3
1982	25.6	8.2	-17.4
1983	30.1	7.8	-22.3
1984	19.8	26.4	6.6
1985	26.6	40.1	13.5
1986	29.5	38.8	9.3
1987	24.5	45.9	21.4
1988	14.2	46.7	32.5
1989	26.6	42.9	16.3
1990	17.0	38.6	21.6
1991	32.4	21.3	-11.1
1992	38.3	27.7	-10.6
1993	39.6	33.7	-5.9
1994	27.9	38.4	10.5
1995	41.7	58.1	16.4
1996	69.4	84.7	15.3
1997	67.1	110.1	43.0
1998	76.3	140.0	63.7

Sources: Cole, Helwege, and Laster (1996); and Fund staff estimates.

Figure 1. United States: S&P500 Dividend Yield and Price Earnings Ratio

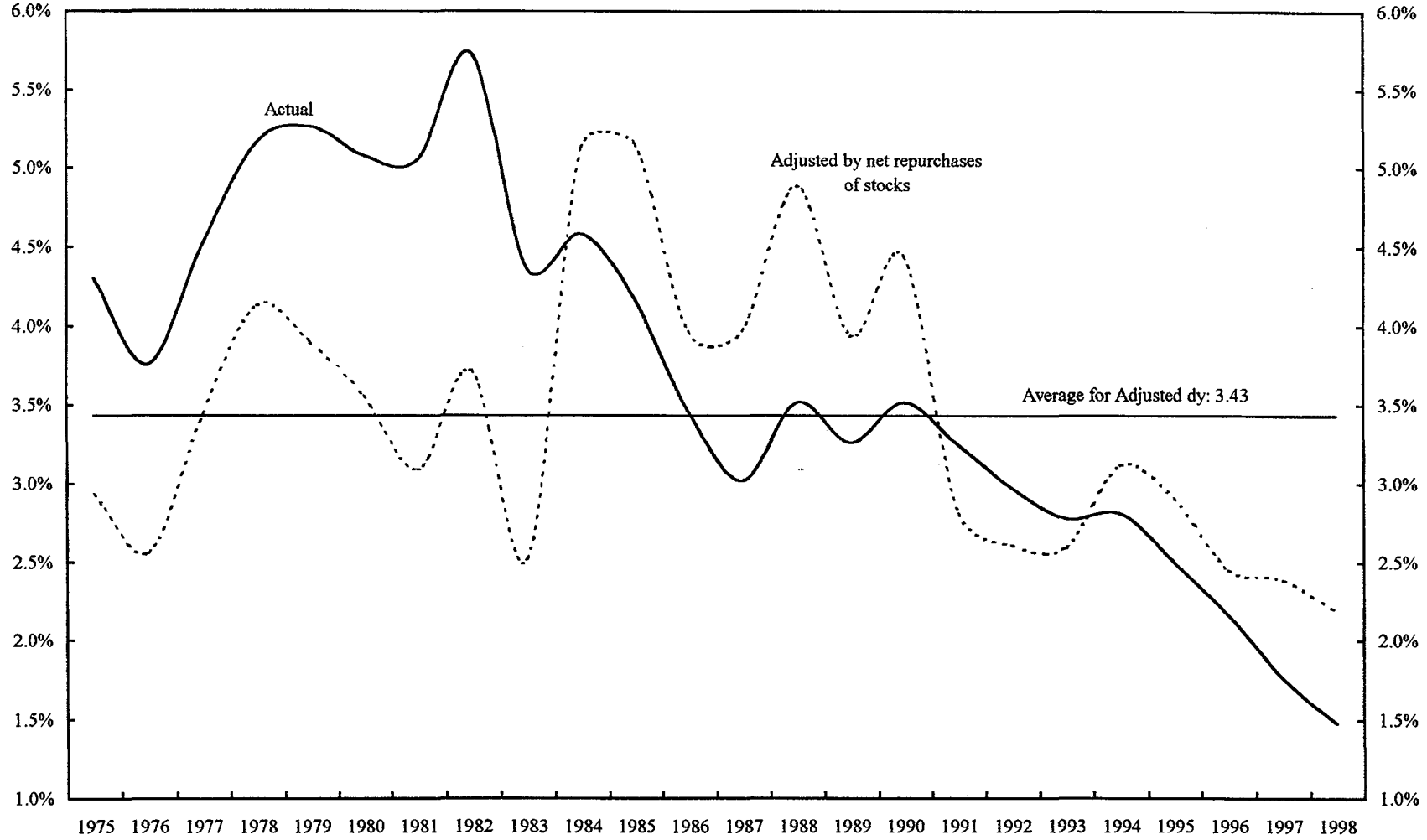




Source: Standard and Poor's.

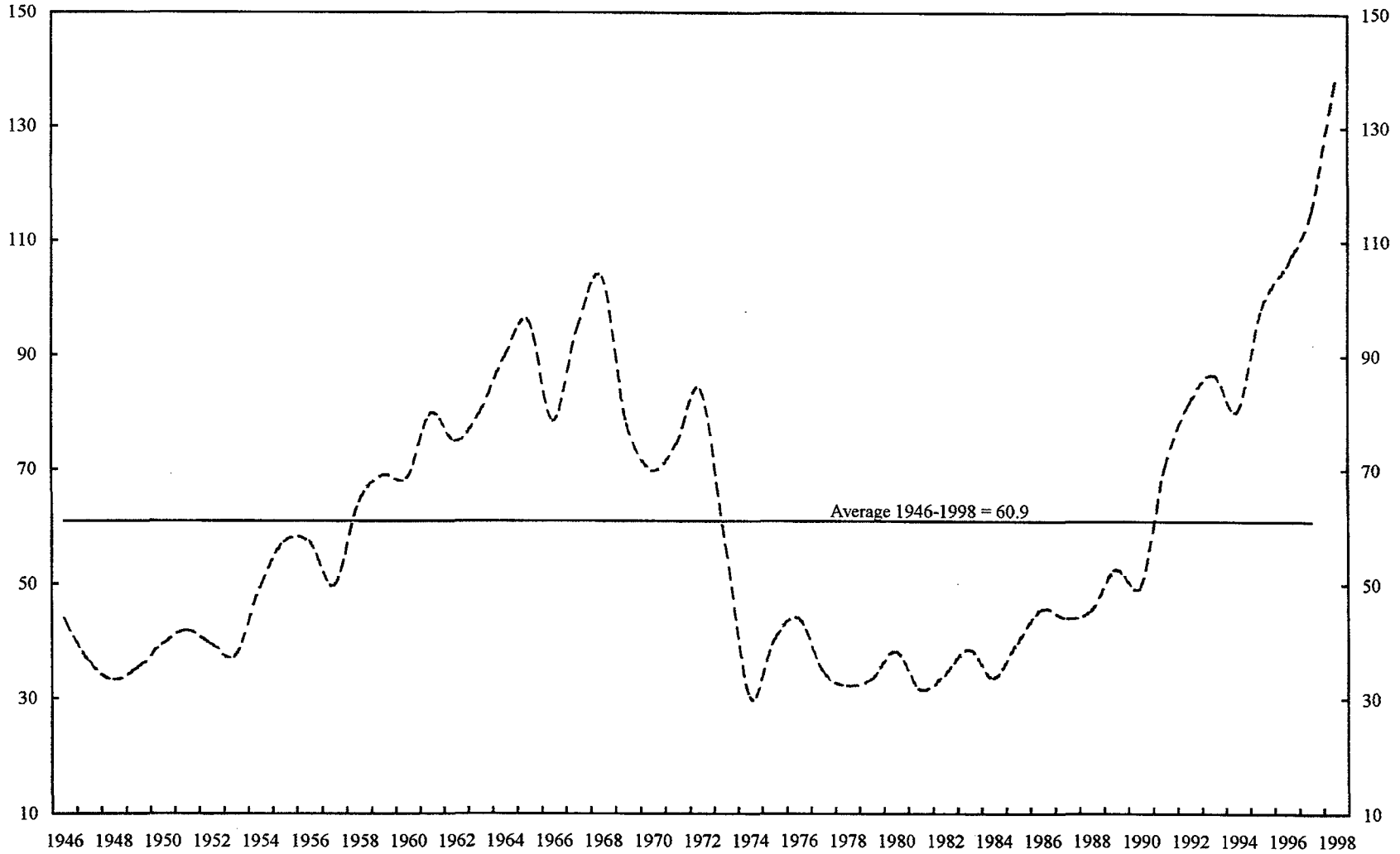
1/ The average excludes the higher inflation subperiod of 1970-84.

Figure 2. United States: S&P500 Dividend Yield
(In percent)



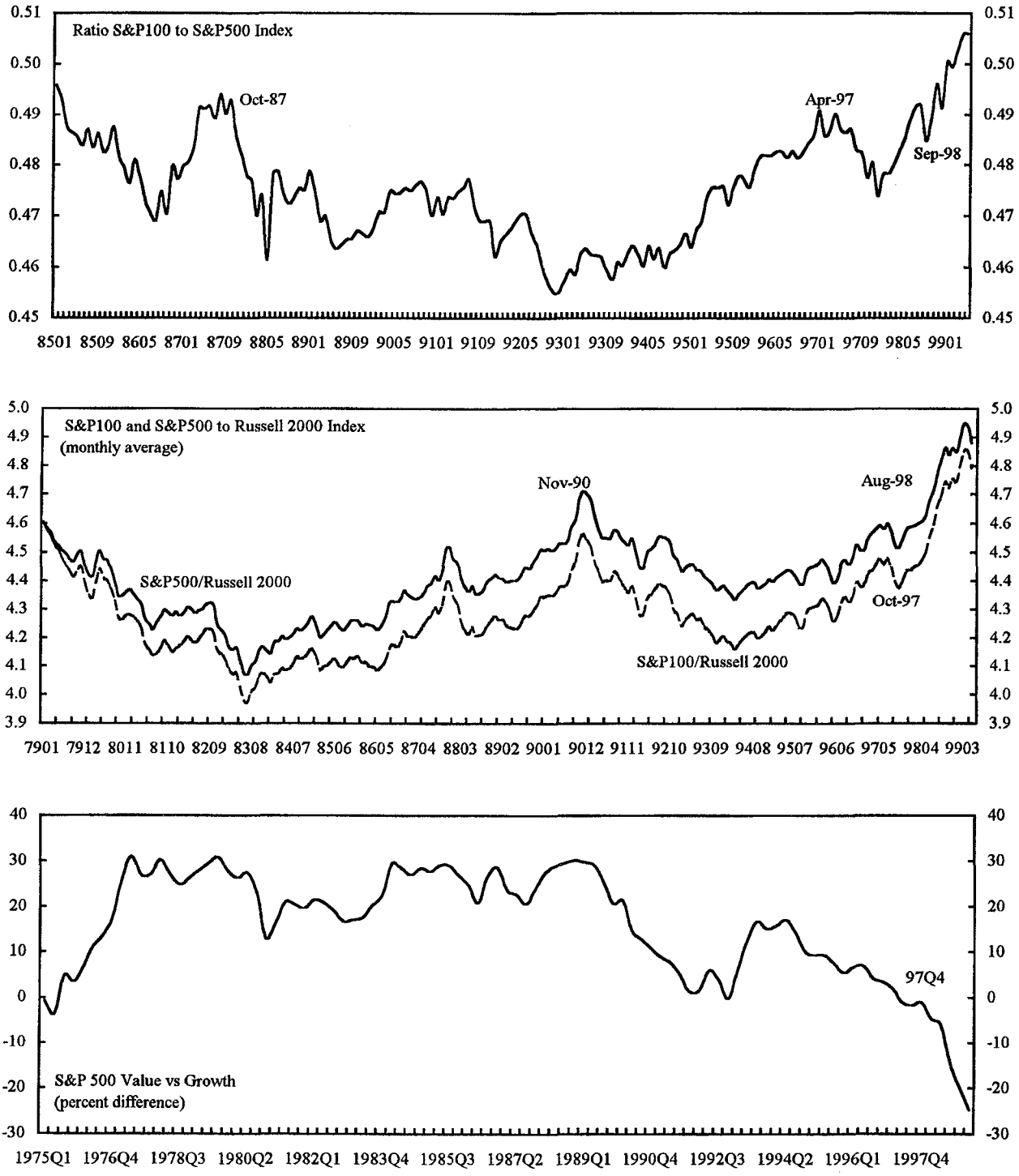
Source: Federal Reserve Flow of Funds; Standard and Poor's; and Fund staff estimates.

Figure 3. United States: Tobin's q



Source: Federal Reserve Flow of Funds Accounts.

Figure 4. United States: Stock Market Developments



Source: Bloomberg.

V. Determinants of the U.S. Personal Saving Rate[1]

1. The rapid increase in U.S. consumer spending pushed the monthly personal saving rate into negative territory in late 1998 and early 1999. A declining personal saving rate, however, is not a new development in the U.S. economy, nor does it reflect recent trends in broader measures of saving. Personal saving began to decline in the early 1980s, with this trend continuing in the 1990s. The trend decline in the personal saving rate has raised concerns about the sustainability of long-term growth, and the risks associated with a sudden reversal in the saving rate. Concerns about long-term growth prospects are to a large extent misplaced. Gross national saving is the most relevant factor in determining future growth, and it has recovered sharply in recent years, as corporate savings has picked up and government saving has risen with fiscal consolidation, more than offsetting the decline in personal savings. The likelihood of a sudden reversal in the personal saving rate, with adverse effects on the economy, is dependent on understanding the factors which have contributed to its trend decline.

2. Based on the evidence presented here, the trend decline in the personal saving rate can be explained by the rise in household equity wealth, higher per capita Medicare transfers, tighter U.S. fiscal policy, households' improved access to credit, and lower inflationary expectations. The likelihood of a sudden reversal in the personal saving rate depends primarily on the extent to which part of the increase in household equity wealth over the last few years has been temporary. Other factors—such as the rising government surplus, lower inflationary expectations, and enhanced access to credit—appear less susceptible to a sudden reversal.

A. Recent Trends in Saving Behavior

3. In spite of all the attention paid to the historic lows of the personal saving rate, total saving in the U.S. economy is actually on the rise. Gross national saving as a share of GNP has steadily increased since its low of 14½ percent in 1993 to about 17¼ percent in 1998 (Figure 1). After reaching a low of -1 percent of GNP in 1992, gross government saving has increased steadily, reaching about 4½ percent of GNP in 1998, reflecting the improved budgetary position of the federal government.[2] Corporate saving has nearly doubled as a share of GNP compared to its low point in the late 1980s as undistributed corporate profits have increased. In sharp contrast, personal saving as a share of GNP began to decline in the early 1980s, and then fell further in the 1990s.

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[1]Martin Cerisola and Paula De Masi

[2]Since 1992, state and local government saving has declined slightly as a share of GNP.

4. Part of the explanation for why personal saving has declined relates to measurement issues. In broadest terms, a measure of household saving would capture the change in real household net wealth for a given period of time. The standard measures of household saving, however, are considerably more narrow than this broad definition. The household saving rate in the United States is usually expressed as a share of disposable income and commonly based on one of two data sources:[3]

- **National Income and Product Accounts (NIPA)** is the most often cited measure. Conceptually, the NIPA household saving measure is based on the after-tax income generated by the current production of goods and services. This measure is computed as the residual of personal income minus personal consumption expenditures, personal interest payments, net personal transfers to the rest of the world, and personal taxes. The NIPA saving rate declined from about 9 percent in the early 1980s to 5 percent in 1990, and fell further to 0.5 percent in 1998 (see Figure 1).

- **Flow of Funds Accounts (FOFA)** data are used to compute personal saving as households' acquisition of financial assets plus net investment in tangible assets less the net increase in liabilities. The FOFA saving rate has also trended downward since the 1980s—although to a lesser extent than indicated by the NIPA measure—declining from about 14 percent in 1990 to about 6 percent in 1998.

5. Neither measure of saving is an ideal indicator of the change in a household's net wealth position. Both measures suffer from the fact that the household sector is treated in statistical terms as a residual, and, therefore, any errors in measuring incomes or financial transactions in other sectors are reflected in the measures of personal saving. For example, substantial errors in measuring consumption and income bias the NIPA saving rate, while problems associated with how assets are valued bias the FOFA saving rate.

6. The FOFA and the NIPA saving rates are different primarily because the FOFA measure includes the purchase of consumer durables as a part of household saving, and only the services derived from these durable goods each year—that is, depreciation—are treated as consumption. The NIPA measure considers the purchase of durables as pure consumption.[4] There is, however, one important similarity between the two measures. Although the FOFA saving rate includes the acquisition of net financial assets, it does not include changes in the valuation of these assets. Therefore, capital gains on equity are excluded from the FOFA measure, just as they are in the NIPA measure. As a result, neither

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[3]Saving estimates are also derived from household survey data; however, the quality and sampling error of such data are problematic.

[4]Government insurance and pension reserves are also treated differently. For a detailed discussion of the differences between the NIPA and FOFA personal saving rates, see Wilson, Freund, Yohn, and Lederer (1988).

measure of saving captures the increase in real household net wealth associated with the rise in equity values over the last few years. The ratio of household net worth to disposable income has increased from 5 in the early 1990s to about 6 in 1998.[5] This sharp rise in household wealth has allowed consumer spending to outpace disposable income, driving down both the NIPA and FOFA measures of saving.

7. With regard to the NIPA saving rate, there have been several technical factors contributing to its recent historically low level. With the sharp rise in equity prices over the last several years, capital gains realizations have increased. Although capital gains are excluded from NIPA income, taxes on these gains are included in the NIPA measure of personal tax payments. Consequently, increases in capital gains taxes paid have lowered the estimates of personal disposable income, and therefore the household saving rate.[6] In addition, with the rise in equity prices, households have moved their saving away from interest-bearing assets toward equities, which also lowers measured personal disposable income.

8. Another technical factor contributing to the recent low of the NIPA saving rate relates to revisions in the methodology of how personal income is calculated. Until recently, dividend payments that reflected capital-gains income had been erroneously included in the NIPA measure of personal income simply because in the collection of data, dividends were defined without regard to the source of income used to fund them. With the sharp rise in capital-gains distributions of mutual funds in recent years, the NIPA estimates of personal income and therefore household saving were increasingly overstated. In July 1998, the Bureau of Economic Analysis corrected this deficiency in the methodology which reduced the personal saving rate for 1997 by 1¾ percentage points to 2.1 percent.[7] Although the revisions to the NIPA personal saving rate, which date back to 1982, are larger in the more recent years, the overall trend in the saving rate has not changed.

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[5]Household net worth is defined as total assets minus total liabilities of households, as in the Federal Reserve Board, Flow of Funds Accounts, Table B.100.

[6]Macroeconomic Advisers (1998) estimates that the bias in the saving rate associated with the tax consequences of capital-gains realizations lowered the saving rate by about 1¼ percentage points in 1997.

[7]The redefinition does not affect gross private saving (that is, personal plus corporate saving) because the downward revision to personal saving is offset by an increase in the measured undistributed corporate profits of the mutual fund industry.

B. Long-Run Determinants of the Personal Saving Rate

9. Empirical models of personal saving are typically based on some form of the life-cycle hypothesis, which postulates that households save a portion of their income during their working years in order to finance their retirement years.[8] Based on this approach, a number of variables have been identified in the empirical literature as being potentially important long-term factors in determining the personal saving rate. The household saving rate has been found to be positively correlated with inflationary expectations (Deaton, 1977)[9] and, to some extent, with the expected real interest rate (Summers, 1984). It has been found to be negatively correlated with the general government balance (Bernheim, 1987), household equity and non-equity wealth (Bosworth, et al., 1991), innovation in the financial sector that eases liquidity constraints faced by households (Bayoumi, 1993), per capita transfers from Social Security and Medicare (Summers and Carroll, 1987), and an aging population (Masson et al., 1995). Table 1 shows simple correlations between each of these variables and the personal saving rate, suggesting that movements in the personal saving rate may be accounted for by macroeconomic and demographic factors.

10. Following Bérubé and Coté (1999), an equation was estimated that explains the U.S. household saving rate on the basis of fundamental factors using cointegration theory.[10] The econometric analysis was conducted for both the NIPA and FOFA measures of personal savings, using quarterly data from 1975 to mid-1998. The main fundamental factors included in the equation are: the ex ante real interest rate; a proxy for expected inflation; the ratio of credit market household debt to personal disposable income as a proxy for access by households to credit;[11] Social Security and Medicare transfers per recipient as a share of per capita

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[8]For example, see Browning and Lusardi (1996) for a more detailed discussion of the life-cycle model.

[9]Generally, it is argued that higher inflationary expectations will induce households to save more in order to offset a decline in the real value of non-indexed assets and to compensate for the increased uncertainty regarding future real income.

[10]This equation was estimated following the Phillips-Hansen's fully modified OLS (FMOLS) estimator. The FMOLS estimates the long-run parameters using a procedure which corrects for serial correlation in the residuals without having to specify the dynamics of the model. It is valid for estimation and inference when there exists a unique cointegration relationship between the fundamental variables and the personal saving rate, and when the fundamental factors are not cointegrated among themselves. Standard errors were computed using the Newey-West serial correlation and heteroskedastic consistent variance-covariance matrix of the parameters. See Phillips and Hansen (1990).

[11]This proxy for household access to credit was compared to an alternative, annual data on the number of credit cards held per person over 16 years old in the United States. As seen in Figure 2, both series show similar sharp upward trends since the early 1980s.

disposable income; the ratio of the general government balance to gross domestic product; and the ratio of equity and non-equity household net worth to personal disposable income (Figure 2).[12]

11. Based on the FMOLS regressions (Table 2 and Figure 3), it appears that most of the fundamental factors had significant effects on both measures of private savings.[13] For the NIPA saving rate, the estimates show that the downward trend in inflationary expectations, tighter fiscal policy, higher household wealth, improved access by households to credit, and higher per capita social transfers explain most of the fluctuations in household savings since 1975. In particular, the model does a good job in explaining the decline in the saving rate that has taken place since the early 1990s. About 35 percent of this 4½ percentage point decline in the saving rate has been accounted for by the rise in household equity wealth. In line with partial Ricardian equivalence, the shift in U.S. fiscal policy since 1994 explains about a third of the decline in saving, as households may have reduced saving in anticipation that part of the improvement in the budget balance would eventually lead to lower taxes in the future. Lower inflationary expectations accounted for slightly less than 20 percent of the decline in the saving rate, while greater household access to credit and transfers from Social Security and Medicare accounted for 15 percent each. Partially offsetting was a decline in household non-equity wealth which served to raise the saving rate.

12. The results in Table 2 also show that by excluding the proxy for household access to credit and per capita Social Security and Medicare transfers tend to increase the size of the estimated effects of household wealth on savings, with the size of these effects at 4 cents per dollar of change in wealth falling in the 3–7 cent range of most traditional estimates. Allowing for household access to credit and per capita social transfers seems very important in explaining U.S. saving and consumption, and for correctly assessing the long-run impact of a potential change in household wealth.[14] For example, estimates from the equation

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[12]Explanations regarding the derivation and sources of data for these variables are included in Annex I.

[13]The econometric results for the FOFA measure of personal saving are less supportive than for the NIPA rate. The expected real interest rate and the proxy for household access to credit are the only statistically significant variables, while the coefficient on household equity wealth has a negative sign. In addition, the working population ratio was included in each regression and was not found to be statistically significant. This result is not altogether surprising because the ratio does not vary substantially over the estimation period. The aging of the population as the baby-boom generation gets older is an unique event whose effect on saving behavior is difficult to predict based on past demographic changes.

[14]One possible explanation is that there is some collinearity between the proxy for household access to credit and household wealth. The correlation between the access to credit proxy and household non-equity wealth was 25 percent during 1975–98; however, the correlation between the proxy and equity wealth was about 85 percent.

including these variables suggest that a 25 percent decline in household equity wealth would increase the saving rate by about ¾ percentage point over the long run and would reduce consumption by about ½ percent of GDP. Estimates from the equation excluding these variables suggest that a 25 percent drop in stock prices would reduce consumption by 1½ percent of GDP and increase the personal saving rate by 1½ percent of GDP.

Data Sources and Definitions

The sample period in the regressions is from the second quarter of 1975 to the second quarter of 1998. The sources and definitions for each variable are as follows:

Personal saving rate based on two alternative measures as reported by the National Income and Product Accounts and the Flow of Funds Accounts. Sources: Bureau of Economic Analysis and the Federal Reserve Board.

Fiscal balance is the ratio of the United States general government balance on a national income and product account basis to GDP. Source: U.S. National Income and Product Accounts, Bureau of Economic Analysis.

Expected inflation is estimated by using the fitted values from an autoregressive equation of order one on the seasonally adjusted Consumer Price Index (all items). Source: staff estimates based on data from Bureau of Labor Statistics.

Expected real interest rate is the yield on a three month Treasury bill deflated by the proxy for expected inflation. Source: Federal Reserve Board, and staff estimates.

Household access to credit is the ratio of credit market household debt relative to personal disposable income. Source: Flow of Funds Accounts, Federal Reserve Board, and National Income and Product Accounts, Bureau of Economic Analysis.

Household equity net worth is the ratio of the market value of household holdings of equities, mutual funds, bank personal trusts, closed-end funds, and private pension equities and mutual funds to personal disposable income. Source: Flow of Funds Accounts, Federal Reserve Board, and National Income and Product Accounts, Bureau of Economic Analysis.

Household non-equity net worth equals household net worth minus household equity net worth as defined above expressed as a share of personal disposable income. Source: Flow of Funds Accounts, Federal Reserve Board.

Social security and Medicare transfers is the ratio of OASDI and Medicare payments per recipient to the personal disposable income per population over 16 years old. Source: Social Security Bulletin, Annual Statistical Supplement.

Credit cards outstanding is the total number of outstanding bank credit cards in the United States. Source: Credit Card Management, *Card Industry Directory*.

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Table 1. United States: Correlations of Fundamental Factors with Household Saving 1/

	Correlation With						
	Expected Inflation	Real Interest Rate	Fiscal Balance	Equity Wealth	Non-equity Wealth	Household Access to Credit	Social Security and Medicare Benefits
Personal saving rate (NIPA)							
Actual	0.65	-0.15	-0.30	-0.88	-0.17	-0.90	-0.68
Cycle 2/	0.25	0.04	-0.25	-0.35	-0.33	-0.34	-0.06
Personal saving rate (FOFA)							
Actual	0.31	0.07	-0.26	-0.69	0.03	-0.68	-0.45
Cycle 2/	-0.05	0.10	0.00	-0.06	-0.07	-0.26	0.05

Sources: Fund staff estimates based on National Income and Product Accounts, Bureau of Economic Analysis; Federal Reserve Board, *Flow of Funds Accounts;* and Bureau of the Census.

1/ Estimates are for the period 1975-98.

2/ The correlations for the cyclical component correspond to the detrended series using the Hodrick-Prescott filter. Since most of these variables are non-stationary, the correlations for the actual series may not be very meaningful because of their trend component, but are still presented to summarize the pattern of co-movement among them.

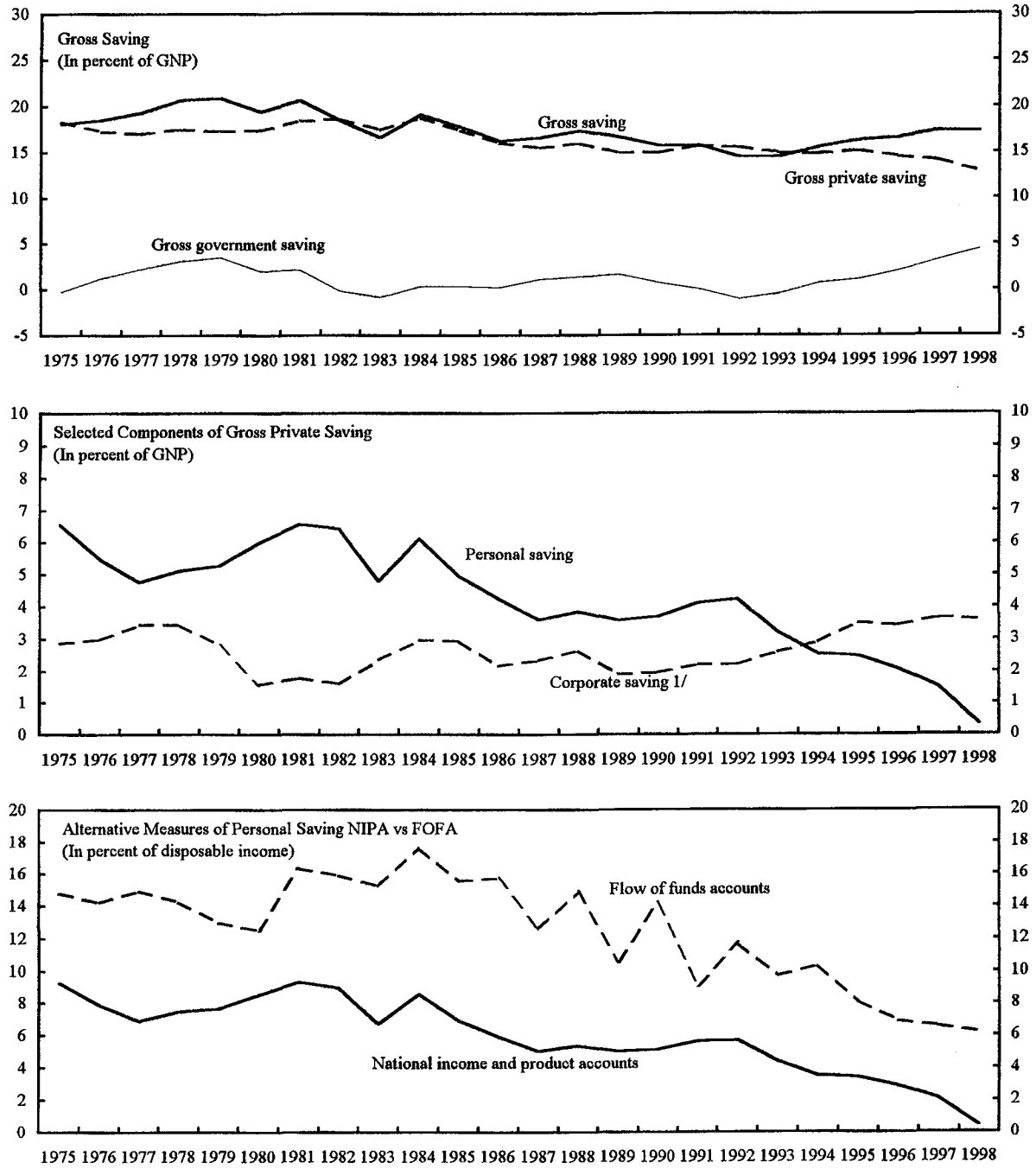
Table 2. United States: Estimated Equations for Personal Saving Rates 1/

	Personal Savings Rate			
	NIPA Measure			
	Traditional Model	with Social Benefits	with Household Access to Credit and Social Benefits	FOFA Measure
Constant	0.2280	0.2657	0.2336	0.2463
	(0.000)	(0.000)	(0.000)	(0.006)
Fiscal balance	-0.2497	-0.4558	-0.4068	-0.2800
	(0.000)	(0.000)	(0.000)	(0.306)
Expected inflation	0.3370	0.3969	0.3437	-0.0576
	(0.000)	(0.000)	(0.000)	(0.733)
Expected real interest rate	0.2300	0.4029	0.3050	0.3124
	(0.000)	(0.000)	(0.000)	(0.138)
Household access to credit	...	...	-0.0551	-0.2002
			(0.002)	(0.007)
Household equity net worth	-0.0415	-0.0206	-0.0147	-0.0245
	(0.000)	(0.000)	(0.005)	(0.253)
Household non-equity net worth	-0.0397	-0.0334	-0.0242	0.0134
	(0.000)	(0.000)	(0.000)	(0.571)
Social Security and Medicare Benefits	...	-0.2069	-0.1193	-0.0228
		(0.000)	(0.006)	(0.899)

Source: Fund staff estimates based on Phillips and Hansen Fully-Modified OLS. Prob-values reported in parenthesis.

1/ Estimates are for the period 1975Q1-1998Q2.

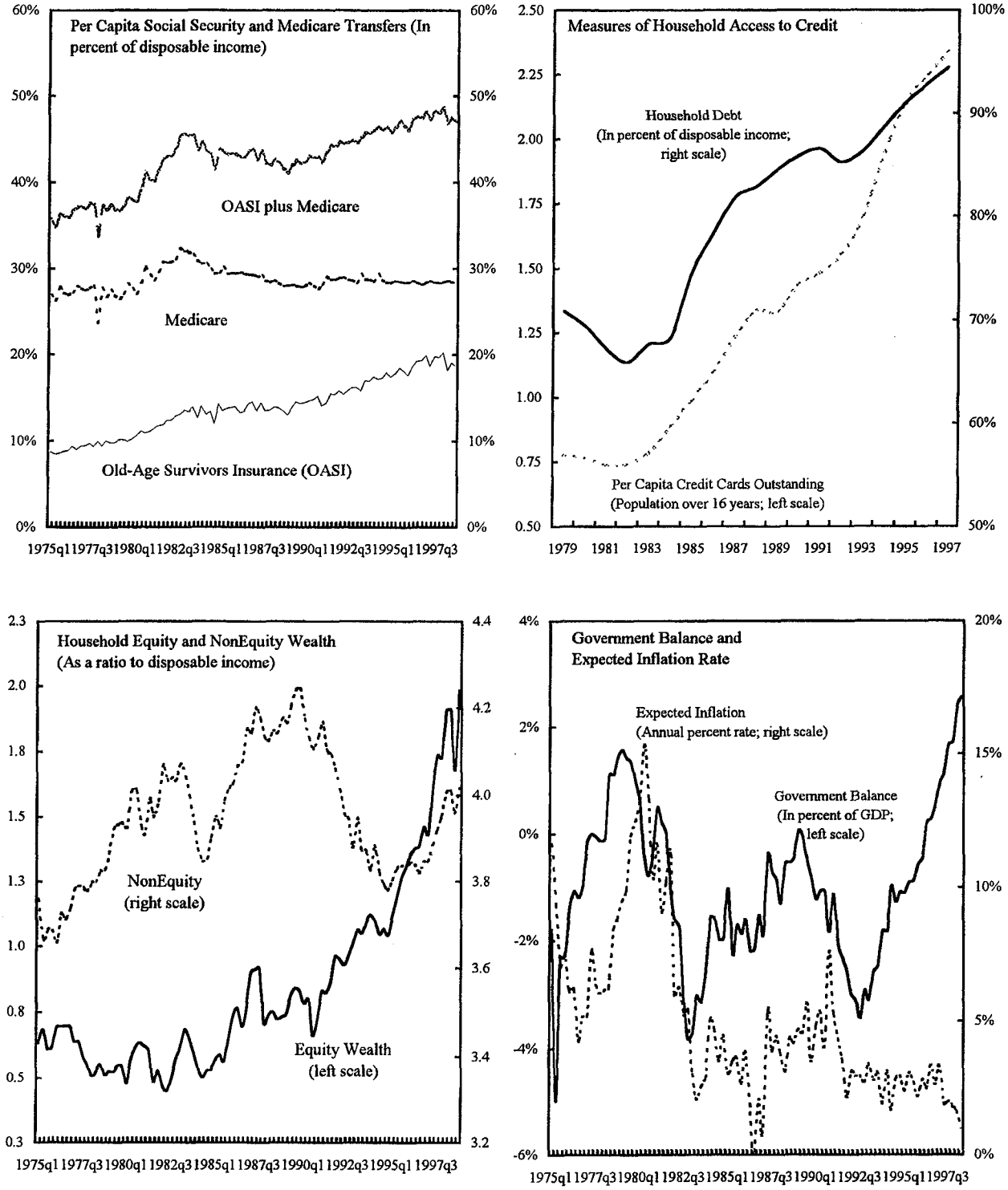
Figure 1. United States: Trends in U.S. Saving Behavior



Sources: Bureau of Economic Analysis, *Survey of Current Business;* and Federal Reserve Board, *Flow of Funds Accounts.*

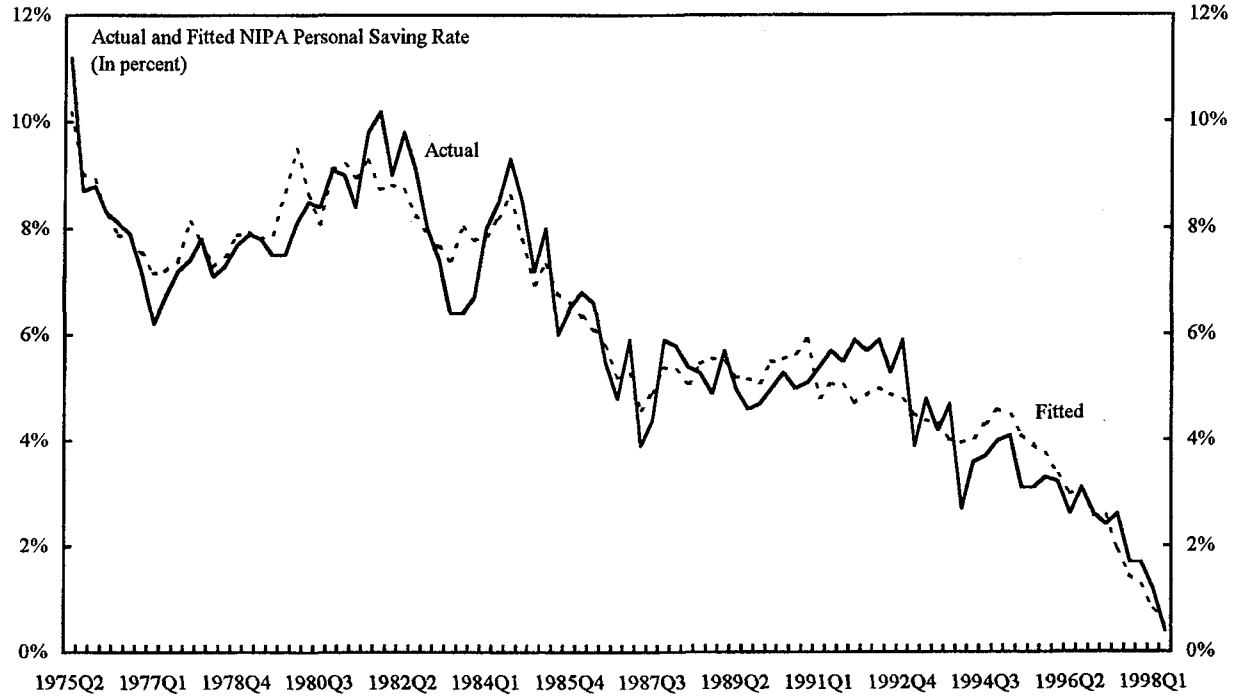
1/ Corporate saving is defined as undistributed corporate profits with inventory value adjustments and capital consumption adjustments.

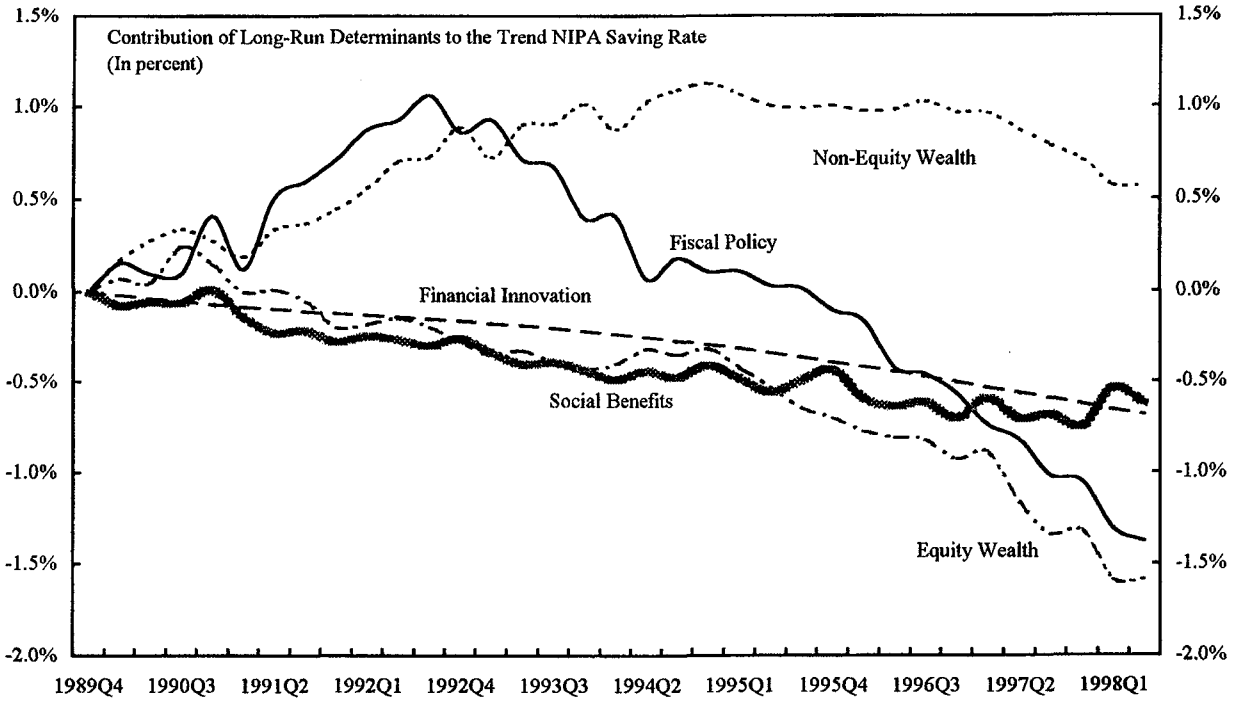
Figure 2. United States: Determinants of the Personal Saving Rate



Source: See Annex I.

Figure 3. United States: Econometric Estimates of the Personal Saving Rate





Source: Fund staff estimates.

VI. Long-Term Sustainability of the U.S. Current Account Balance[1]

1. During the period 1960–81, the United States experienced current account surpluses, which averaged about 0.3 percent of GDP. Since 1981, the United States has run persistent current account deficits. As a result, the United States has shifted from a net external creditor to a debtor position, which amounted to about 18 percent of GDP in 1998. Concerns about the persistence of large current account deficits relate primarily to whether the value of the U.S. dollar will be subject to continuous downward pressure and to the sustainability of the capital inflows to the United States to finance these deficits. If such inflows were to represent over time an increasing share of the world's savings, the situation could pose considerable risks that investors, beyond some point, would be less willing to continue accumulating dollar-denominated assets.

2. The prospects for the long-term sustainability of the U.S. external current account are explored using the IMF's multicountry model (MULTIMOD). Several scenarios are used to assess the long-run implications for the U.S. current account and the exchange rate of population aging and of alternative fiscal policy rules in the United States and in other industrial countries. In the main scenarios, the fiscal policy rule for the United States provides for a solution to the financing needs of Social Security and Medicare and maintains balance in the rest of the budget, while other industrial countries balance their budgetary positions.

3. In the medium term, such a fiscal consolidation in the United States would lead to a marked reduction in the U.S. current account deficit and lower U.S. interest rates. The U.S. dollar would tend to depreciate slightly (by 5–7 percent in real terms) over the medium term, before appreciating slowly over the longer term. The U.S. current account deficit as a share of the rest of the world savings would fluctuate between 1–2½ percent in the long term, which compares favorably to its average of 2½ percent during the last two decades, suggesting that future current account deficits in the United States would not put substantial pressure on world savings and remain financeable. Nonetheless, the results underscore the need for the United States to run a prudent fiscal policy as a means of ensuring a sustainable current account position over the long term.

A. Long-Term Prospects for the U.S. Current Account in a Multicountry Context

4. To assess the long-term sustainability of the U.S. external balance, illustrative scenarios were generated using MULTIMOD over the period to 2070. In the main scenario, under a central fiscal policy rule in the United States and balanced budgets in other industrial countries, the U.S. external current account deficit would fall from about 3½ percent of GDP in 1999 to 1 percent of GDP in 2007–10, and stabilize at a deficit of about 1¼ percent of

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[1]Prepared by Martin Cerisola, Hamid Faruqee, and Alexander Keenan.

GDP through 2070 (Figure 1 and Table 1).[2] The scenario also suggests that private savings would decline to about 11½ percent of GDP over the next three years (Figure 2), before rising gradually and stabilizing around 15½ percent of GDP in 2070. Private investment would slow down primarily reflecting the effects of demographic changes in output.[3] Long-term interest rates in the United States would decline sharply over the next six years, reflecting the consolidation of domestic and foreign budgetary positions, before rising as a result of lower budget surpluses in the United States (Figure 3).[4] The U.S. dollar would depreciate by 5–7 percent in real terms through 2005, and would appreciate modestly over the long term (Figure 4).

5. In an alternative scenario, where the United States and other industrial countries both balance their budgets, the simulations show a smaller improvement in the U.S. current account deficit (see Figure 1). The U.S. current account would decline from a deficit of about 3½ percent of GDP in 1999–2000 to an average of roughly 1¾ percent of GDP beyond 2020. Interest rates in the United States would be higher, and the U.S. dollar would be more depreciated over the long term. Private savings in the United States would be significantly higher than in the main scenario over the medium term, while investment would be lower, as a generally smaller fiscal adjustment in the United States would tend to strengthen private savings and "crowd-in" less investment (see Figure 2). However, over the longer term, private savings and investment under the balanced budget scenario would remain somewhat

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[2]The central fiscal policy rule for the United States is assumed to put Social Security and Medicare in long-term actuarial balance, while maintaining the remainder of the unified budget in balance from 1999 on. Other industrial countries are assumed to balance their budgets gradually by 2005, which would bring their debt as a proportion of GDP down from 40 percent in 2005 to roughly zero over the long term. Panel estimates based on IMF (1998) suggest that, if the United States and the rest of the world had been at internal equilibrium, and their real exchange rates at the medium-term equilibrium, the U.S. current account deficit would have been 1–1¼ percent of GDP in 1998 based on the structural fiscal balance, and the relative demographic positions prevailing in the United States and other industrial countries in that year.

[3]Demographic changes would tend to put an upward pressure on interest rates as dependency ratios rose and saving propensities fell. However, since the rate of aging is faster in other industrial countries than in the United States, the rise in relative consumption abroad would tend to depreciate the U.S. dollar real exchange rate over the medium term. Over the long term, the real exchange rate would tend to appreciate so as to stabilize U.S. net foreign assets at its higher steady state level.

[4]Under the central scenario, the U.S. budget balance rises to an average of about 3.6 percent of GDP between 2004 and 2010, and declines gradually over the long term, before shifting into deficit between 2060 and 2070.

below their levels in the main scenario, reflecting the front-loaded nature of the fiscal adjustment in the main scenario.

6. In the case where other industrial countries do not balance their budgetary positions, the central fiscal policy rule in the United States would result in a larger improvement in the U.S. external current account (see Figure 1). Further fiscal consolidation in the United States would raise national saving relative to other industrial countries, while less fiscal consolidation abroad would reduce foreign and global saving. Hence, world and U.S. interest rates would decline by less. The resulting differences in the income-expenditure patterns between the United States and other industrial countries—reflecting a more uneven pattern of fiscal adjustment—would result in a larger medium-term depreciation of the U.S. dollar, ranging between 10–15 percent in real terms.

B. Sources and Magnitude of Capital Inflows to the United States

7. To illustrate the importance of the available external financing for U.S. current account deficits, Table 2 summarizes the main components of the U.S. capital account for the period 1990–98. The U.S. current account deficit rose from 1.3 percent of GDP in 1993 to 2.6 percent in 1998. Net portfolio and other investment flows accounted for most of the financing, exceeding what was needed to finance the current account deficit.[5] The sheer volume and the recent rapid growth of U.S. private portfolio liabilities is particularly remarkable—rising from less than $70 billion in 1991 to more than $620 billion in 1997, before falling back to $330 billion in 1998 (Table 3).

8. Japan has remained an important provider of capital to the United States, accounting for about 13 percent on average of the total capital inflows during the 1990s. However, other regions have increased their relative importance. Inflows from the European Union have risen markedly since 1996, accounting for about 41 percent of the total in 1998.[6] The rest of the world has been the most important source of financing in the 1990s but its importance has diminished somewhat over the last few years. In the 1990s, the rest of the world accounted for around 60 percent of the total U.S. gross financial account liabilities.

9. The U.S. current account deficit as a proportion of gross savings in the rest of the world has declined in the 1990s to an average level of 2 percent, compared with 4½ percent

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[5]The remainder reflects the change in official reserve assets and the statistical discrepancy in the U.S. balance of payments.

[6]The reported sources of capital inflows should be interpreted with some caution. In particular, capital flows from the EU may be overstated since a significant share of those inflows may in fact reflect flows from other regions intermediated through the United Kingdom.

in the second half of the 1980s. However, this ratio has risen sharply since 1997, reaching close to 4¼ percent in 1998 and is envisaged to increase further to about 5½–6 percent in 1999. The simulations show that the share of savings in the rest of the world needed to finance U.S. current account deficits is likely to remain high in the next few years before declining gradually over the longer term (Figure 5). In the main scenario, the U.S. current account deficit would peak at about 5¾ percent of world savings in 1999–2000 and would gradually decline to an annual average of about 1 percent around 2020–30, before gradually rising to about 2½ percent by the end of the scenario. These simulations show that tighter fiscal policy in the United States would reduce reliance on savings in the rest of the world and adds support to the view that a moderate current account deficit would be sustainable over the long term.

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Table 1. United States: Long-Term Macroeconomic Projections 1/

	1998-2003	2004-2010	2011-2020	2021-2030	2031-2050	2051-2060	2061-2070
	(Percent change)						
Real GDP growth	3.0	2.2	1.9	1.8	1.7	1.7	1.7
GDP deflator growth	1.9	2.2	2.2	2.2	2.2	2.2	2.2
Labor force growth	1.1	0.8	0.4	0.2	0.2	0.1	0.1
Dependency ratio (in percent) 2/	52.1	50.9	53.8	63.6	69.7	69.8	69.8
	(Percent of GDP)						
General government fiscal balance 3/							
Revenues	32.9	32.5	31.6	31.0	30.4	30.7	32.3
Expenditures	30.1	29.0	28.5	28.8	29.2	30.2	32.7
Balance	2.8	3.6	3.2	2.3	1.3	0.5	-0.4
Current account balance (BOP basis)	-2.8	-1.2	-0.7	-0.5	-0.7	-0.9	-1.2
Private saving	12.3	13.0	13.9	14.3	14.7	15.0	15.4
Private investment	16.1	16.8	16.5	15.9	15.3	15.2	15.1
Public saving-investment balance	1.1	2.6	2.0	1.1	0.1	-0.7	-1.5
Memorandum item:							
Other industrial countries dependency ratio (in percent) 2/	48.8	50.6	55.9	64.7	74.3	74.8	74.8

Source: Fund staff estimates.

1/ Based on the central fiscal policy rule in the United States, and a balanced budget in other industrial countries.
2/ Defined as the ratio of population under 20 years plus 65 and above to working-age population.
3/ On a NIPA basis.

Table 2. United States: Balance of Payments, 1990-98
(In billions of U.S. dollars)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Balance on current account	-79	4	-51	-85	-122	-114	-129	-143	-221
In percent of GDP	-1.4	0.1	-0.8	-1.3	-1.8	-1.6	-1.7	-1.8	-2.6
Financial account	60	47	97	82	131	137	194	286	210
In percent of GDP	1.1	0.8	1.6	1.3	1.9	1.9	2.5	3.5	2.5
Direct investment	11	-15	-28	-32	-33	-40	-4	-1	61
in percent of GDP	0.2	-0.2	-0.4	-0.5	-0.5	-0.5	0.0	0.0	0.7
Direct investment abroad	-38	-38	-49	-84	-81	-99	-93	-110	-133
Direct investment in the United States	49	24	21	53	47	60	89	109	193
Portfolio and other investment	51	55	121	115	159	186	191	288	156
In percent of GDP	0.9	0.9	1.9	1.8	2.3	2.6	2.5	3.6	1.8
Gross assets	-42	-32	-30	-115	-101	-221	-295	-354	-153
Official (excluding reserves)	2	3	-2	0	0	-1	-1	0	0
Private	-44	-35	-28	-115	-101	-220	-294	-354	-153
Gross liabilities	93	88	151	231	260	408	486	642	309
Official	34	17	40	72	40	110	127	18	-22
Private	59	70	110	159	220	298	358	624	331
Reserve assets	-2	6	4	-1	5	-10	7	-1	-7
In percent of GDP	0.0	0.1	0.1	0.0	0.1	-0.1	0.1	0.0	-0.1
Statistical discrepency	25	-46	-47	3	-9	-24	-65	-143	10
In percent of GDP	0.4	-0.8	-0.8	0.0	-0.1	-0.3	-0.9	-1.8	0.1

Source: Department of Commerce, Bureau of Economic Analysis.

Table 3. United States: Gross Financial Account Liabilities, 1985-98

(Billions of dollars)

	1985	1986	1987	1988	1989	Average 1985-89	1990	1991	1992	1993	1994	1995	1996	1997	1998	Average 1990-98
Foreign assets in the United States	146	230	249	247	225	220	142	111	172	283	307	468	575	752	503	368
Japan	35	58	53	104	42	58	-6	17	27	41	56	83	78	80	48	47
Canada	1	14	15	-3	0	6	2	4	5	11	15	15	27	7	20	12
European Union	18	40	63	21	52	39	45	14	33	62	31	55	103	176	207	81
Rest of world	92	119	117	125	131	117	101	76	106	169	206	314	367	489	228	228
Direct Investment in the United States	20	36	59	58	69	48	49	24	21	53	47	60	89	109	193	72
Japan	3	7	9	17	19	11	19	13	4	3	5	8	10	9	9	9
Canada	1	3	4	2	2	2	2	0	2	4	5	5	8	9	16	6
European Union	5	8	16	11	16	11	16	8	5	19	11	13	36	33	74	24
Rest of world	11	18	29	28	33	24	12	3	9	27	27	34	35	58	95	33
Portfolio and other foreign assets	126	195	190	189	157	171	93	88	151	231	260	408	486	642	309	296
Japan	31	51	44	86	24	47	-24	4	23	38	50	75	68	70	39	38
Canada	1	11	11	-5	-1	3	0	4	3	7	11	10	18	-2	4	6
European Union	13	31	47	10	36	27	29	6	28	44	20	42	67	143	133	57
Rest of world	81	101	88	97	99	93	89	73	97	142	179	280	332	431	133	195
Of which:																
Private	127	159	145	149	148	146	59	70	110	159	220	298	358	624	331	248
Japan	34	57	48	78	14	46	-46	-2	14	50	51	67	71	60	31	33
Canada	1	10	8	-9	-1	2	1	5	3	6	9	8	17	0	4	6
European Union	8	23	30	-1	21	16	13	-3	23	25	9	30	31	110	59	33
Rest of world	85	69	59	81	115	82	91	69	70	78	151	193	239	453	238	176
Current account																
(in percent of gross rest of world savings)	5.7	5.7	5.1	3.4	2.6	4.5	1.8	-0.1	1.2	1.9	2.5	2.1	2.3	2.6	4.2	2.1
(in percent of U.S. GDP)	-2.8	-3.4	-3.5	-2.4	-1.8	-2.8	-1.4	0.1	-0.8	-1.3	-1.8	-1.6	-1.7	-1.8	-2.6	-1.4
Foreign assets in the United States																
(In percent of gross world savings)	7.0	8.8	7.8	6.8	5.9	7.3	3.3	2.5	3.9	6.5	6.3	8.5	10.2	13.6	9.5	7.1
Japan 1/	8.1	9.1	6.8	10.7	4.4	7.8	-0.6	1.5	2.2	2.9	3.8	5.3	5.4	6.1	4.2	3.4
Canada 1/	2.0	20.5	19.2	-2.8	0.4	7.8	1.6	5.2	6.9	14.6	17.7	14.8	24.9	6.5	18.4	12.3
European Union 1/	3.3	5.3	6.7	1.9	4.4	4.3	3.1	0.9	2.2	4.8	2.2	3.5	6.5	12.0	13.6	5.4
Rest of world 1/	8.8	10.4	8.5	8.5	8.2	8.9	5.7	4.4	7.0	10.4	10.5	14.0	14.7	18.4	9.1	10.5
U.S. assets abroad																
(In percent of U.S. private savings)	5.6	15.8	12.2	12.8	18.5	13.0	9.2	7.6	8.1	20.4	17.7	29.0	34.8	40.7	26.2	21.5

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

1/ In percent of country's gross national savings.

Figure 1. United States: Current Account Balances
(In percent of GDP)

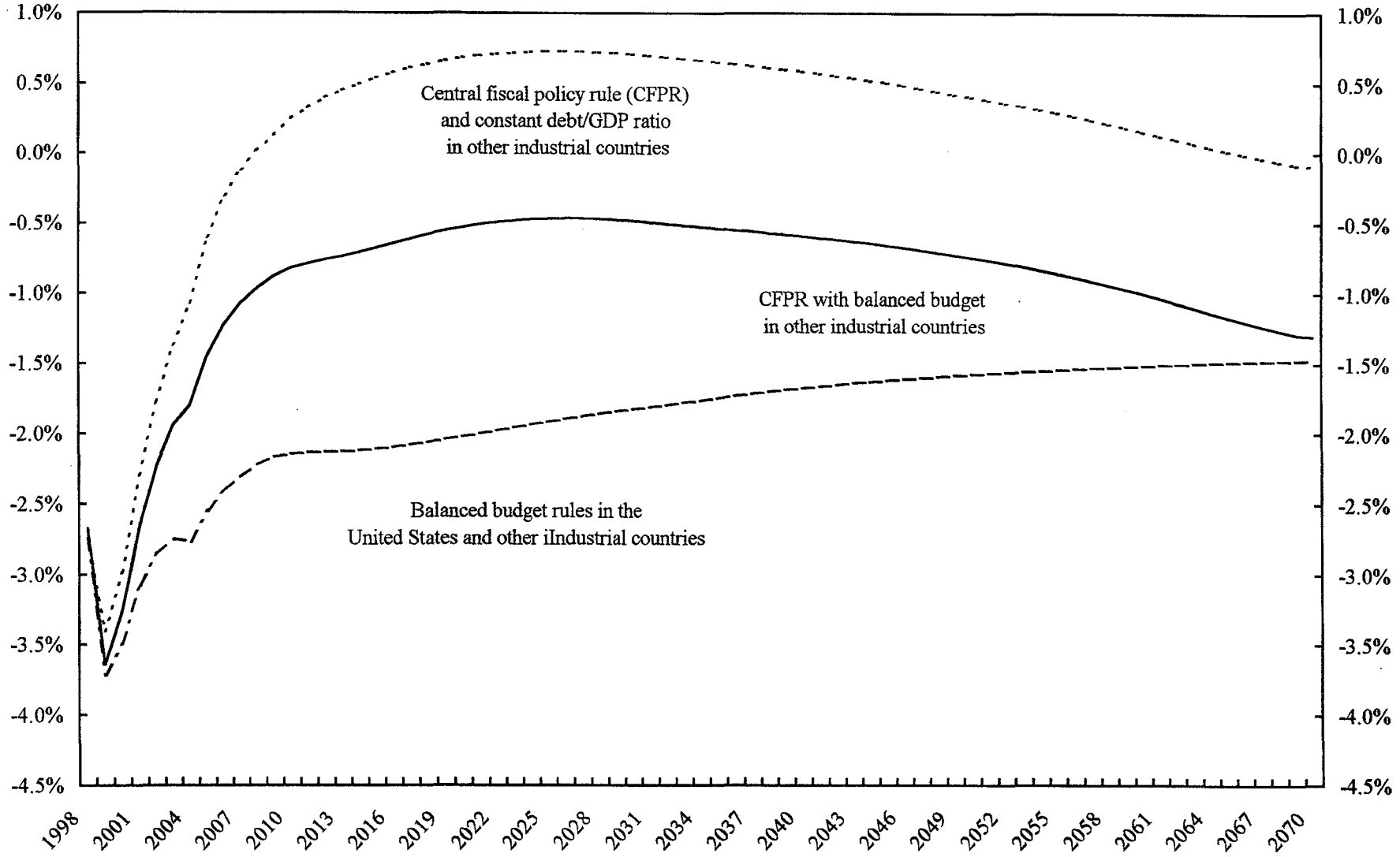
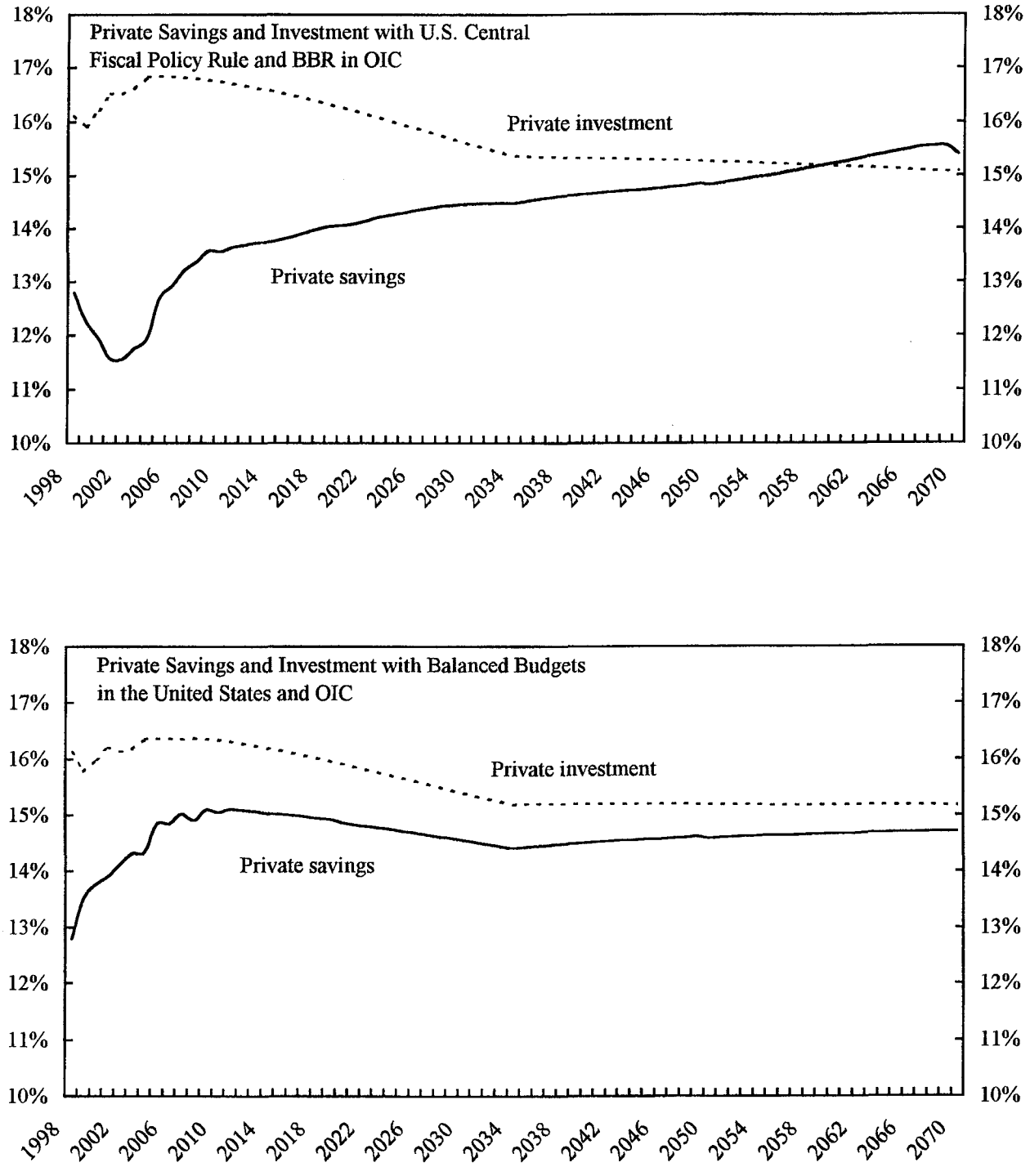


Figure 2. United States: Private Savings and Investment, 1998-2070



Source: Fund staff estimates.

Figure 3. United States: Long-Term Interest Rates
(In percent)

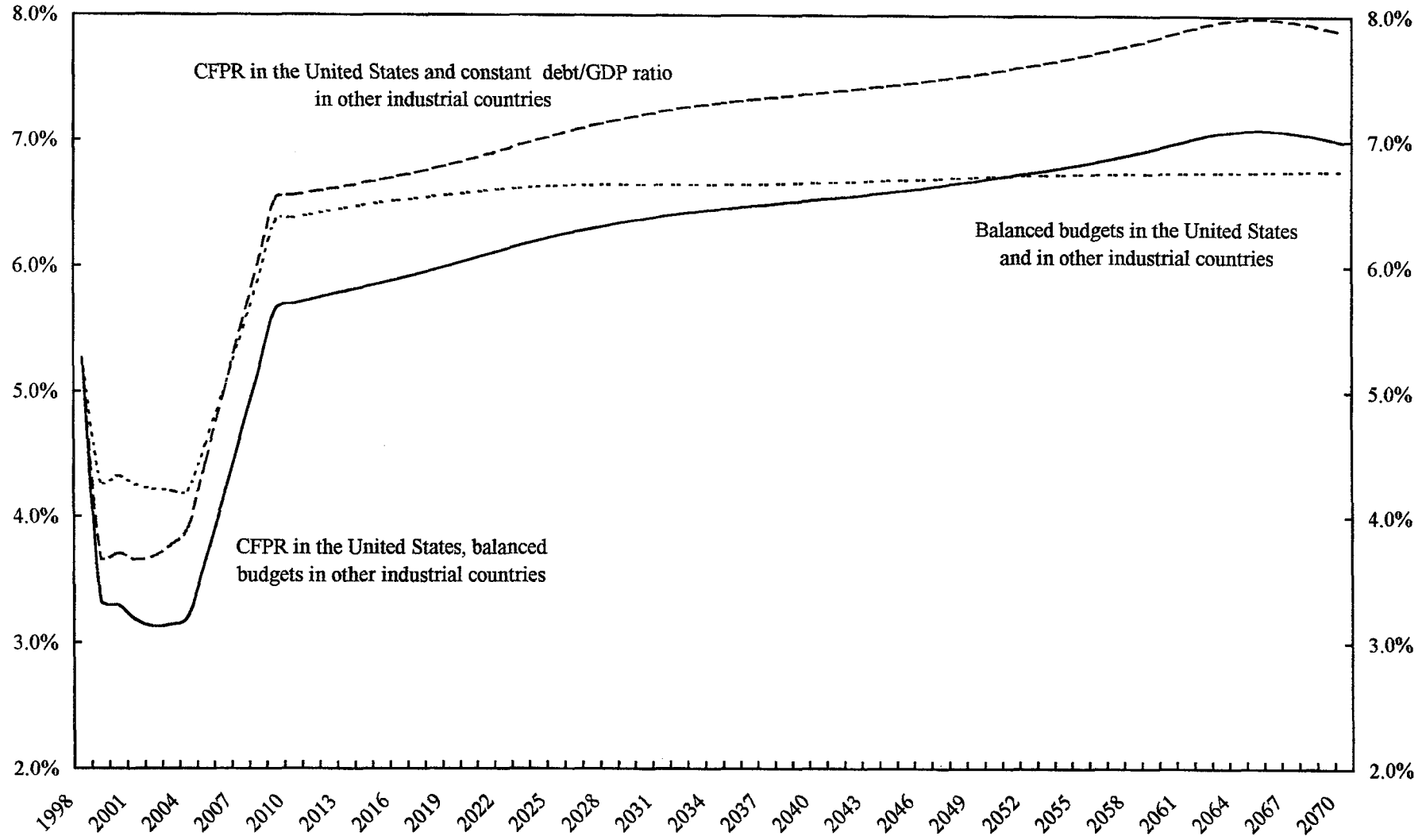


Figure 4. United States: Real Exchange Rate

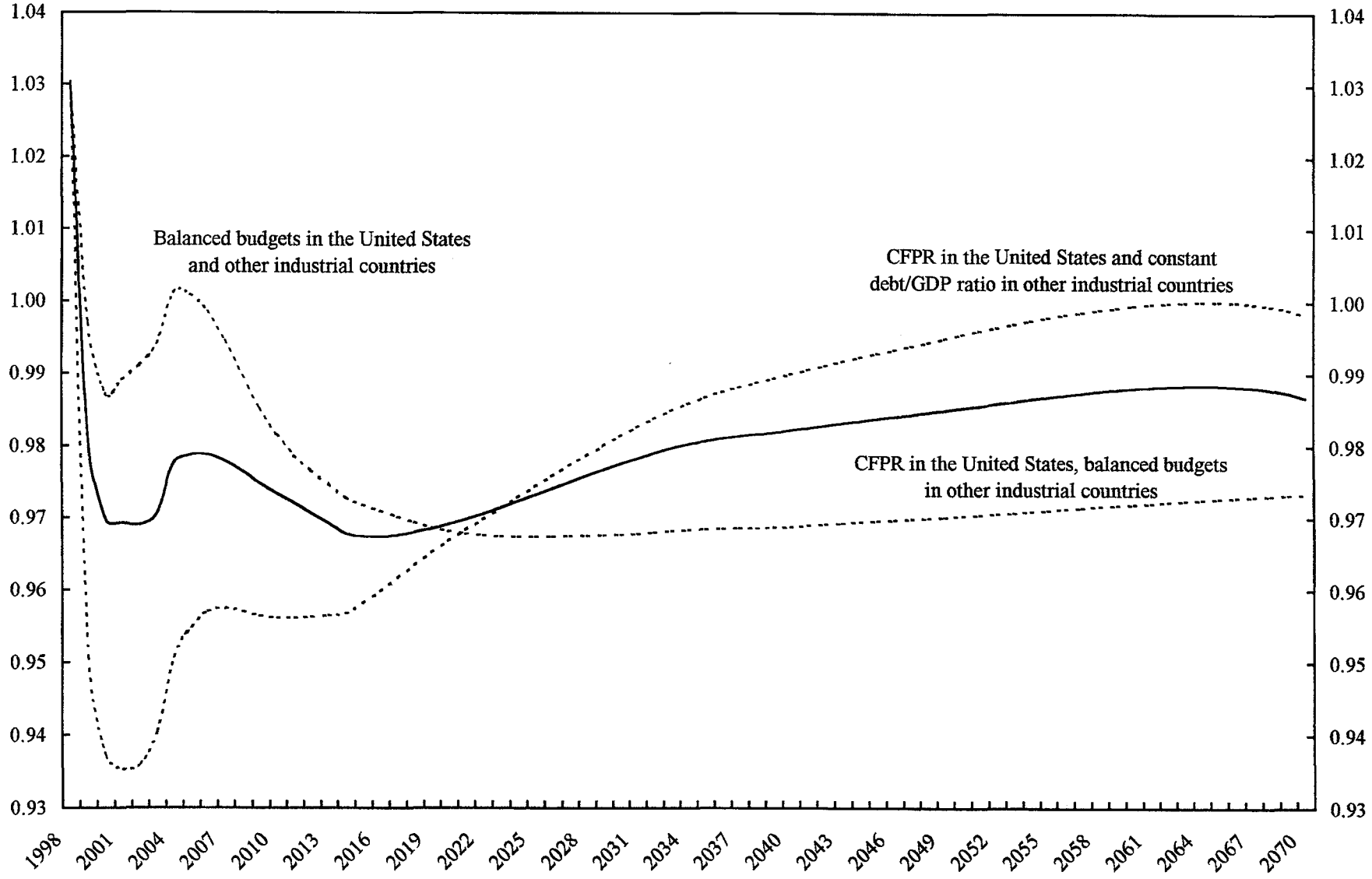
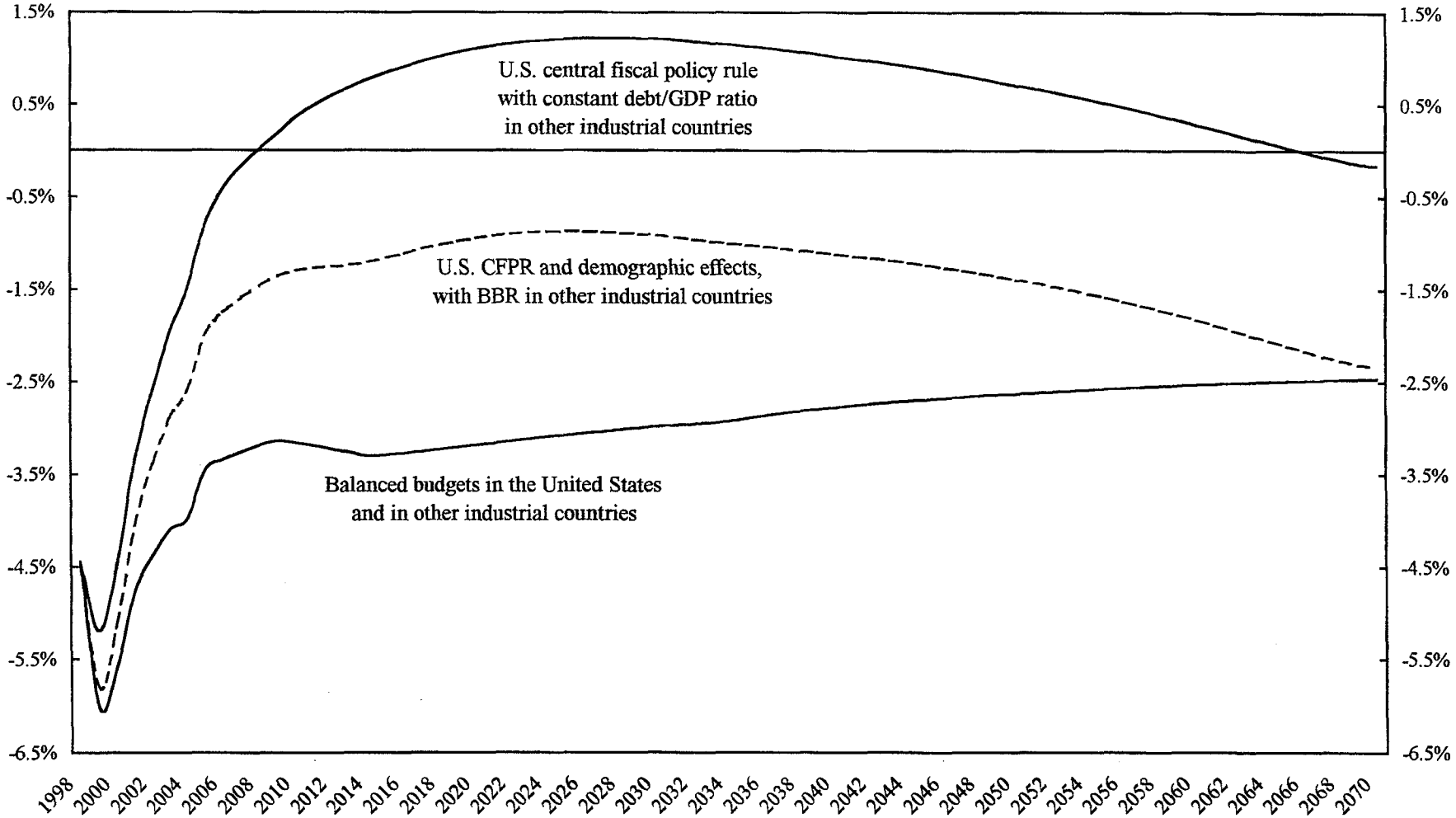


Figure 5. United States: Current Account Deficit as a Share of Rest of the World Savings
(In percent)



VII. "FIXING" SOCIAL SECURITY[1]

1. Without changes in the current structure of benefits and revenues, the Social Security system is expected to begin running large deficits in the next 15 years that will grow rapidly over the longer term.[2] This long-term financial imbalance reflects the significant demographic shift as the baby-boom generation begins to retire in increasing numbers around 2010. Although the U.S. Social Security system faces a significant longer-term financial imbalance, a number of other industrial countries, particularly Germany, Italy, France, and Japan, are expected to face even larger imbalances as their dependency ratios are projected to grow more rapidly than that for the United States (Figure 1). The longer action is delayed in the United States, the greater the tax increase facing future generations, or the deeper real benefits cuts would have to be in order to restore the financial viability of the system. Recognizing the importance of prompt action, in its FY 2000 budget presented in February 1999 the Administration proposed a plan to significantly improve the long-term financial outlook of Social Security that retains the basic structure of the program, but introduces two significant changes in the way the system is financed. On June 28, 1999, with the release of the Mid-Session Review of the budget, the Administration modified the details of its proposal, but retained its core elements.

2. The Administration's plan would transfer general revenues to the Social Security Trust Fund over the next 15 years and allow a certain portion of the Trust Fund's assets to be invested in equities. These proposed measures raise some concerns. Opening the doors to general-revenue financing could compromise the effectiveness of a budget constraint that probably has helped to restrain increases in Social Security benefits over the years. There is also a possibility that reliance on general revenues might further loosen the perceived link between benefits received and payroll taxes paid, possibly exacerbating the tax distortion associated with Social Security funding. Moreover, the proposal to invest a small share of Trust Fund assets in equities raises the question whether an effective "firewall" can be built to insulate such investments from political influence.

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[1]Prepared by Michael Leidy and Stephen Tokarick.

[2]The 1999 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds estimates that without changes in benefits or revenues, the cash flow of the system will shift to a deficit in 2014 and the assets of the system will be exhausted in 2034. The "actuarial balance" of the system compares the expected present value of all revenues to the expected present value of outlays over a given time horizon. This calculation also requires that at the end of the period (e.g., 75 years) the Trust Fund balance equals one year of projected outlays. The 1999 Actuarial Report indicates that an increase of 2.07 percentage points in the payroll tax would be needed now to eliminate the 75-year actuarial deficit of the Social Security program.

A. The Administration's Approach

3. Currently, Social Security benefits are financed principally through payroll taxes, but interest income on Social Security Trust Fund assets and income taxes on Social Security benefits also help fund the system. The Social Security payroll tax is paid by both the employer and employee (each paying 6.2 percent) on gross yearly wages up to a ceiling of $72,600 in 1999. The wage income ceiling is adjusted automatically each year based on the increase in the average wage for all workers. Although the current system does establish a direct linkage between the amount paid in over a worker's lifetime and the benefits received, there is a significantly more favorable pay-back to low-wage workers, especially low-wage workers with families (i.e., progressivity in benefits).[3] Because of the wage ceiling, however, the payroll tax itself is regressive.

4. The approach to restoring the long-term financial viability of the Social Security system outlined in the Administration's FY 2000 Budget departs from past fixes in two substantive ways. First, general revenues would be used to bolster the funding of Social Security for the first time since the inception of the program. This is intended by the Administration to be a response to a one-time demographic episode; namely, the retirement of the baby-boom generation. Second, a small portion of Social Security Trust Fund assets would be invested in private equities. Trust Fund assets are currently restricted by law to be invested in so-called "special issues;" U.S. Treasury securities specifically designated for the Social Security Trust Fund.

5. The plan outlined in the FY 2000 Budget calls for transferring 62 percent of projected federal budget surpluses over the next 15 years ($2.8 trillion) to the Social Security Trust Fund. Of these amounts, one-fifth would be invested in private equities so as to improve the expected risk-adjusted return on the Trust Fund's assets. The intention is not to allocate 62 percent of the yearly budget surpluses ex post as they accrue, but to legislate ex ante dollar amounts to be transferred to the Social Security Trust Fund on a yearly basis. According to Administration estimates, the annual transfers to the Trust Fund and the higher expected returns associated with the investment of Trust Fund assets in private securities would bring the Social Security system into actuarial balance over a 55-year horizon. This is an improvement over the current outlook, but falls short of the 75-year actuarial balance that is the norm for assessing the long-term financial viability of the system. The Administration estimates that the remaining funding gap under its proposal would be equivalent to a ¾ percentage point increase in the contribution rate.

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[3]Nichols (1994) provides summary statistics on the progressivity of expected Social Security benefits across income groups. For example, a low-income married male with a family could expect, on average, to pay about $19½ thousand in Social Security payroll taxes over a 40-year work life, and would receive about twice that amount (all dollar amounts are 1994 present values) in retirement benefits. A comparable upper-income male would pay about $104 thousand in payroll taxes and receive about the same amount in retirement benefits.

6. The Administration modified the details of its proposal in the Mid-Session Review of the FY 2000 Budget, but retained the core elements (namely, equity investments and transfers from general revenues). The new proposal calls for preserving all of the projected Social Security surpluses, with each dollar of that surplus used to reduce federal government debt held by the public (the so-called "lockbox"). Moreover, the Administration's new proposal also calls for transferring the full amount of the interest saved from this debt reduction to the Social Security Trust Fund beginning in 2011. Between 2011 and 2014, a transfer of $543 billion from general revenues to Social Security would occur. Thereafter, transfers would be $189 billion annually. To further improve the financial outlook for Social Security, the Administration would invest these transfers in equities until these equity investments reached a maximum of 15 percent of the total Trust Fund. According to the Administration's estimates, this approach would achieve actuarial balance over a 53-year horizon.

7. Both plans would establish a framework for retiring a significant share of federal government debt held by the public. This strengthens the capacity of the federal government to meet future Social Security obligations by easing future debt-service obligations, thereby avoiding economically burdensome levels of future taxation and/or public debt. Nevertheless, the effectiveness of the plans will remain subject to the resolve of future Congresses to sustain unified federal government budget surpluses.[4] In the absence of full Ricardian equivalence, the Administration's proposals will help to increase national saving, as would any plan that targets sustained budget surpluses, and would thereby stimulate investment and growth.[5]

8. The fiscal effectiveness of these plans to a large extent hinges on their capacity to achieve public debt reduction so as to strengthen the government's capacity to meet its future Social Security obligations. Since Social Security is entirely pay-as-you-go on a consolidated federal government basis (i.e., the federal government including all government agencies), the unified federal government has no net assets to help defray future Social Security obligations, and thus must achieve a low level of public indebtedness in order to position itself to absorb the rising tide of Social Security outlays as they occur. On the other hand, if private securities are also purchased by the Trust Fund, debt held by the public would be reduced more slowly than otherwise, but this would be offset by the accumulation of net assets to help defray future Social Security obligations.

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[4]Under budget accounting rules that have been in place since the 1960s, only those transfers used to purchase equities would result in lowering the reported unified budget deficit. The reported on- and off-budget surpluses would, however, be affected.

[5]It is noteworthy, however, that the federal government's budget outlook under current policies (projected unified budget surpluses) is better than under the Administration's budget proposals with Social Security measures. The CBO (1999) estimates that debt held by the public under the Administration's budget with Social Security proposals (correcting for Social Security assets held in private equities) would exceed that under current policies by more than $700 billion in 2009.

B. An Economic Assessment

9. The Administration's approach would preserve current taxation and benefit levels, and leave the fundamental structure of the system essentially intact.[6] An alternative approach would be to combine a Social Security payroll tax increase, or an increase in the payroll tax ceiling, with benefit cuts. In view of the large fiscal surpluses under current policies, these measures would create the fiscal capacity to cut income taxes and/or increase government spending on non-Social Security items while improving the outlook for debt reduction.[7] Given these alternatives, an economic assessment of the Administration's approach hinges on the equity (horizontal and vertical) and efficiency implications of: (i) higher payroll taxes versus higher income taxes; (ii) maintaining Social Security benefits at current levels versus cutting benefits; and (iii) investing Trust Fund assets in equities versus maintaining current restrictions.

10. The Administration's approach has implications for the distribution of income. By relying on general revenues, the Administration is in effect selecting progressive income taxes to (partially) close the financing gap. Summers (1999) has indicated that the Administration prefers not to raise the payroll tax for equity reasons; namely, because it would hit low- and middle-income workers proportionately harder than upper-income households. Compared with the alternatives of higher payroll taxes and/or reduced benefits, the Administration's approach seeks to preserve the existing redistributional structure of the system. By relying on income taxes instead of the payroll tax, the plan may also achieve a degree of "tax smoothing," since reliance on the payroll tax with its smaller tax base would require a greater adjustment in the tax rate to achieve comparable revenues. Tax smoothing and maintaining a higher degree of progressivity are desirable on efficiency and equity grounds, respectively. However, payroll taxes with a perceived fee-for-service link could be less distortionary than equivalent income taxes, which carry no such link.[8] Moreover, since taxes tend to impose a deadweight loss on the economy, cutting benefits to improve the finances of the system instead of raising taxes would improve efficiency.

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[6]Plans that include more radical overhauls of the existing system are not considered in this paper. Hogan and Tokarick (1998) discuss three broad approaches to reforming the Social Security System, including altering the parameters of the current system, moving to fuller funding, and privatization.

[7]A number of alternative reform plans include some combination of payroll-tax increases or benefit reductions, including the plan put forth by Robert Ball (1999). Changes to payroll taxes and benefits also constitutes one of the three approaches to reform contained in the 1996 *Advisory Council Report on Social Security*.

[8]See Auerbach and Kotlikoff (1985), and Marchildon, Sargent, and Ruggeri (1996).

11. An alternative approach that might satisfy the Administration's equity objectives without resorting to general revenues would be to remove the ceiling on the Social Security payroll tax. At the same time, income taxes would be cut to offset the increase in receipts from payroll taxes. Eliminating the ceiling on the payroll tax base clearly would directly affect only higher-wage households.[9] All workers with gross yearly wages of at least $72,600 in 1999 would face a direct increase of 6.2 percentage points in the marginal tax rate on labor income. The labor market distortion associated with the existing payroll tax ceiling, which makes it proportionately more costly to hire lower-wage workers, would be removed. On balance, removing the ceiling would put downward pressure on market wages at the upper end of the wage scale that in the long run would approach 6.2 percent of the amount in excess of the ceiling.[10] However, because the payroll tax excludes nonlabor income such as dividends, short-term capital gains, interest, or property income, lifting the payroll-tax ceiling would discriminate against higher-income households whose income is derived largely from labor, and would create an additional incentive to seek nonwage compensation. It would treat households with high levels of nonlabor income relatively more favorably than would the Administration's reliance on the income tax. Moreover, since higher income households tend to have a higher share of nonlabor income than lower-income households, the payroll tax with the ceiling lifted would remain regressive relative to an income tax base. However, to the extent that existing income tax loopholes already enable higher-income households to avoid income taxes, these distributional implications would be mitigated.

12. Some have suggested that the Administration's approach could "undermine fiscal discipline" since it would eliminate the direct link between the assessed viability of the system and projected payroll tax revenues.[11] Providing access to general revenues could tend to loosen a long-term budget constraint that has helped to restrict the growth in Social Security benefits over the years.[12] The Administration has taken the view that the proposed

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[9]Assuming that maximum benefit levels were left unchanged, the Office of the Chief Actuary of the Social Security Administration has estimated that removing the ceiling on gross wages subject to the payroll tax in 2000 would be equivalent to an increase in the tax rate of 2.02 percentage points, essentially eliminating the current 75-year financing gap. If benefits were adjusted in line with current policies, lifting the ceiling on taxable payroll would be equivalent to an increase in the tax rate of 1.53 percentage points.

[10]This assumes that the long-run elasticity of supply of higher-income workers is nearly zero and that labor markets are competitive. If, instead, the long-run aggregate labor-supply curve for upper-wage labor were somewhat elastic, lifting the ceiling would put less downward pressure on wages and would tend to reduce the equilibrium level of employment.

[11]Gramlich (1999) and CBO (1999).

[12]Perhaps to help minimize this possible problem, the Administration's proposal also calls for changing budget accounting rules so that transfers to the Social Security Trust Fund would reduce the reported budget surplus.

transfers from general revenues are designed to address a one-time demographic episode associated with the aging of the "baby-boom" generation. Although the original proposal limited transfers to a 15- year period, the revised approach calls for transfers over an indefinite period. In either case, once the precedent of transferring general revenues to Social Security has been set, a practice that would benefit an influential interest group that would be growing in size relative to the rest of the population (retirees), it may well prove difficult to restrict these transfers (whether in size or duration) as originally intended.

13. Investing a share of Trust Fund assets in equities has been criticized on the grounds that it would likely have little, or no, effect on national saving and would merely lead to a shift in the asset composition of public and private portfolios. Equity accumulation by the Social Security Trust Fund would result in the substitution of government bonds for equities in private portfolios as a whole. Under the current defined-benefit structure of Social Security, equity investments would help to relieve future taxpayers of the tax burden otherwise required to close the system's financial shortfall. At the same time, future Social Security recipients (current taxpayers/savers) would retire with unchanged Social Security benefits and a lower expected stockpile of financial wealth.[13]

14. Political economy considerations are also raised by the proposal to invest Trust Fund assets in equities. Some have argued, including Greenspan (1999), that it may be difficult to insulate investment decisions from political considerations. To address this concern, the Administration has proposed an institutional framework similar to the existing Federal Retirement Thrift Investment Board, whereby investment decisions would be made by an apolitical, independent investment board comprised of private-sector investment managers selected through a competitive bidding process. Furthermore, the Administration has proposed that investments would be limited to broad-based, widely used index funds, eliminating the possibility of individual stock picking. Moreover, the share of Trust Fund assets that would be invested in equities would be relatively small.

15. A further political-influence consideration may arise once the Social Security system has accumulated private equities and must eventually decide on how to draw Trust Fund resources to finance expenditures. When the system reaches a stage of negative cash flow, a choice will have to be made on the balance between net selling of the Trust Fund's special issues and net equity sales. Since this decision could have direct implications for stock and bond markets and would also affect changes in federal government debt held by the public—a transparent and politically sensitive variable—political considerations again may come into play. To avoid this situation, Congress could legislate a rule specifying how much of each type of asset would be sold, well in advance of the date when the Trust Fund's assets would need to be liquidated.

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[13]Leidy (1997) examines the macroeconomic and intergenerational effects of investing Social Security Trust Fund assets in equities.

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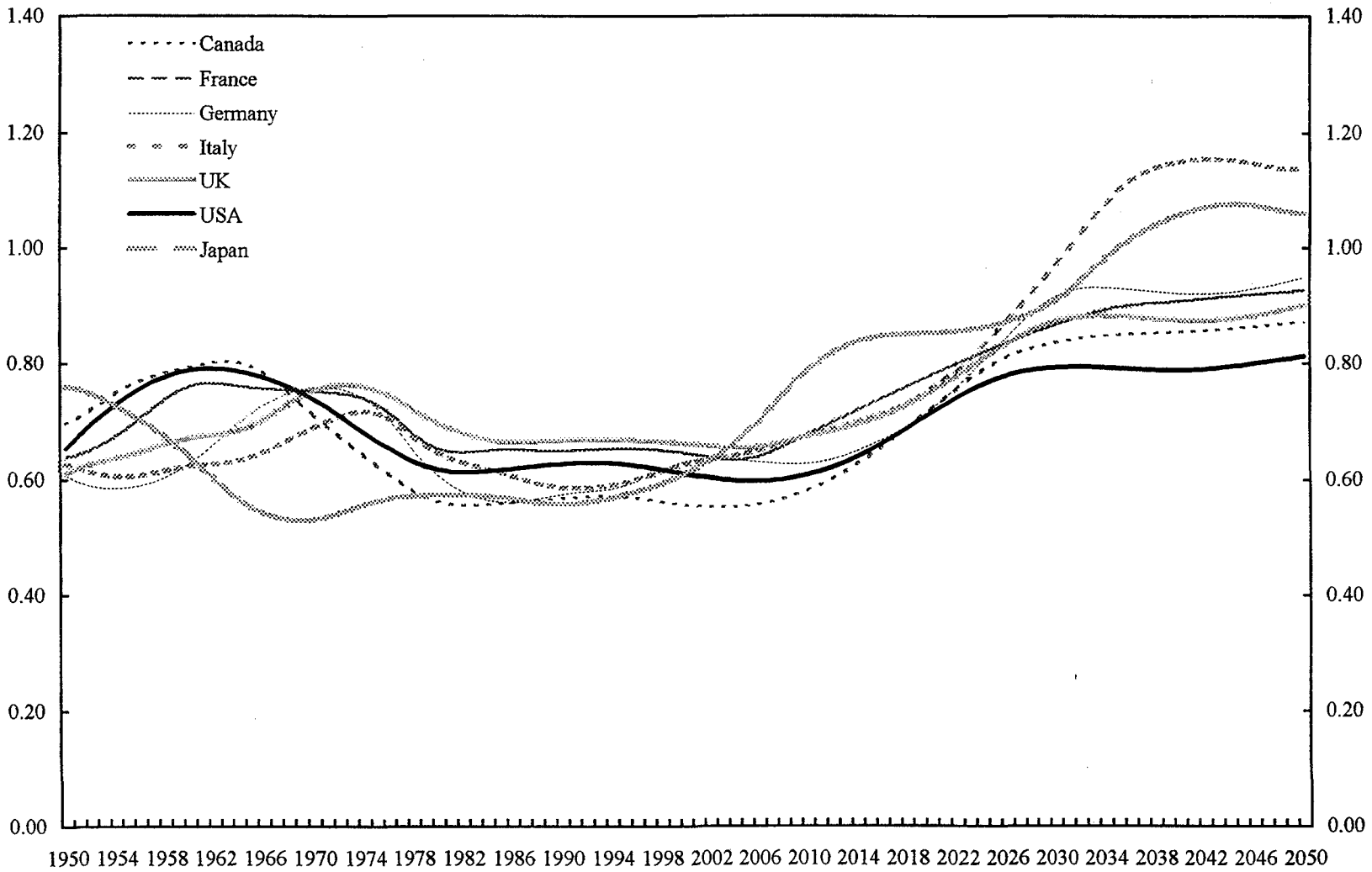
Figure 1. Selected Industrial Countries: Classic Dependency Ratio, 1950-2050



Source: United Nations (1998).

VIII. Fixing Medicare? Issues and Recent Proposals[1]

A. Characteristics of the Medicare System

1. The Medicare system comprises two separately financed trust funds: the *Hospital Insurance (HI)* trust fund, which reimburses health care providers for the costs of inpatient hospitalization, skilled nursing facilities, home health care, and hospice services; and the *Supplementary Medical Insurance (SMI)* trust fund, which covers services provided by physicians and hospital outpatient services. Persons age 65 and over and most disabled persons are eligible for HI coverage. Funding for HI benefits comes from a payroll tax, with employees and employers each currently paying 1.45 percent of earnings. SMI coverage is optional and available to all people eligible for HI benefits. In 1998, the HI program covered about 39 million individuals, of which approximately 22 percent received covered medical services. SMI is fully financed through federal government general revenues and enrollee premiums. As a result of the Balanced Budget Act of 1997, the monthly SMI premium is now adjusted yearly to maintain premium revenues at 25 percent of total program expenditures, with the remainder financed from general revenues.[2] In 1998, the SMI program covered about 37 million individuals, of which approximately 87 percent received covered medical services. Medicare beneficiaries incur other health care expenses reflecting deductibles and co-payments for some services, and payments for medical services not covered by HI or SMI, such as outpatient prescription drugs.

2. Medicare beneficiaries can choose between two kinds of coverage: *fee-for-service,* in which beneficiaries freely choose their health care providers, and *managed-care plans,* in which beneficiaries receive services from a network of providers. About 90 percent of current beneficiaries opt for the fee-for-service coverage. Fee-for-service providers are paid directly by Medicare according to an established fee schedule or reasonable costs. Managed-care plans are paid 95 percent of fee-for-service costs, with adjustments for demographic and other characteristics of each plan's beneficiaries. While managed-care plans limit the choice of providers, they tend to cover a broader range of services and entail less out-of-pocket expenses for beneficiaries.

B. Medicare's Financial Imbalance

3. Despite a recent slowdown owing largely to changes enacted in the Balanced Budget Act of 1997, Medicare spending has grown significantly as a share of GDP, rising from about 1½ percent in 1988 to 2½ percent in 1998. The rapid aging of the population beginning around 2010 will greatly accelerate this trend unless substantive changes are made. In

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[1]Prepared by Brenda González-Hermosillo and Michael Leidy.

[2]The monthly premium in 1999 is $45.50 per enrollee, a 3.9 percent increase over 1998.

particular, HI and SMI expenditures are expected (under the Trustees' intermediate scenario) to continue to grow faster than the economy as a whole (Figure 1). Rapid growth in Medicare spending in relation to the economy is related to two factors. The first and most immediate factor is the *growth in costs per beneficiary*, which is expected to continue at a rapid pace under current policies. The second factor is the rate of *growth in the number of beneficiaries*, which is expected to rise beginning around 2010. Indeed, the United States is currently in a period of historically low growth in Medicare enrollment as the so-called "baby-bust" generation, born during the 1930s and 1940s, reaches age 65. Only after 2010, when the first wave of the baby-boom generation reaches age 65, will Medicare enrollment begin a period of exceptionally fast growth lasting approximately two decades. Between 2010 and 2030, the rate of growth in enrollment is expected to average nearly 2½ percent a year, compared with an average annual growth of about 1½ percent during the period 1995–2010. Medicare enrollment is expected to increase from about 14 percent of the population in 1996 to 22 percent in 2030.[3]

4. Under the current funding rules, the SMI trust fund cannot experience a financial imbalance since beneficiary premiums and Federal general-revenue contributions are adjusted each year automatically to meet program costs. Thus, the concept of solvency as applied to Medicare applies only to the HI component. In 1998, HI income exceeded program expenditures by $4.8 billion, the first surplus since 1994. Income exceeded expectations as a result of higher-than-expected payroll-tax revenues due to high levels of employment. Expenditures also declined, reflecting the implementation of measures enacted in the Balanced Budget Act of 1997. By 2007, HI annual expenditures are projected to again exceed annual HI income. The assets of the HI trust fund, based on the Trustees' intermediate cost assumptions, are now expected to be exhausted in 2015, somewhat later than envisaged in last year's report. To bring the HI account into long-term actuarial balance,[4] measures affecting either revenues or outlays equivalent to a 1.46 percentage point increase in the payroll tax would be required.

C. Approaches to Fixing the Financial Imbalance

5. Equity and efficiency considerations tend to argue against closing the financial imbalance entirely through a payroll tax increase, or through a transfer of general revenues, without also adopting measures to reduce outlays. This is because higher taxes generally impose a deadweight economic loss on the economy, and thus a purely tax-based fix, maximizes the associated distortion. In addition to this efficiency consideration, a purely

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[3]Congressional Budget Office (1997).

[4]Roughly, a 75-year actuarial balance is achieved when the expected present value of payroll taxes equals that of outlays, and the Trust Fund balance at the end of the 75-year horizon equals a year's worth of outlays.

tax-based fix places the full burden of the reform on current and future workers without imposing any cost on current Medicare beneficiaries, thereby raising intergenerational equity concerns. This suggests that a balanced approach that targets both revenues and outlays probably is warranted. Further efforts should be made to identify areas in which incentives to hold down costs might be strengthened. On the demand side, this might be achieved, for example, through an increase in co-payments and deductibles in order to enhance price sensitivity and induce a degree of "comparison shopping." On the supply side, this might be achieved by identifying and eliminating any "excess" payments (i.e., beyond what is needed to induce supply at a given quality) for specific services and/or by taking steps to enhance price competition among service providers. This, of course, would be an extremely challenging undertaking in view of the complicated structure of health care markets. Finally, further efforts to improve transparency, enhance auditing procedures, and strengthen sanctions could make the system less open to fraud and abuse.[5]

6. The reforms adopted in the Balanced Budget Act of 1997 made a number of steps toward such a balanced approach.[6] A major piece of the 1997 package was a general reduction in real prospective payments to physicians and hospitals. Although price ceilings in competitive markets would be expected to create shortages and/or queues, or to adversely affect quality, the U.S. health care market, particularly that element functioning under the Medicare system, is far from the competitive ideal. It remains unclear whether reducing real prospective payments for Medicare services has compromised quality or impaired access. The 1997 reforms also shifted most home health care benefits from HI to SMI, which essentially increased that portion of Medicare that is financed through a combination of general revenues and SMI insurance premiums. In addition, the 1997 measures allowed recipients to choose either the traditional fee-for-service program, certain private fee-for-service plans, or so-called "coordinated care" plans (including health maintenance organizations, provider-sponsored organizations, and preferred provider organizations) under which a fixed amount per enrollee is paid by Medicare. The introduction of alternatives to the traditional fee-for-service approach was designed to achieve a degree of cost containment by establishing a foundation for greater competition in health care delivery.

7. The Administration's FY 2000 budget contains proposals to reduce the growth in spending in the traditional fee-for-service segment of Medicare HI and to transfer general

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[5]In part owing to measures taken in the 1997 Balanced Budget Act, estimates suggest that "improper payments" fell from $10.6 billion (5.6 percent of total Medicare outlays) in 1997 to $7.7 billion (4 percent of total Medicare outlays) in 1998 (General Accounting Office, 1999).

[6]A detailed review of these reforms appears in the 1998 Annual Report of the Board of Trustees of the Federal Hospital Insurance Trust Fund (Section II.A).

revenues to the HI trust fund.[7] Together with a proposed extension of Medicare coverage, the measures to achieve spending restraint are estimated by the Congressional Budget Office (1999) to result in a net increase of $19 billion for the HI trust fund in FY 2009. From the perspective of improving the actuarial outlook, the only significant adjustment is the proposal to transfer $350 billion over the next decade from general revenues to the HI trust fund. Including interest earned, the Congressional Budget Office (CBO) estimates that this would increase the value of the HI trust fund in FY 2009 by $435 billion for a total of $595 billion and push back the date of insolvency of the HI trust fund by several years. The longer-term financial imbalance in the HI trust fund thus would be narrowed, but not significantly improved by this proposal.

8. In an effort to address this longer-term imbalance, the Bipartisan Commission on the Future of Medicare was created by Congress in the Balanced Budget Act of 1997 and was charged with making recommendations by March 1, 1999 to "strengthen and improve" the system in time for the retirement of the "Baby Boomers." The 17-member commission failed to achieve the 11-member super majority needed for a single plan to win the Commission's endorsement. Although the Breaux-Thomas Plan, named after Commission Chairman Senator John Breaux and Commission Administrative Chairman Congressman Bill Thomas, failed to win the necessary super majority, it was endorsed by a majority of Commission members and is expected to help frame the continuing debate on Medicare reform.

9. The Breaux-Thomas plan calls for a fundamental restructuring of the Medicare system. It consists of three parts: (i) a "premium support" system to take effect in 2003 under which private health insurance plans and a government-run fee-for-service plan would compete for subscriber's subsidized premium payments; (ii) certain immediate improvements in the quality of Medicare services; and (iii) financing and solvency considerations.

10. Under the premium support proposal, a Medicare Board would oversee and negotiate with private health insurance plans, provide information to subscribers, enforce financial/prudential and quality-of-care standards, and review and approve benefit packages. All plans would have benefits and premiums approved by the Board, and benefits would be funded by actuarially sound premiums. The government fee-for-service plan would have to meet the same requirements as private plans. Plans would have to offer a standard benefits package, but they could also offer additional benefits and vary copayments and deductibles subject to Board approval. On average, beneficiaries would pay 12 percent of the total cost of the standard benefits package, with the remainder funded by the federal government.

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[7]In addition, the Administration proposes to extend Medicare coverage to workers 55 to 61 who lose their health insurance due to job loss, and people ages 62 to 64 without private insurance. These people would be allowed to buy into the program at "actuarially" fair rates. The CBO (1999) estimates that the proposed expansion would add only $1.4 billion to net Medicare outlays over the period FY 2000–09.

Low-income beneficiaries would pay nothing for most plans.[8] Beneficiaries that select plans costing 85 percent of the national average plan, or less, would also face no beneficiary premium. Financing for the Breaux-Thomas premium support plan would come from a combination of general revenues, premiums, and payroll taxes. Under the plan, the age eligibility for Medicare would conform to the normal Social Security retirement age, and a nonsubsidized buy-in would be available at age 65 when that age restrictions rise.

11. Among the immediate "improvements" relative to the benefits package under the current Medicare system, the plan would introduce outpatient prescription drug coverage. The Breaux-Thomas plan would also consolidate and somewhat reduce the deductibles established under the current HI and SMI systems and index these to the growth in Medicare costs. In order to improve the incentives to economize on the use of outpatient services, a minimum 10 percent coinsurance/copay would be established for all services except hospitalization and preventive care. Those services with higher copayments under the current system would retain the higher levels.

12. By enhancing competition among medical-services providers and taking steps to improve efficiency (e.g., through higher copayments), the Breaux-Thomas proposal would appear to place Medicare on an improved financial foundation. According to Medicare Commission staff estimates, the plan would reduce the current annual growth rate in Medicare outlays by 1–1½ percentage points.[9] In 2030, for example, Medicare spending is estimated to reach nearly 6 percent of GDP compared to 8½ percent under current law.

13. The Breaux-Thomas proposal argues that the concept of "solvency" as currently applied to Medicare is not a useful guide to policy making, and that a more meaningful test would be based on the amount of general revenues needed to fund outlays in each year. This would focus attention on the tradeoffs between Medicare and other programs financed from general revenues. The proposal would redefine the concept of solvency, which currently applies only to the HI component of Medicare. HI and SMI would be combined into a single trust fund, and the new concept of solvency ("programmatic solvency") would require the Trustees to publish annual projections for the ratio of general-revenue financing to total Medicare financing. Whenever this ratio is projected to exceed 40 percent of annual Medicare outlays, the Trustees would notify Congress of the envisaged "programmatic insolvency." This would then trigger Congressional deliberations on the appropriate mix between adjustments in the payroll tax, premiums, and/or the share of general revenues that

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[8]Full premium support would be paid for most plans for eligible individuals up to 135 percent of the poverty level.

[9]Details on the underlying cost estimates for the Breaux-Thomas proposal were published in a memo to the Medicare Commission (available on the Commission web page) entitled "Cost Estimate of the Breaux-Thomas proposal," dated March 14, 1999.

should be devoted to Medicare versus other spending priorities. Under the revised solvency standard, the Medicare system would become "programmatically insolvent" around 2013–17.

15. Objections to the Breaux-Thomas plan included that the plan: (i) did not take into account the Administration's plan; (ii) did not solve the longer-term insolvency problem of Medicare; (iii) did not adequately address the limited access to outpatient prescription drugs; (iv) would eventually raise the age of eligibility; and (v) inadequately protected low-income seniors.

16. On June 29, 1999, the Administration released a plan to reform and improve the longer-term financial outlook for Medicare. The main features include measures to increase price competition, extensions of prescription drug and preventive healthcare benefits, and transfers from general revenues to the Medicare HI Trust Fund.

17. The single most significant measure to extend the life of the HI Trust Fund by 25 years (through 2027) is the proposed transfer from general revenues beginning in 2000 of about 15 percent of projected budget surpluses over the next 15 years (totaling $794 billion). Budget enforcement rules would require that the reported on-budget federal budget surplus would be reduced by the full amount of the transfer, helping to ensure that these surpluses would materialize and not be used for other purposes.

18. The proposal also includes a number of measures to improve efficiency through greater price competition among services providers and incentives for beneficiaries to "comparison shop." The traditional fee-for-service program would provide broader authority to service providers for competitive pricing, and would also create incentives for beneficiaries to select physicians based on both quality of care and costs. Beneficiaries electing the managed-care option would be encouraged to select a low-cost private managed care provider by providing them 75 cents of every dollar of cost savings. Direct cost-containment provisions like those in the Balanced Budget Act of 1997, which are set to expire in 2003, would be extended under the plan.

19. A new voluntary outpatient prescription drug benefit would be established. When fully phased-in in 2008, it would cover half of a beneficiaries' outpatient drug outlays of up to $5,000 annually ($2,500 in Medicare payments) with no deductible. Like the Breaux-Thomas proposal, it would ensure that beneficiaries with incomes below 135 percent of the poverty level would pay no premiums and be free of cost sharing. Premium assistance would be available to those with incomes between 135 percent and 150 percent of the poverty level. Participant premiums would be around one-half to one-third of private premiums for plans currently including similar outpatient drug benefits.

20. Cost sharing (copayments and deductibles) for preventive-care benefits would be eliminated. At the same time, certain existing cost-sharing provisions would be increased, including a 20 percent copayment for clinical laboratory tests, and the SMI deductible would be indexed to inflation.

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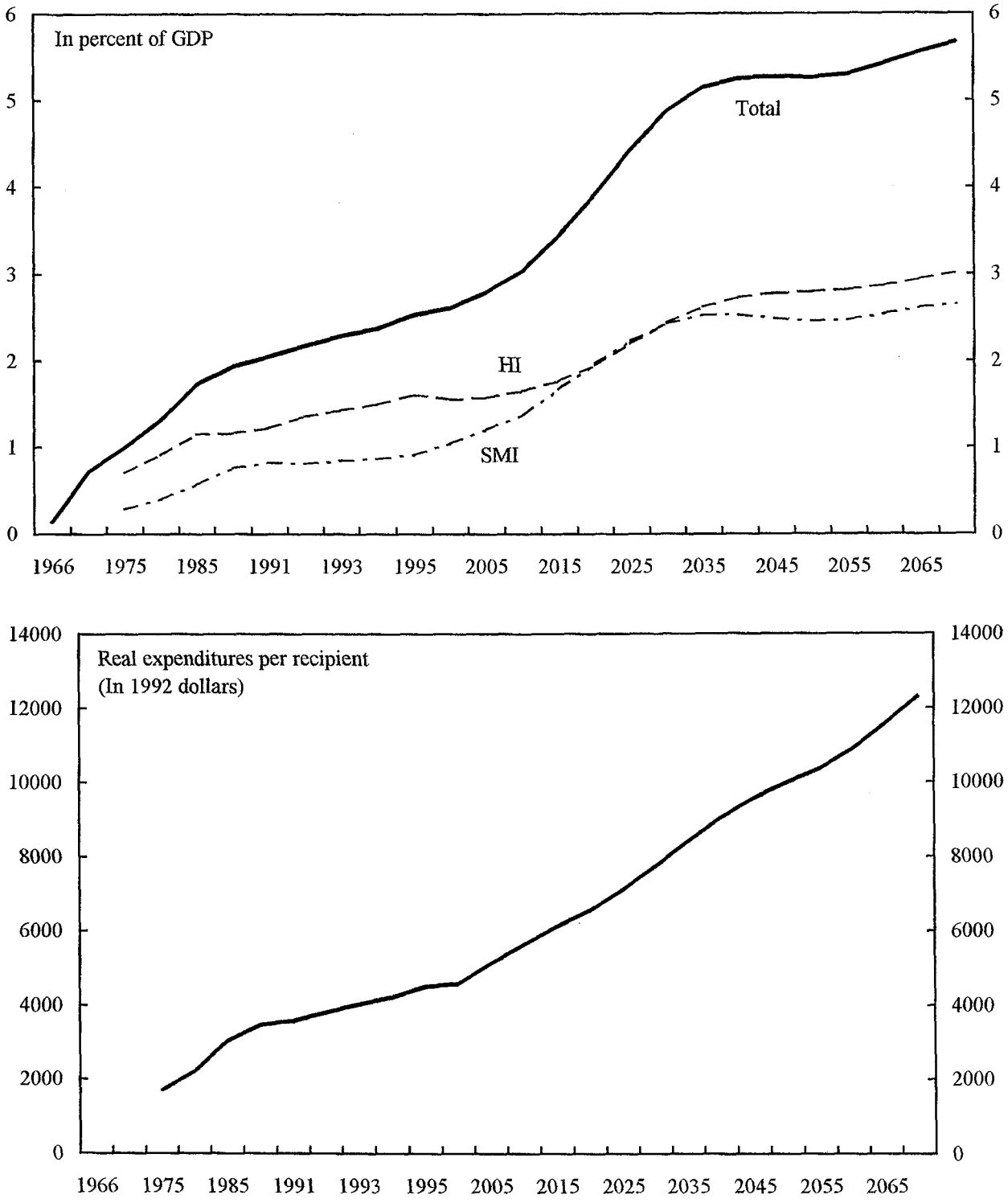
Figure 1. United States: Medicare Expenditures, 1966-2070



Source: Medicare Trustee's 1999 annual report.

IX. Dollarization and the Implications for U.S. Seigniorage and Macroeconomic Policy[1]

1. A significant degree of dollarization has been evident in Latin America, and elsewhere, for many years and recently Argentina suggested that full dollarization—i.e., replacement of the peso by the dollar as legal tender—might be a desirable alternative to its currency board.[2] Should Argentina eventually proceed with full dollarization, other Latin American countries might follow, thereby stimulating a surge in U.S. dollars circulating abroad. Evidence also suggests that significant dollarization has occurred in many transition economies.[3] On the other hand, the creation of the euro and European Monetary Union introduced a strong potential competitor to the dollar. This paper addresses the question of how important foreign demand for U.S. dollars is as a source of seigniorage and budgetary revenue, as well as other possible implications for the U.S. economy of a move toward full dollarization elsewhere in the Western Hemisphere.

2. Although foreign dollar holdings as a percent of U.S. GDP have increased steadily since the mid-1970s, the importance of seigniorage in the U.S. fiscal accounts has declined as a share of GDP, from nearly ½ percent in 1980 to just under ¼ percent of GDP in 1998. Of this amount, it is estimated that from 50 percent to 70 percent is from foreign holdings of U.S. dollars. Although variations in the net dollar flows abroad affect the measured monetary aggregates, the practice of the Federal Reserve in monitoring and targeting the federal funds rate as its principal short-term monetary instrument avoids any real macroeconomic effects on the U.S. economy from variations in overseas dollar holdings. Broadly, the implications of possible "full dollarization" in one or more countries in the Americas would likely be positive for the United States if it is successful in increasing the dollarizing countries' integration into the regional and global economies, and, by lowering risk premiums, increases investment and sustainable growth. In contrast, full dollarization that was not backed by appropriate policies, especially those promoting fiscal stability and labor market flexibility, could increase the vulnerability of the dollarizing country to adverse shocks and, could thereby lower the dollarizing countries longer-term prospects, which would also not be to the advantage of the United States. The U.S. authorities have indicated that they would not consider extending the regulatory and supervisory responsibilities of the Federal Reserve or expanding the Federal Reserve's lender-of-last resort function. While they have not explicitly ruled out possible seigniorage-sharing arrangements, such an approach would require Congressional approval.

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[1]Prepared by Michael Leidy.

[2]Panama adopted the U.S. dollar as legal tender shortly after independence in 1904. See Savastano (1996) for a discussion of dollarization in Latin America.

[3]Sahay and Végh (1996).

A. Trends in Foreign Holdings of U.S. Dollars

3. The term "dollarization" has been used in a variety of ways, and occasionally has been defined broadly to include the total value of dollars held or circulating abroad, total dollar deposits in non-U.S. banks, plus dollar deposits held by foreigners in the U.S. banking system. In this paper, because the focus is on seigniorage from dollarization, a narrower definition is used; namely, holdings of U.S. dollar currency abroad. Estimates of either the stock or flow value of such holdings are subject to a high degree of uncertainty.[4] The Federal Reserve publishes a series on both the level and flow of dollars held outside the United States based on net wholesale shipments abroad reported by large commercial bank-note brokers, primarily large commercial banks. Such shipments fail to capture net dollar transfers abroad through smaller commercial channels and private channels, including clandestine shipments related to illegal activities. Thus, this series is likely to underestimate the actual flow of dollars abroad.

4. Using a variety of direct and indirect information, Porter and Judson (1996) concluded that between 55 percent and 70 percent of the total U.S. currency stock outstanding was held abroad in 1995.[5] This compares to an estimate of about 45 percent in 1995 based on the net wholesale shipments data. But all of the estimates suggest the same broad trends. A review of the available time-series data based on net wholesale currency shipments indicates that the rate of real dollarization (the percentage change in inflation-adjusted dollars held abroad) has moved through two peak episodes during the last thirty years (Figure 1). The first occurred during the latter part of the 1970s through the early 1980s, and the second took place during the early-to-mid-1990s. The pace of dollarization appears to have slowed somewhat in the last several years, but remains high by historical standards.

B. Dollarization and U.S. Seigniorage

5. When the Federal Reserve, or any central bank, places currency into circulation, it exchanges domestic currency units for interest-bearing securities. In accounting terms, an asset swap of equal value has occurred. However, the Federal Reserve has exchanged a noninterest-bearing asset (dollars) for an interest-bearing asset (U.S. government securities). The capacity to do this, using currency manufactured for a fraction of its market value, leads to seigniorage. Seigniorage can be thought of in either stock or flow terms. The central

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[4]See Porter and Judson (1996) for a review of the various ways in which the quantity of dollars held abroad can be estimated and for a sense of the uncertainty associated with such estimates.

[5]By comparison, work at the Deutsche Bundesbank suggests that between 30 percent and 40 percent of deutsche marks are held abroad (Porter and Judson, 1996).

bank's stock seigniorage from a given exchange of dollars for government securities equals the full value of the exchange less a relatively small expense for manufacturing the currency.

6. Central bank revenue accruing from its holdings of government securities is the flow value of seigniorage, and this is the measure that enters the Federal Reserve's yearly cash-flow statement. The flow concept is particularly relevant to assessing the significance of seigniorage to the federal government budget. Because Federal Reserve profits (roughly flow seigniorage net of central bank operating expenses) are transferred to the U.S. Treasury, higher seigniorage improves the fiscal outlook. Figure 2 displays transfers to the U.S. Treasury from the Federal Reserve system since 1965. In fiscal years 1997 and 1998, for example, the U.S. Federal Reserve transferred to the U.S. Treasury $20.7 billion and $17.8 billion, respectively (i.e., an average of about ¼ percent of GDP and a little over 1 percent of total federal revenues).[6] Based on the estimates of Porter and Judson and the conservative series published by the Federal Reserve, it is reasonable to conclude that from 50 percent to 70 percent of total seigniorage in recent years has been attributable to foreign holdings of U.S. dollars.[7] So average seigniorage earnings from abroad in these two years was probably in the range of $10–$13½ billion.

7. Despite periods of relatively rapid dollarization in the early to mid-1980s and 1990s, the significance of seigniorage in the United States relative to GDP, and as a percentage of total federal government revenues, has generally been declining since the early 1980s (Figure 2). Total seigniorage, of course, depends both on the total amount of currency in circulation (at home and abroad) and interest rates on government securities. The explanation for the declining significance of seigniorage is twofold. The structure of interest rates on government securities generally has drifted downward since the early 1980s. At the same time, there has been a secular decline in dollars to GDP held in the United States associated with increased credit card usage and the emergence of automated teller machines. This has partially offset the continued increase in U.S. dollar holdings abroad (Figure 3). Since 1990, the stock of dollars outstanding has risen by just over 1 percentage point of GDP, owing to the strength of the increase in foreign holdings (Figure 4). If these trends continue, U.S. seigniorage will increasingly be attributable to dollarization throughout the world.

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[6]These amounts are the so-called "statutory transfers." The Omnibus Budget Reconciliation Act of 1993 requires that surplus Federal Reserve Bank earnings be transferred from the regional Federal Reserve banks to the Board, and then to the U.S. Treasury. These earnings are principally from holdings of U.S. Treasury securities. Federal Reserve holdings of U.S. Treasury and federal agency securities in 1998 were valued at $473 billion.

[7]This range also encompasses the U.S. Administration's view that "Foreign holdings of U.S. currency are conservatively estimated at 60 percent of the total in circulation." (*Economic Report of the President, February 1999).*

C. Implications of Dollarization for the Conduct of U.S. Macroeconomic Policy

8. There are a number of possible benefits to the United States from foreign holdings of U.S. dollars. The discussion in *Economic Report of the President* (February 1999) identifies a number of possible benefits associated with the international currency role of the U.S. dollar including: (i) the "power and prestige" that might be associated with having an international currency; (ii) the possibility of increased business for U.S. banks and other financial institutions; and (iii) a degree of convenience for U.S. resident importers, exporters, borrowers, and lenders. However, seigniorage is possibly the most significant, and certainly the most quantifiable, benefit of dollarization for the United States. Thus, one risk associated with dollarization is that it brings with it the potential for a marked shift in the demand for dollars overseas and the associated loss of seigniorage.[8] However, even a very large net inflow of dollars over a short period of time would produce a rather trivial effect for total seigniorage and the U.S. federal budget.[9]

9. Do shifts in overseas holdings of dollars have real macroeconomic effects on the U.S. economy beyond the seigniorage earnings? In particular, do such shifts complicate the conduct of monetary policy? Net international dollar flows directly affect liquidity in the United States and sudden shifts in net dollar flows might be expected to impart an added degree of short-term volatility to the monetary aggregates and to other indicators of liquidity. However, as with any liquidity shock, whatever the source, if the Federal Reserve can respond in a timely manner, real effects would be prevented. Indeed, under current monetary policy procedures in which the central bank conducts daily open-market operations to achieve a target federal funds rate, the Federal Reserve would respond automatically to such liquidity shocks. Suppose, for example, that the demand for dollars held by the public in Argentina were to increase. To accommodate the increased demand for U.S. dollars, the Argentine central bank would have to sell dollar reserve assets—U.S. government bonds. Even if this transaction were to take place in the private U.S. credit markets, rather than approaching the U.S. Federal Reserve directly, the effect would be the same. Initially, dollar deposits in the U.S. banking system would begin to contract as bonds were offered for sale. At that point, with bank deposits contracting, there would be a shortage of bank reserves and this would put upward pressure on the federal funds rate. The Federal Reserve, however, would respond automatically to this pressure by buying bonds in order to create new bank

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[8]The most likely factor on the horizon that might eventually lead to a degree of dedollarization is the emergence of the euro. Of the national currencies it replaced, the mark had the most significant overseas holdings. The euro could emerge over the years as a strong competitor to the dollar, but significant shifts in currency holdings are not likely to take place suddenly on a large scale.

[9]For example, even a 75 percent reduction in total world dollarization, assuming that the current foreign share of dollars outstanding is 70 percent, would have increased the federal budget deficit by only about 0.1 percent of GDP in FY 1997.

deposits sufficient to fully offset the pressure on the federal funds rate. The Federal Reserve's open-market purchases would be sufficient to accommodate the increased demand for U.S. dollars held by the Argentine public.

10. The process, of course, also operates in reverse and does not depend on the specific institutional arrangements associated with the Argentine currency board. Suppose, for example, there was a sudden reversal of preferences and economic agents abroad wished to reduce their holdings of dollars. This would generate a net increase in bank deposits in the United States as foreign-dollar holders, or agents acting on their behalf, made preparations to exchange dollars for U.S. goods, services, or assets. The initial surge in bank deposits would immediately increase reserves in the U.S. banking system and would thus increase the supply of federal funds, putting downward pressure on the federal funds rate. This downward pressure would be met by a withdrawal of liquidity from the domestic banking system through an equivalent open-market sale of bonds by the Fed. Thus, the effect of the net inflow of dollars on domestic liquidity would be quickly neutralized and the seigniorage that had been associated with the repatriated dollars would be lost.

11. These examples indicate that the monetary aggregates (which include currency in circulation both at home and abroad) are affected by international currency flows, even though the effects on domestic liquidity are simultaneously offset by the Federal Reserve. Thus, variations in net international currency outflows, which rose sharply in the early 1990s, would help to explain the breakdown between the growth in the monetary aggregates and nominal GDP. For this reason, it has been suggested by some that currency should be excluded from measures of the U.S. money supply if monetary aggregates are to be useful in guiding the conduct of monetary policy (Sprenkle, 1993).

12. Net international dollar flows began being recorded in the U.S. international accounts in July 1997. Under the new BOP accounting convention, an estimate of net international dollar flows is included in the capital account—net dollar outflows (inflows) are a credit (debit) in the capital account. Balancing items could show up on either the current or capital account. For example, in the case of a decline in overseas holdings, dollars could flow back to the United States through the purchase of U.S. goods, services, or assets. Unless the full amount of the repatriated currency is used to acquire U.S. assets, the composition of the balance of payments would shift toward an improved current account and a worsened capital account.

D. Implications of "Full Dollarization" for the United States [10]

13. Argentina has raised the idea of moving from its existing currency board arrangement to full dollarization in which the U.S. dollar would become the legal tender, and all peso currency notes in circulation would be replaced by dollars. There has also been a revival of the debate about full dollarization in El Salvador, although the new administration has indicated that it would first give consideration to moving toward a currency board. For a country considering full dollarization, the main benefits would be the potential for narrowing sovereign interest rate spreads by eliminating exchange risk and—less quantifiable but probably more important in the long run—the benefits of fuller integration into the global economy and the elimination of future currency crises. The costs would include potential loss of seigniorage revenues, the loss of a more unrestrained lender of last resort capability, and the loss of the option to devalue in the face of major shocks. For countries that had not already moved to the stage of a currency board, there would also be some additional loss of monetary discretion, as interest rates would become fully linked to the monetary policy cycle of the United States; however, this is a price already paid by countries, like Argentina, with a currency board.

14. But what would be the implications for the United States? In the long term, the main effects—whether positive or negative—are likely to stem from the impact on growth in the dollarizing trading partners. If dollarization successfully increases these countries' integration into the regional and global economies and, by lowering risk premiums, increases investment and sustainable growth, the United States will also indirectly benefit. However, if domestic policies, especially fiscal and labor market policies, are not fully consistent with the requirements of full dollarization, the result could be lower growth in the dollarizing economies, with consequently adverse consequences for the United States. In these latter circumstances especially, political tensions could also arise if there were to be a marked divergence between the United States monetary policy stance and the near-term cyclical requirements of the dollarized partner.

15. In addition to these considerations, the effects on the United States would depend in large part on the way in which full dollarization were implemented. In principle, there appear to be three broad options: (i) a gradual move toward a full multilateral monetary union between the United States and interested regional partners; (ii) a bilateral monetary arrangement between the United States and individual dollarizing countries; and (iii) unilateral dollarization. Because the United States is a large, diversified, and highly open economy, and because the U.S. dollar is already widely used in international transactions involving the United States—thus minimizing existing trade frictions that might be associated with currency fluctuations—a full monetary union would likely produce

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[10]This section focuses on the possible implications for the United States of "full dollarization." The potential costs and benefits for Argentina, or any other country, are discussed in detail in the forthcoming Board seminar paper on full dollarization.

relatively small trade-based benefits for the United States. However, the costs would also be relatively small. A full monetary union would impose costs on the United States by requiring it to relinquish monetary policy autonomy and to accept a framework based on regional, rather than domestic, economic developments and objectives. But the economic size of the United States is such that, even with a full monetary union in which the monetary authority's objectives were defined in terms of the overall union, the United States component would predominate—much more so than Germany does in Europe (see box). For example, in such a union Argentina would have a weight, by GDP, equivalent to that of, say, Florida or Ohio. In practice, the United States authorities have indicated that they would not be prepared to alter the focus of United States monetary policy on serving domestic interests as part of any dollarization initiative. Bayoumi and Eichengreen (1994) find that the supply shocks across countries in the Americas have, on balance, been both large and negatively correlated with those in the United States, making the region relatively unsuited to monetary union—although such estimates cannot take into account the fact that the appropriate theoretical prerequisites for a common currency area are, to some extent, endogenous since the degree of integration and hence the nature of shocks is likely to change once the monetary union is formed.

Box. How Dominant Would the United States be in any Regional Monetary Arrangement?

If the United States were to enter into a monetary union with a number of its regional partners—which is obviously unlikely in the foreseeable future—its economic weight would dominate that union to a far greater extent than any country in the European Monetary Union.

As a practical matter, therefore, monetary policy in such a union would be dominated to a significant extent by domestic economic considerations in the United States.

Western Hemisphere1/	**100%**		
Of which:			
United States	76%	**European Monetary Union**	**100%**
		Of which: 1/	
California	10	Germany	33
New York	6	France	22
Texas	5	Italy	18
Illinois	4		
Florida	4		
Ohio	3		
Brazil	8		
Canada	6		
Mexico	4		
Argentina	3		

Sources: WEO data; and Bureau of Economic Analysis, U.S. Department of Commerce.

1/ Based on 1997 GDP (at prevailing exchange rates) and estimates of Gross State Product. The sample includes the United States, Canada, and the ten largest economies in Latin America (Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, Mexico, Peru, Uruguay, and Venezuela).

16. The impact on the United States of any bilateral monetary treaty with, say, Argentina would largely depend on the scope of such a treaty. The U.S. authorities have already indicated that they would not consider extending the regulatory and supervisory responsibilities of the Federal Reserve or expanding the Federal Reserve's lender-of-last resort obligations.[11] In practice, therefore, the most significant difference between a bilateral treaty and unilateral dollarization would revolve around possible arrangements for sharing of seigniorage. Since full dollarization involves an expansion in overseas dollar holdings, even a full remittance of the additional seigniorage to the dollarizing countries would leave the United States no worse off, in budgetary terms, than prior to the dollarization. As an indication of the magnitudes involved, the total amount of seigniorage associated with full dollarization in Argentina would have been about US$¾ billion a year in 1998 (about 0.01 percent of United States GDP).[12] At present, there is only one country—South Africa—that shares seigniorage earnings with its smaller neighbors that use its national currency (i.e., with Namibia and Lesotho as part of the Common Monetary Area (CMA) agreement).[13] However, a number of possible arrangements have been suggested.[14] Some observers in Argentina have suggested that the seigniorage earnings could be earmarked as backing for a facility—with private or public lenders—to provide liquidity support in the event of difficulties in Argentina's banking sector. A recent staff report from the Joint Economic Committee of the U.S. Congress (1999) suggested a specific formula for sharing seigniorage whereby a dollarizing country's share would be linked to its share of the total dollar monetary base, adjusted for the costs of operating the Federal Reserve system.

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[11]Deputy Treasury Secretary Summers (1999).

[12]The stock of peso currency in circulation in Argentina in 1998 was equivalent to about $13.5 billion. This would yield $709 million in additional seigniorage for the United States assuming a 5.25 percent average yield on United States government securities.

[13]See Bogetic (1999) for details.

[14]Any provision calling upon the United States to share seigniorage would require an appropriation from Congress. Present arrangements with Panama and other countries using the dollar as legal tender do not include any provisions for seigniorage-sharing.

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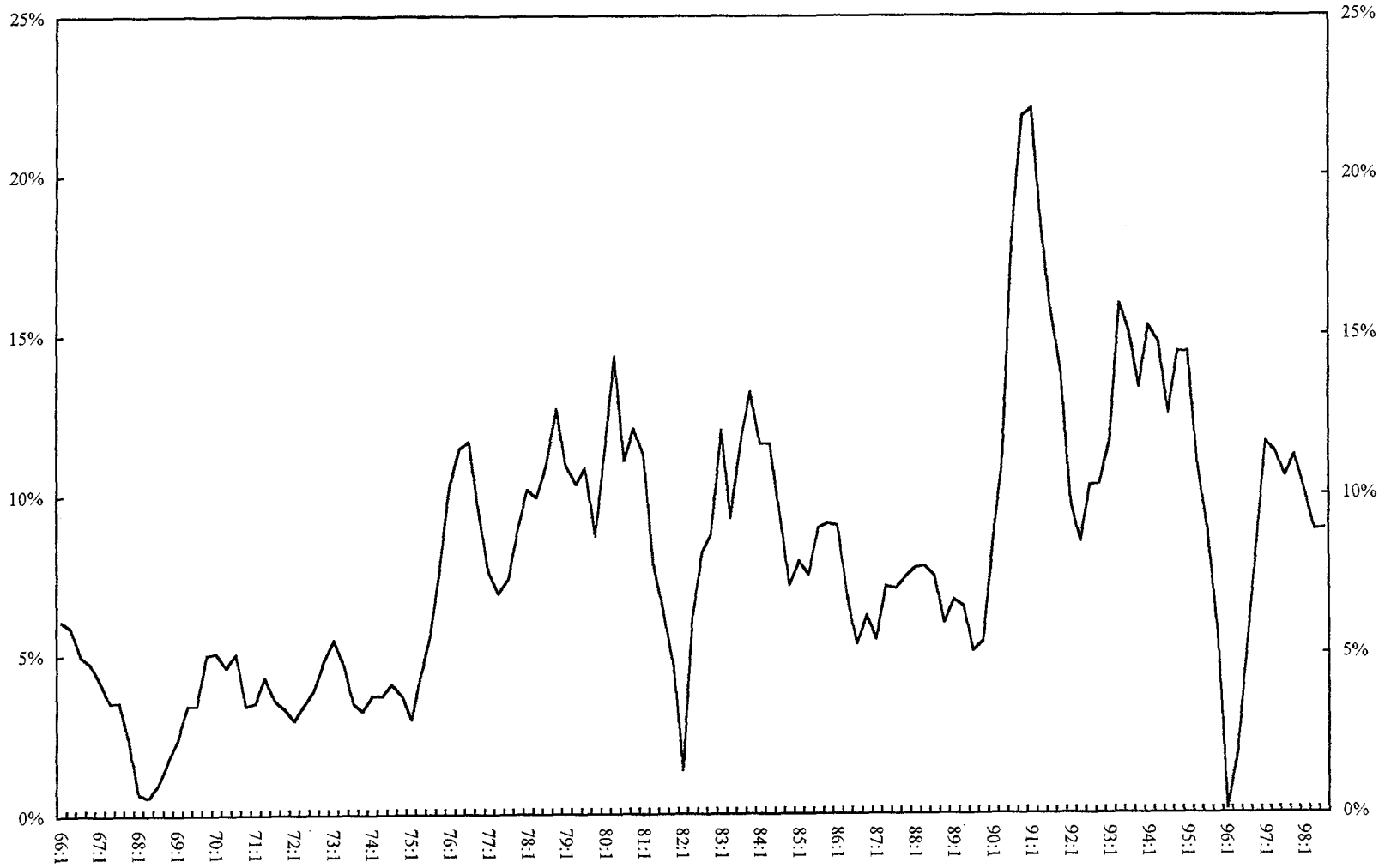
Figure 1. United States: Real Dollarization, 1965-97

(Annualized quarterly growth in the stock of inflation-adjusted dollars held abroad)

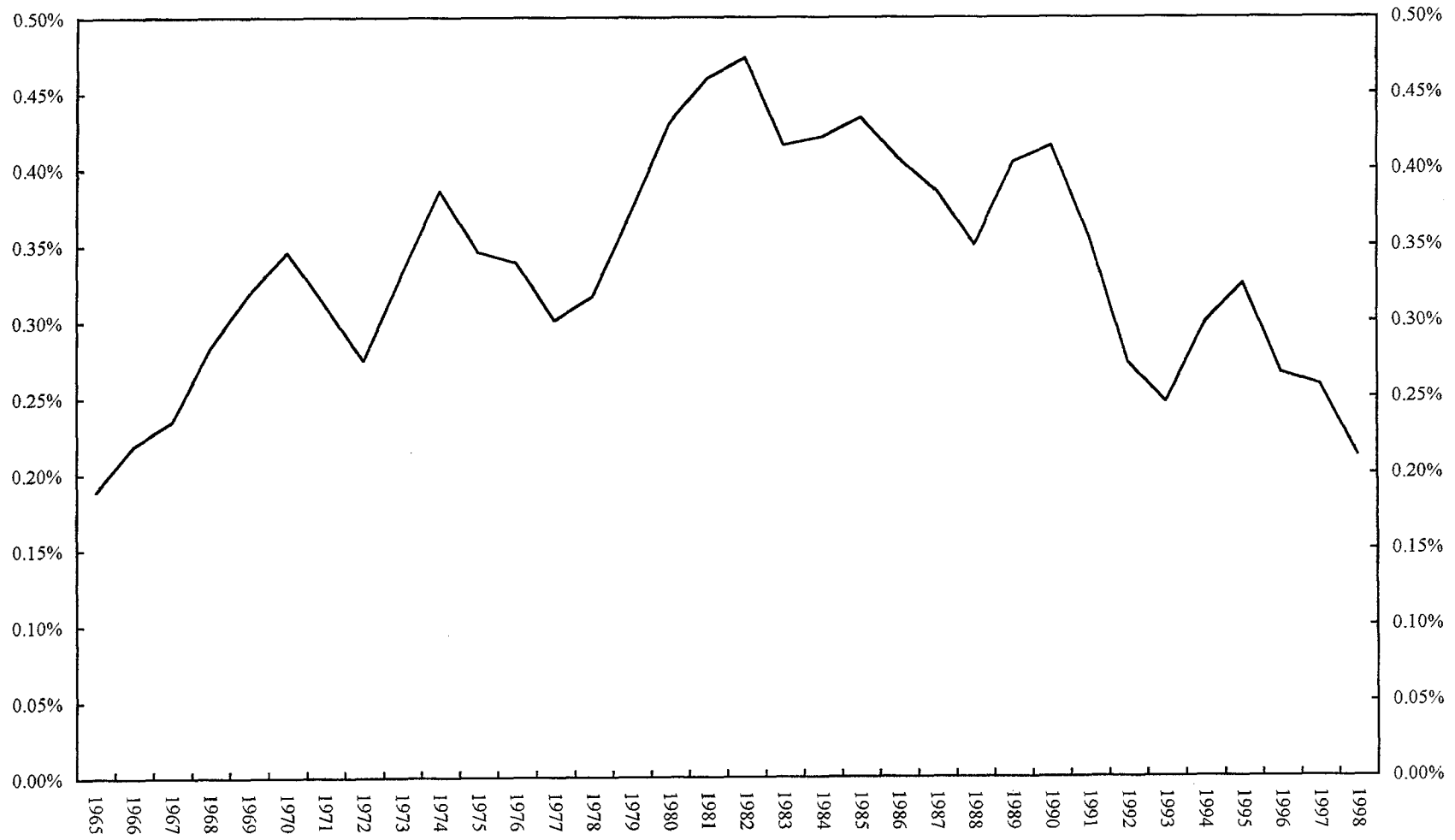


Sources: Board of Governors of the Federal Reserve System, Flow of Funds z-series data tables, Table F204; and Fund Staff estimates.

Figure 2. United States: Seignorage, 1965-97

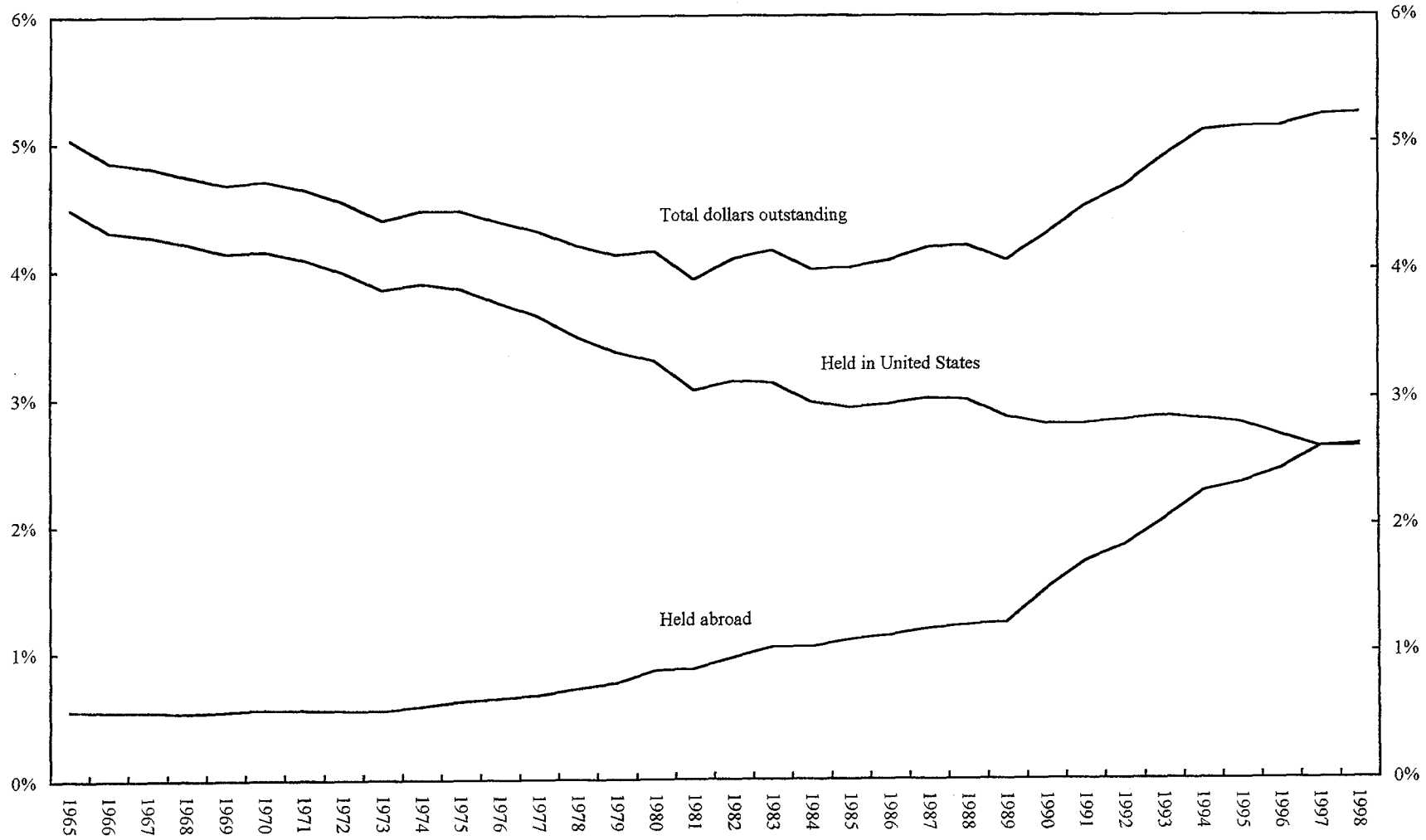
Payments to the Treasury

(Percent of FY GDP)



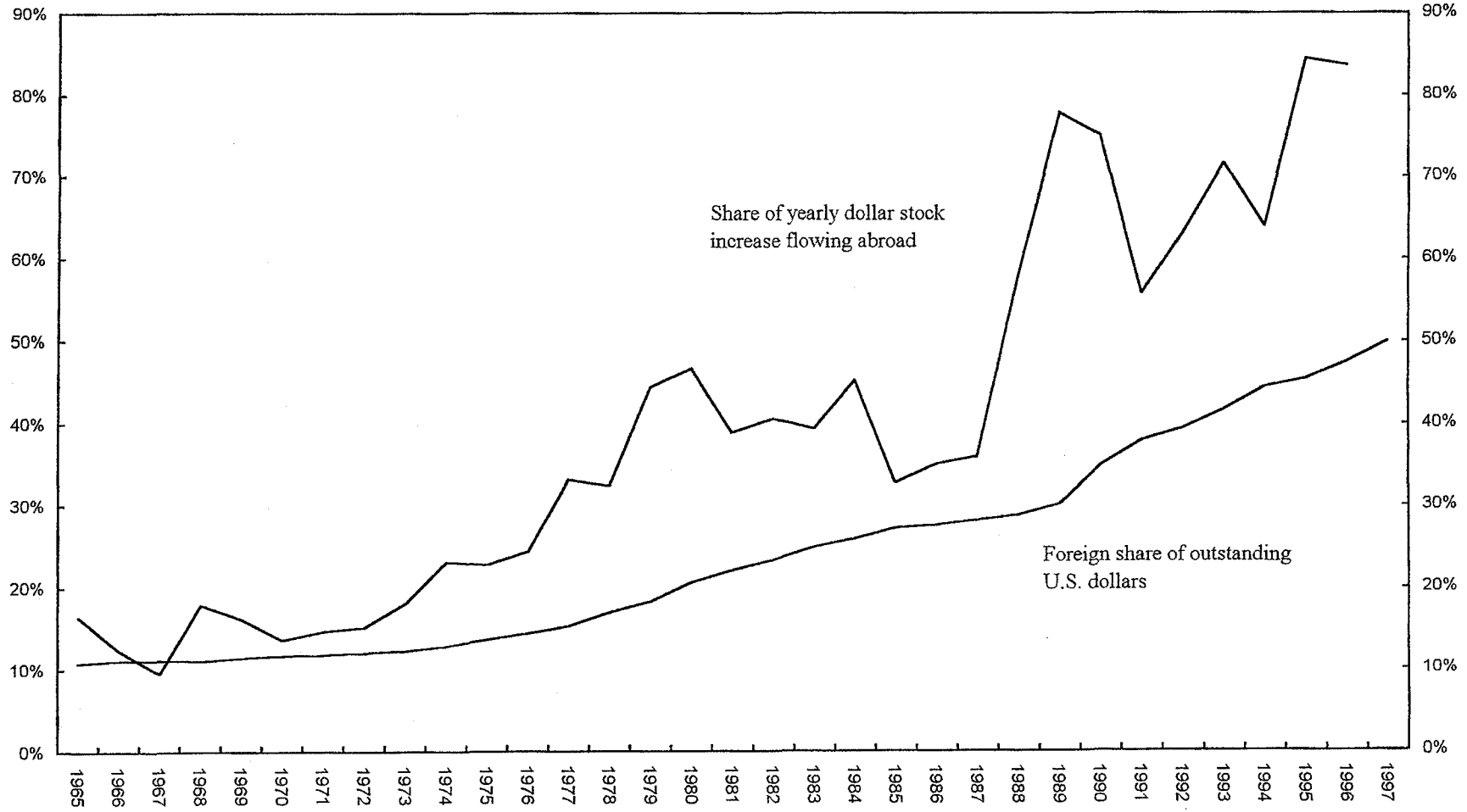
Sources: Board of Governors of the Federal Reserve System, Annual Reports, various issues; and Fund staff estimates.

Figure 3. United States: U.S. Dollars Outstanding, 1965-98
(Percent of GDP)



Sources: Board of Governors of the Federal Reserve System, Flow of Funds z-series data tables, Table F204; and Fund Staff estimates.

Figure 4. United States: Share of the Increase in Total Dollars Outstanding Flowing Abroad, 1965-97



Sources: Board of Governors of the Federal Reserve System, Flow of Funds z-series data tables; and Fund staff estimates.

X. Official Development Assistance

1. The U.S. budget for development assistance is channeled mainly through the Agency for International Development (USAID), the Economic Support Fund (ESF), the multilateral development banks (MDBs), and food aid under Public Law 480. The USAID provides financial assistance to developing countries, mainly in the form of grants, to help complete projects related to agricultural development, population control, primary education, health, and the environment. The ESF makes financial assistance available to countries facing security risks, with a large share of these funds being provided to Israel and Egypt. In recent years, most of the contributions to the MDBs have been directed to the World Bank's International Development Association (IDA), which provides concessional lending to the poorest nations. Title 1 of Public Law 480 provides concessional loans for the purchase of U.S. agricultural commodities, Title 2 provides food aid to both government and private organizations, and Title 3 provides food aid conditional on policy reforms.

2. U.S. foreign assistance outlays on a budgetary basis are expected to increase from $8.05 billion in FY 1998 (0.10 percent of GDP) to $8.66 billion in FY 1999 (0.10 percent of GDP) (Table 1). While funding for some categories of assistance (such as USAID, the Economic Support Fund, and MDBs) will likely decline in FY 1999, total assistance is expected to increase as a result of higher funding for Public Law 480. In FY 2000, the Administration has indicated that it will seek authorization to make contributions to the Heavily Indebted Poor Countries (HIPC) Trust Fund, which provides debt relief to severely indebted poor countries. The U.S. authorities believe that the HIPC Trust is underfunded and that a contribution from the United States would catalyze additional international support. Also, clearing U.S. arrears with the MDBs is a high priority of the Administration.

3. In its 1998 report, the OECD Development Assistance Committee (DAC) noted that U.S. official development assistance (ODA) declined by about $2.5 billion in 1997 to $6.9 billion (0.09 percent of GNP). The decline in U.S. ODA in 1997 was due, in part, to delays in the approval of the federal budget, as capital subscriptions to MDBs scheduled for 1997 were deferred to 1998. Also, the decline in U.S. ODA in 1997 reflected the removal of Israel from the list of DAC recipients; in 1996, Israel received $2.2 billion in payments that were classified as ODA. The United States was the second largest donor among DAC participants in 1997 in terms of the level of assistance, but it ranked last among DAC participants in terms of ODA as a percent of GNP (Table 2).

Table 1. United States: Outlays for Foreign Assistance on a Budget Basis

(In billions of dollars)

	Fiscal Year						
	1993	1994	1995	1996	1997	1998	1999
Outlays for foreign assistance by program							
Agency for International Development	3.32	3.40	4.10	3.94	3.70	3.62	3.53
Economic Support Fund	3.23	2.77	2.74	2.24	2.23	2.46	2.20
Multilateral Development Banks	1.16	1.36	1.40	1.72	1.81	1.53	1.36
International Organizations	0.38	0.31	0.50	0.30	0.31	0.30	0.29
PL 480 food aid	1.44	1.73	1.37	1.08	0.89	0.94	1.63
Enterprises for the Americas Initiative debt forgiveness	--	0.0	0.02	0.03	--	0.02	0.04
Refugee Assistance	0.67	0.7	0.71	0.64	0.72	0.72	0.69
Peace Corps	0.21	0.21	0.23	0.21	0.23	0.22	0.24
Credit liquidating accounts	1.01	0.50	0.52	1.44	1.51	1.76	1.32
Offsetting receipts	0.94	0.56	0.56	0.01	0.04	--	--
Other	--	--	--	--	--	--	--
Total	**8.43**	**9.41**	**9.99**	**8.71**	**8.41**	**8.05**	**8.66**
In percent of GDP	0.13	0.14	0.14	0.12	0.11	0.10	0.10

Source: U.S. Agency for International Development.

Table 2. United States: ODA by DAC Countries in 1997

	In Millions of U.S. Dollars	Rank	Percent Of GNP	Rank
Australia	1,061	13	0.28	13
Austria	527	16	0.26	16
Belgium	764	15	0.31	11
Canada	2,045	7	0.34	8
Denmark	1,637	9	0.97	1
Finland	379	17	0.33	9
France	6,307	3	0.45	6
Germany	5,857	4	0.28	12
Ireland	187	19	0.31	10
Italy	1,266	11	0.11	20
Japan	9,358	1	0.22	19
Luxembourg	95	21	0.55	5
Netherlands	2,947	6	0.81	3
New Zealand	154	20	0.26	14
Norway	1,306	10	0.86	2
Portugal	250	18	0.25	17
Spain	1,234	12	0.23	18
Sweden	1,731	8	0.79	4
Switzerland	911	14	0.34	7
United Kingdom	3,433	5	0.26	15
United States	6,878	2	0.09	21
Total DAC	**48,324**		**0.22**	
Memorandum items				
DAC average	--		0.40	
EU countries combined	26,612		0.33	
European Commission	5,261			

Source: OECD/DAC 1998 Development Co-operation Report.