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CONTAINS CONFIDENTIAL
INFORMATION

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To: Members of the Executive Board

From: The Secretary

Subject: **United States—Selected Issues**

The following corrections have been made in SM/99/164 (7/12/99):

Pages 1, 39, 52, 56, 66, 81: Revised

Corrected pages are attached.

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CONTAINS CONFIDENTIAL
INFORMATION

INTERNATIONAL MONETARY FUND

UNITED STATES OF AMERICA

Selected Issues

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Approved by the Western Hemisphere Department

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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.

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.

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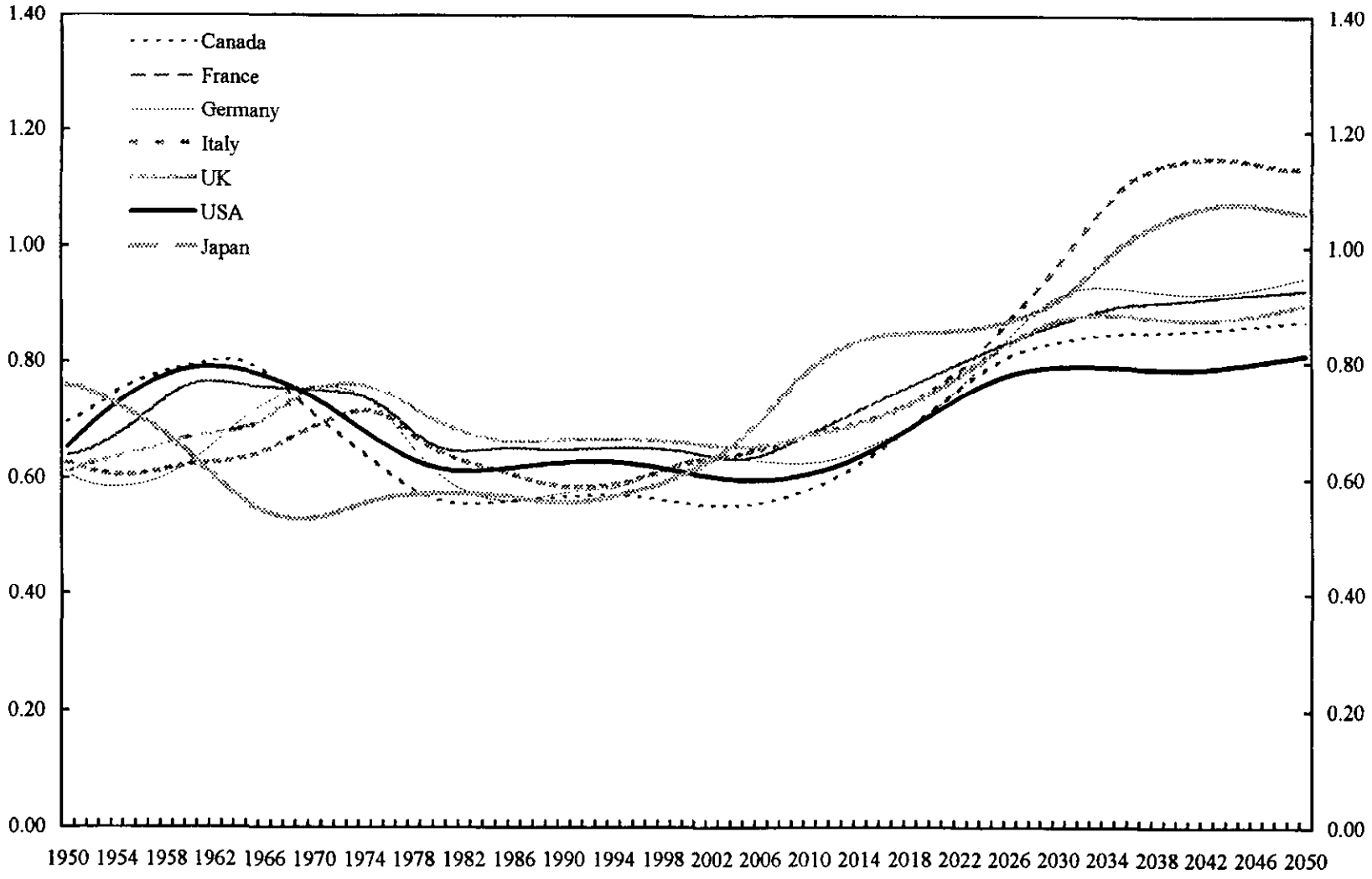
Figure 1. Selected Industrial Countries: Classic Dependency Ratio, 1950-2050



Source: United Nations (1998).