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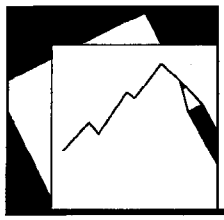

IMF Working Paper

Financial Implications of the Shrinking Supply of U.S. Treasury Securities

Garry J. Schinasi, Charles F. Kramer, and R. Todd Smith

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Research Department

Financial Implications of the Shrinking Supply of U.S. Treasury Securities[1]

Prepared by Garry J. Schinasi, Charles F. Kramer, and R. Todd Smith

May 2001

Abstract

Recent improvements in fiscal positions in advanced countries have sharply curtailed the issuance of government securities and created the possibility that government securities could disappear in some countries. The possibility that this might occur in the United States has attracted the most attention, in large part because of the international role of the U.S. dollar and the widespread perception that U.S. treasury securities have the lowest total financial risk (the combination of credit, market, and liquidity risks) among U.S. dollar assets. This paper analyzes the unique features of government securities and links them to the important roles that government securities, in particular U.S. treasury securities, have come to play in national and international financial markets. The paper then identifies and examines financial market-oriented public policy questions raised by the shrinking supply of U.S. treasuries.

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[1]This paper draws, in part, on a series of informal discussions with commercial and investment banks, securities firms, insurance companies, pension fund managers, regulatory and monetary authorities, credit rating agencies, and official reserve managers. These discussions took place in New York and London in late 2000 and early 2001. The study has benefited from comments and suggestions from Michael Mussa, staff in other IMF departments, IMF Executive Directors, and some national authorities. Yoon Sook Kim provided expert research assistance and Caroline Bagworth and Adriana Vohden provided drafting assistance.

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I. Introduction and Summary

Government securities and government securities markets have several characteristics that distinguish them from other financial instruments and markets. They have minimal credit risk, are issued in a wide range of maturities, are usually traded in relatively deep and liquid markets, and are supported by efficient repo and derivative markets. In addition, government securities markets typically are deeper and more liquid than corporate debt securities markets. Because of these characteristics, government securities provide services and play important roles that might not easily be filled by other financial instruments. These roles include their use as benchmarks for pricing and quotation of other fixed-income instruments, for hedging interest-rate risks, as collateral, and as "near monies" (safe havens) for investors during periods of major economic and financial market adjustments.

Recent improvements in fiscal positions in advanced countries have sharply curtailed the issuance of government securities. In some countries, the improvement is projected to continue well into the next decade, and has created the possibility that government securities could disappear in some countries. The possibility that this might occur in the United States has attracted the most attention, in large part because of the international role of the U.S. dollar and the widespread perception that U.S. treasury securities have the lowest total financial risk (the combination of credit, market, and liquidity risks) among U.S. dollar assets. The U.S. treasury market has long been considered one of the deepest and most liquid financial markets in the world. In addition, U.S. treasury securities are widely used for hedging interest-rate risk, are key benchmarks for quoting dollar-denominated fixed-income instruments in both U.S. and international markets, and are the most widely accepted collateral for international financial transactions. For these reasons, the possibility that treasury securities might disappear has attracted considerable interest, even alarm.

The paper analyzes the unique features of government securities and links them to the important roles that government securities, in particular U.S. treasury securities, have come to play in national and international financial markets. The paper then identifies and examines financial market-oriented public policy questions raised by the shrinking supply of U.S. treasuries. These questions are related to the financial market benefits of treasury securities deriving from the roles they play in U.S. and international financial markets. A complete assessment of the costs and benefits of U.S. treasury securities would have to consider also the economic consequences of paying down the public debt. In addition, as the baby-boom generation moves into retirement it is possible, if not likely, that the path of U.S. federal government debt could again change course. Thus, any benefits of paying down the public debt would need to be weighed against the costs of having to resuscitate public debt securities markets, quite possibly within the next decade.

The shrinking supply of U.S. treasury securities has already resulted in significant changes in U.S. and international financial markets, particularly in terms of the instruments that are used by market participants for various purposes. In the roles of pricing and quotation of private fixed-income instruments, hedging market risks, and to some extent in collateralizing counterparty

risks, market participants have shifted significantly—but not completely—to private financial instruments (interest-rate swaps, and to a lesser extent high-grade corporate debt securities). The ability to find private substitutes in these particular roles may pertain only to the U.S. treasury market and a few other advanced-country government securities markets. In less well-developed markets in advanced countries, and in less developed countries and financial systems, there most likely are significant financial market benefits associated with having well developed and liquid government securities markets to play these roles.

In some of the other roles played by U.S. treasury securities there is skepticism and concern that private financial instruments may neither easily nor fully substitute for treasury securities. There are three main concerns. First, it may take a considerable period of time before market participants fully and completely adapt in using private instruments—embodying credit risk—to substitute reliably for U.S. treasury securities as universally accepted collateral. As the large internationally-active financial institutions appear to have a cost advantage in the management of risky collateral, this influence may be adding to increased concentration in U.S. and international financial markets. In addition, it remains to be seen how private collateral will perform during periods of stress, and this uncertainty may be why some market participants have increasingly come to rely on cash (bank deposit transfers) as collateral instead of U.S. treasuries. Second, it may be difficult to find or produce (short of central bank money) reliable substitutes for U.S. treasuries in their roles as domestic and international safe havens. While it is difficult to discern the consequences of this for market dynamics and systemic risk, this issue has received relatively little attention both by policymakers and by market participants. Third, for some types of investors, treasury securities may improve substantially the ability to achieve desired risk-return combinations of portfolios. An important instance of this is insurance companies and pension funds for which there do not appear to be sufficient private substitutes for long-term treasury securities that are desired by these investors. As a result, if the supply of long-term government securities in the United States and in some other countries continues to decline, institutional investors may need to contend with and manage greater mismatches between the maturities of assets and liabilities. In these areas, the paper raises more questions than it answers.

The paper is organized as follows. Section II discusses the historical development of government securities markets, with particular emphasis on the U.S. treasury securities market. Section III analyzes the unique features of government securities and markets, and the roles they have come to play in both domestic and international financial markets, again with a heavy focus on U.S. treasury markets. Section IV discusses the recent impact of the shrinking supply of U.S. treasury securities on U.S. financial markets, potential substitute benchmark issuers, and U.S. Federal Reserve assets. Section V examines some of the key issues raised by the shrinking supply of U.S. treasuries, and assesses the challenges they entail. The final section draws some conclusions.

II. Historical Development of Government Securities Markets

A. The Major Government Securities Markets

Beginning in the 1970s, sustained budget deficits produced large government securities markets in all the major advanced economies (Tables 1-2). As of June 2000, the outstanding global supply of private and public debt securities totaled $36.7 trillion, of which more than half ($19.8 trillion) was public sector debt. The growing volumes of government bonds over the past two to three decades spurred the development of infrastructure for trading and hedging fixed-income securities in many, but not all, of the major countries. As a result, some of the major advanced economies have deep, liquid, and sophisticated government debt securities markets. Most of these markets are large compared to their economies, other domestic stock and bond markets, and international markets for debt securities denominated in their respective currencies. Government securities markets also tend to be the most internationalized markets, and secondary-market turnover generally far surpasses turnover in other securities markets. For example, in the U.S. treasury market, daily turnover currently averages about $200 billion, a magnitude that is about two-thirds *global* turnover in spot currency transactions involving the dollar, and five times greater than daily turnover on the New York Stock Exchange.

In the past two or three years, as the major countries have consolidated their fiscal positions, government debt markets have by and large changed course. Because of sharply improved fiscal situations in many advanced economies—the notable exception being Japan—stocks of government debt are on relatively flat or downward trajectories. Canada, Germany, the United States, and the United Kingdom have fiscal surpluses projected for 2000, and except for Germany these countries also posted surpluses in 1999.[2] Governments in these countries have dramatically cut back new issues of debt securities and some have bought back securities. In Australia, Sweden, and the United States, improvements in fiscal positions have been so large that it is possible, if not likely, that publicly held federal debt could disappear in the next 5-10 years in each of these countries.

The possibility that this might occur in the United States has attracted the most attention, in part because of the international role of the U.S. dollar, and also because it has the largest, deep and liquid government securities market in the world. Thus, while several countries are on track to eliminate their publicly held debt ahead of the United States, the shrinking supply of U.S. treasury securities is widely considered to be of greatest global financial importance. This is partly because of the absolute magnitude involved—about $3.5 trillion of treasury securities are publicly held. Possibly even more important reasons relate to the central role of the U.S. dollar in international finance and the important roles played by treasury securities in U.S. and global financial markets. Expressed concerns have related mainly to the possibility that many of these roles may not be easily filled by other financial instruments. As will be examined in Section III

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[2] International Monetary Fund, *World Economic Outlook, October 2000.*

Table 1. Global Bond Markets
(In billions of U.S.dollars)

	Gross Issuers	Debt Securities [2/]		International Debt Securities			Domestic Debt Securities		
		International	Domestic	Public Sector	Financial Institutions	Corporate Issuers	Public Sector	Financial Institutions	Corporate Issuers
All countries	36,690.1	5,384.6	31,305.5	1,132.3	2,819.3	1,433.0	18,675.9	8,261.9	4,367.7
North America	18,097.8	1,751.9	16,345.9	509.1	702.2	540.6	8,786.5	4,625.4	2,934.0
Canada	741.5	210.6	530.9	125.3	37.3	48.0	422.4	43.6	64.9
Mexico	126.1	64.6	61.5	33.8	3.3	27.5	49.8	4.0	7.7
United States	17,230.2	1,476.7	15,753.5	350.0	661.6	465.1	8,314.3	4,577.8	2,861.4
Japan	6,681.2	314.0	6,367.2	21.6	156.4	136.0	4,868.3	749.5	749.4
EU - 15	9,422.8	2,615.9	6,806.9	361.3	1,709.4	545.2	4,007.8	2,392.9	406.2
Austria	241.6	87.6	154.0	35.0	47.2	5.4	90.3	60.3	3.4
Belgium	396.5	72.4	324.1	18.1	50.7	3.6	233.3	77.0	13.8
Denmark	277.4	30.5	246.9	16.3	9.3	4.9	84.3	147.3	15.3
Finland	120.2	41.4	78.8	29.7	7.7	4.0	44.7	26.8	7.3
France	1,399.0	326.1	1,072.9	30.5	182.9	112.7	635.4	328.8	108.7
Germany	2,518.8	779.9	1,738.9	17.5	679.8	82.6	746.0	974.3	18.6
Greece	116.7	25.5	91.2	21.9	1.7	1.9	90.9	0.3	0.0
Ireland	67.0	36.8	30.2	6.9	25.9	4.0	23.3	0.0	6.9
Italy	1,535.9	184.5	1,351.4	70.1	73.1	41.3	1,024.5	314.5	12.4
Luxembourg	17.7	17.7	n.a.	0.1	15.2	2.4	n.a.	n.a.	n.a.
Netherlands	468.9	237.8	231.1	0.6	194.1	43.1	174.9	42.1	14.1
Portugal	88.5	26.2	62.3	11.1	12.4	2.7	36.0	15.3	11.0
Spain	460.2	129.3	330.9	33.1	70.9	25.3	272.8	31.5	26.6
Sweden	309.7	98.6	211.1	57.4	24.2	17.0	108.6	83.8	18.7
United Kingdom	1,404.7	521.6	883.1	13.0	314.3	194.3	442.8	290.9	149.4
Other countries	2,488.3	702.8	1,785.5	240.3	251.3	211.2	1,013.3	494.1	278.1

Source: Bank for International Settlements, *International Banking and Financial Market Developments* (November 2000).

[1/] Outstanding amounts as of end-June 2000.

[2/] International and domestic debt securities shown by nationality of the issuer.

Table 2. Relative Size of Repo Markets

(In percent)

Country	Year	Outstanding Amount as Percent of		
		Nominal GDP	M3	Government Debt
Belgium [1/]	1995	18.4	22.5	23.5
	1997	25.0	28.9	31.0
France	1995	14.5	20.4	34.7
	1997	21.7	32.8	47.3
Italy [2/]	1995	8.1	9.0	6.5
	1997	9.9	11.1	7.3
Japan [3/]	1995	n.a.	n.a.	n.a.
	1997	5.7	2.8	9.0
United Kingdom [4/]	1995	0.0	0.0	0.0
	1997	9.5	10.0	17.4
United States	1995	12.0	18.3	17.8
	1997	14.9	22.9	22.4

Source: Bank for International Settlements, *Implications of Repo Markets for Central Banks* (March 1999).

[1/] Only repos in Belgian francs on government securities.

[2/] Repos reported by banks, including interbank and customer repos.

[3/] Securities lending against cash allowance.

[4/] Outstanding amounts are computed as a share of M4.

below, U.S. treasury securities have come to play the following roles in both U.S. domestic and international financial markets:

- benchmarks for pricing and quotation in U.S. and international bond markets;
- important component of global bond indexes used by portfolio managers;
- major instrument for hedging fixed-income positions in U.S. dollar and international markets;
- collateral for domestic and international financial transactions;
- main tool for liquidity management by private sector, especially by banks;
- large share of foreign exchange reserves held by other governments
- main monetary intervention vehicle used by the U.S. Federal Reserve;
- domestic and international safe-haven.

For these reasons, the possibility that the supply of U.S. treasury securities might fall below some as yet uncertain minimum threshold, or worse disappear, has attracted considerable attention, even alarm.

B. The Evolution of the U.S. Treasury Market

The United States has issued public debt for more than 200 years, although for most of this period the outstanding stock of debt has fluctuated mainly due to war-financing efforts.[3] In 1946, total federal government debt—that is, publicly-held debt plus government-held debt—reached a peak of nearly 122 percent of GDP (Figure 1). Although the nominal dollar value of federal government debt has increased almost every year since then, up until the 1970s it increased more slowly than both inflation and GDP. Consequently, in real terms and relative to GDP, federal government debt fell continuously from the late 1940s through the mid-1970s, reaching less than 34 percent of GDP in 1974. Federal government debt as a share of total credit market debt also declined over this period from more than 50 percent to less than 20 percent.[4] During the 1970s and 1980s, and as in most other major economies, large U.S. budget deficits caused U.S. federal government debt to reach 67 percent of GDP by the mid-1990s, and the publicly-held debt reached 50 percent of GDP.

As of December 2000, federal government debt in the United States stood at $5,629 billion. About half of this is non-marketable debt (Figure 2). Non-marketable debt is mainly debt issued directly by the U.S. Treasury to U.S. government accounts (primarily the Social Security trust funds), to state and local government accounts, as well as U.S. savings bonds issued to the

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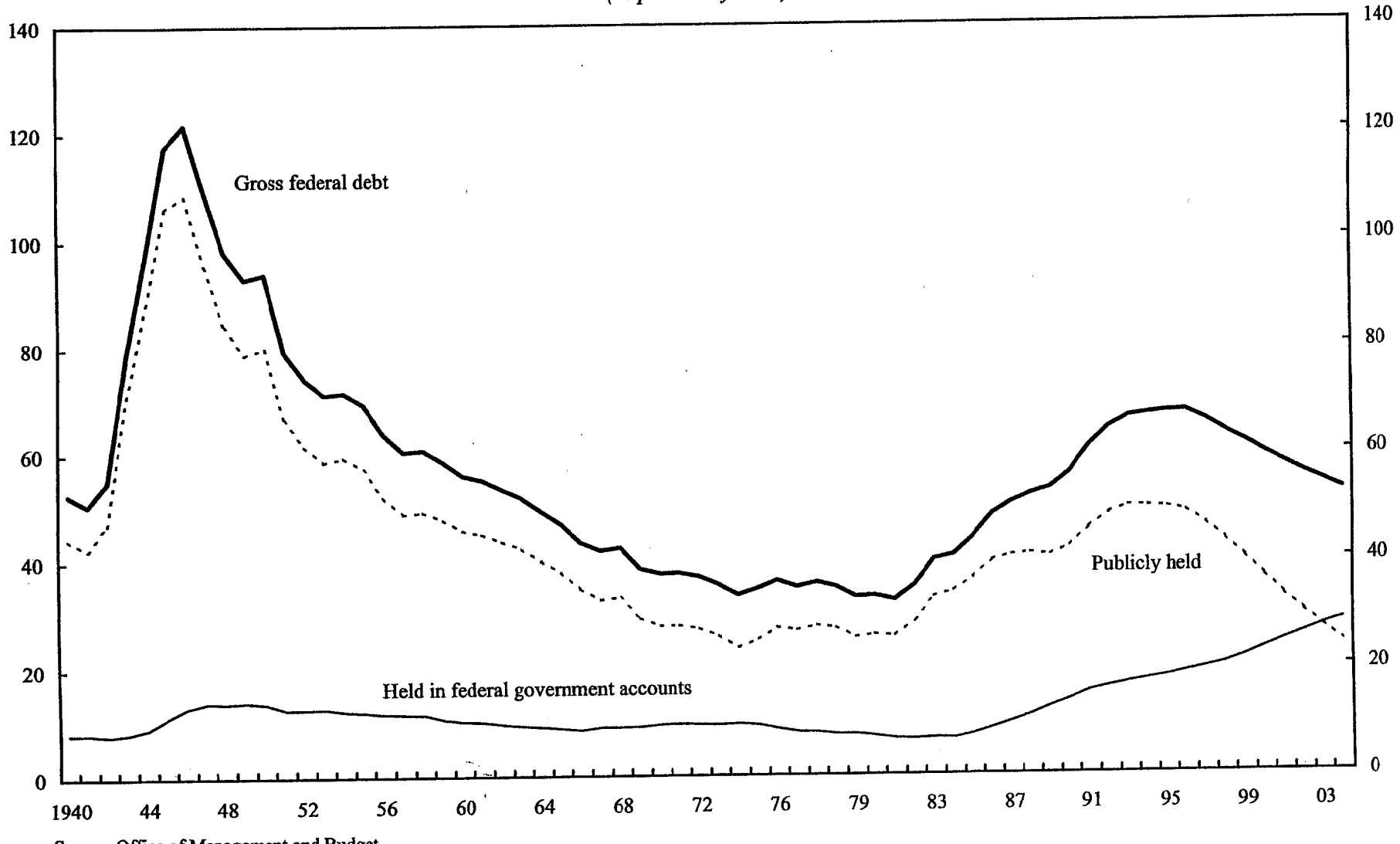
[3] See Dupont and Sack (1999).

[4] See Office of Management and Budget (2000).

Figure 1. Public Debt, 1940-2004 [1/]

(In percent of GDP)

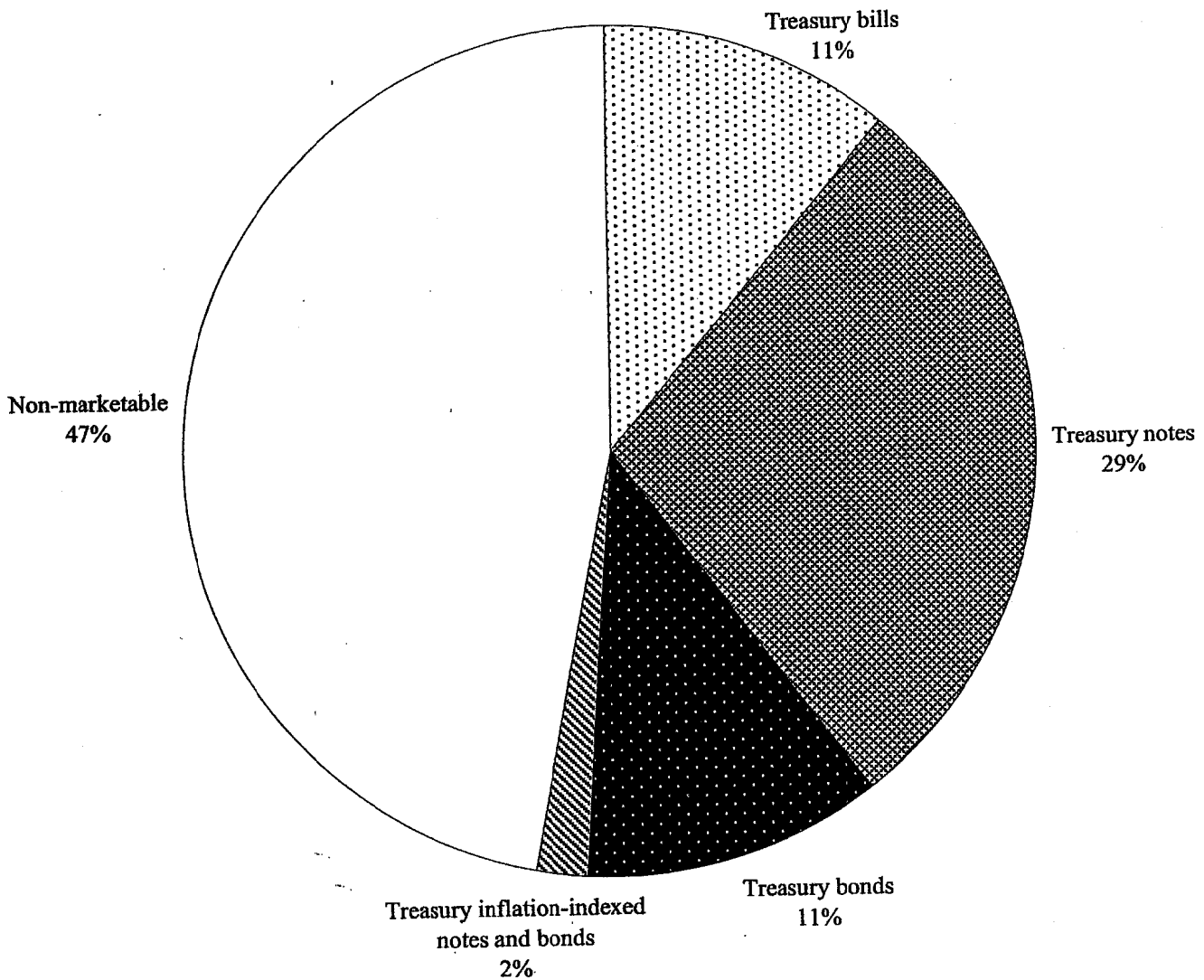


Source: Office of Management and Budget.

[1/] Data for 2000-2004 are estimated.

Figure 2. Composition of the U.S. Public Debt

(In percent of total as of end-September 2000)



Source: Department of the Treasury, *Treasury Bulletin* (December 2000).

public. Treasury debt issued directly to state and local governments is a result of 1969 legislation that restricted these governments from investing proceeds of tax-exempt bonds in higher-yielding investments.

Marketable debt securities—the stock of which is roughly equivalent to the publicly-held debt stock—include treasury bills (maturities of one year or less), treasury notes (maturities from one to ten years) and bonds (maturities more than ten years), and inflation-indexed notes and bonds (the marketable debt includes $15 billion of bonds issued by the Federal Financing Bank). Bills are pure-discount securities, which do not pay coupons (interest). Treasury notes and bonds pay semiannual coupons in addition to the par value paid at maturity. All treasury securities issued since the mid-1980s are non-callable. The average maturity of marketable held has been 5-6 years over the past decade, despite the fact that nearly two-thirds of the securities have maturities of less than 5 years (Figure 3).

U.S. treasury securities trade in deep and very liquid, nearly round-the-clock markets. U.S. treasuries trade twenty-two hours per day (they do not trade from 5:30PM –7:30PM, New York time), although more than 90 percent of trading takes place during New York trading hours. The core of the treasury markets is comprised of "primary dealers," serving as counterparties to the U.S. Federal Reserve in its open-market operations and participating in auctions of new treasury securities. In late 2000, there were 27 primary dealers, down from a peak of 46 in 1988. As market makers, primary dealers handle nearly $200 billion per day of "cash market" trading in treasuries. In addition, primary dealers are currently involved in more than $2 trillion of repurchase and reverse repurchase agreements, and have substantial positions in exchange-traded and OTC markets for treasury futures, options, and interest-rate swap contracts.

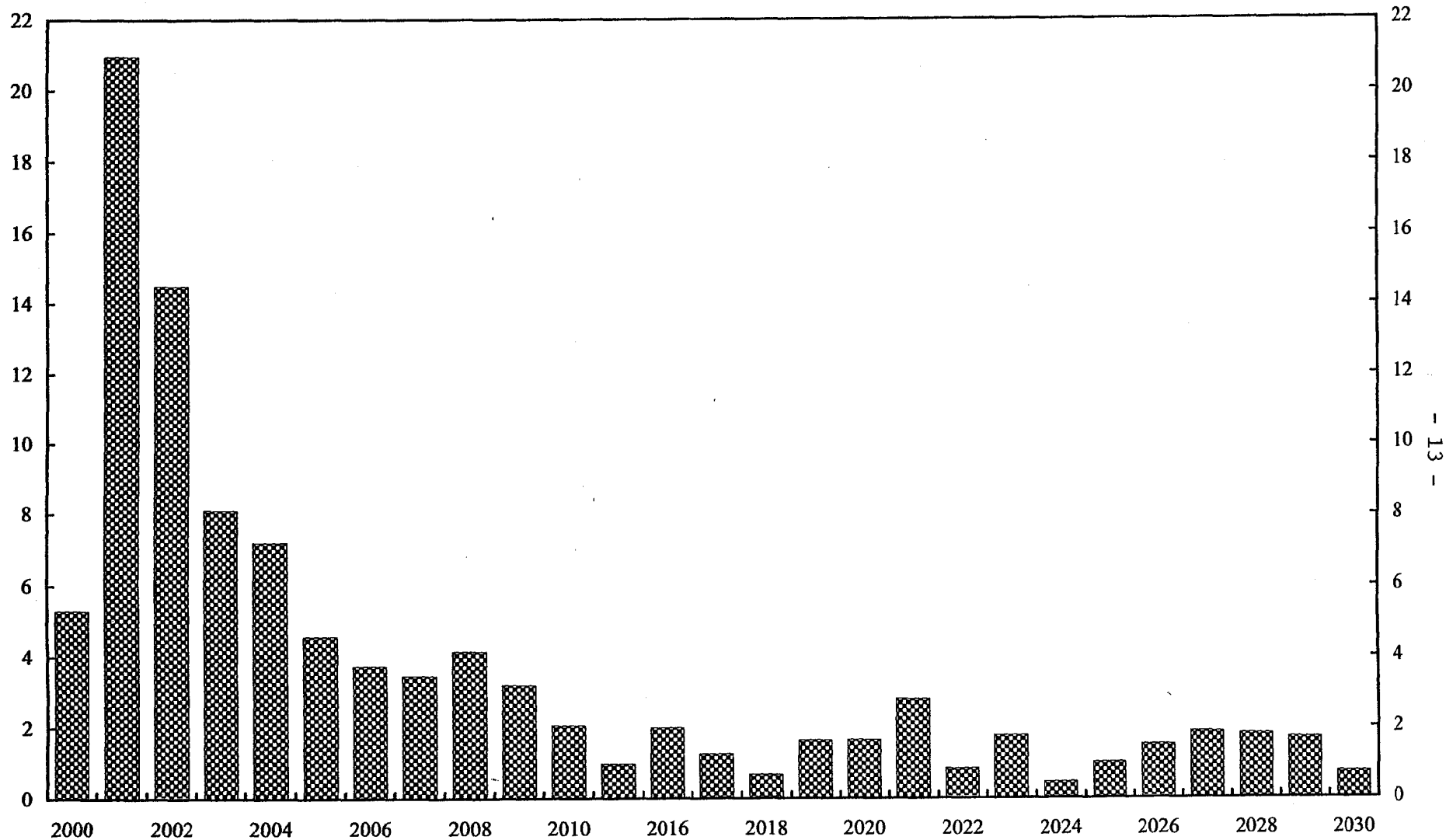
The U.S. treasury market is highly internationalized. Foreign ownership of publicly-held treasury debt was well below five percent in the 1960s, but jumped to 15 percent in the early 1970s, where it remained until the mid-1980s. Thereafter it began to increase steadily and rose to its current share of 40 percent.[5] Of the total federal government debt (publicly-held debt plus debt held in government accounts) foreign ownership presently accounts for about 23 percent, split roughly evenly between private and official investors (Figure 4). Excluding treasury debt held by U.S. federal (including the Federal Reserve), state, and local government accounts, foreign ownership accounts for just over 50 percent (Figure 5). Regardless of which debt measure is used, involvement by non-U.S. investors in the treasury market is high in comparison to other advanced economies.[6] A key reason for the high degree of foreign ownership of U.S. treasuries is the international role of the dollar, and consequently the usefulness of U.S. treasuries for hedging, as collateral, and for managing interest-rate risk. U.S. fixed-income markets also include the largest private debt securities market in the world. Currently there are more than $7 trillion of private debt securities outstanding in the United

[5] See Office of Management and Budget (2000).

[6] See Inoue (1999).

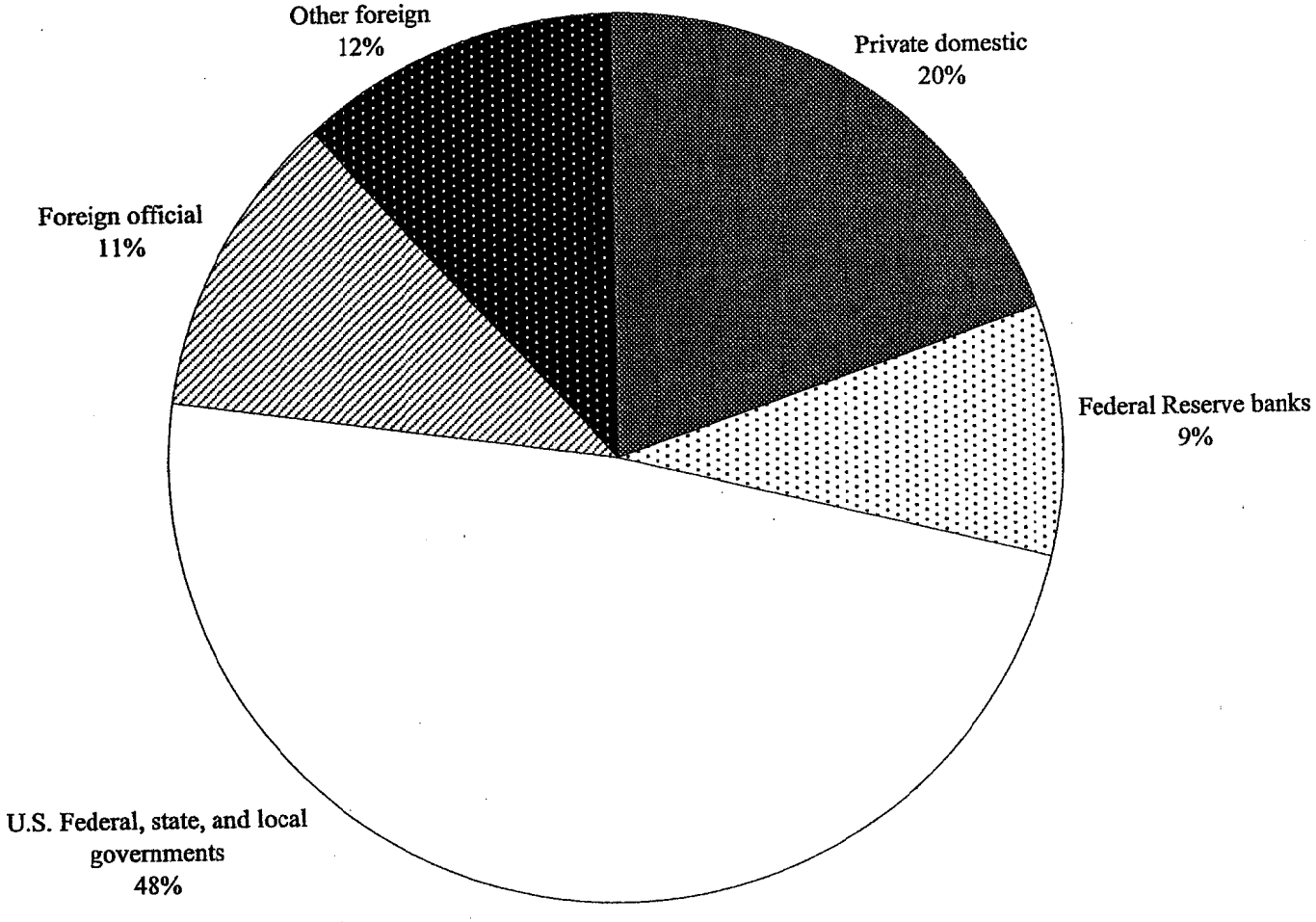
Figure 3. Maturity Distribution of Interest-bearing Publicly Held Treasury Debt, 2000-2030

(In percent of total publicly held debt)



Source: Department of the Treasury, *Treasury Bulletin* (December 2000).

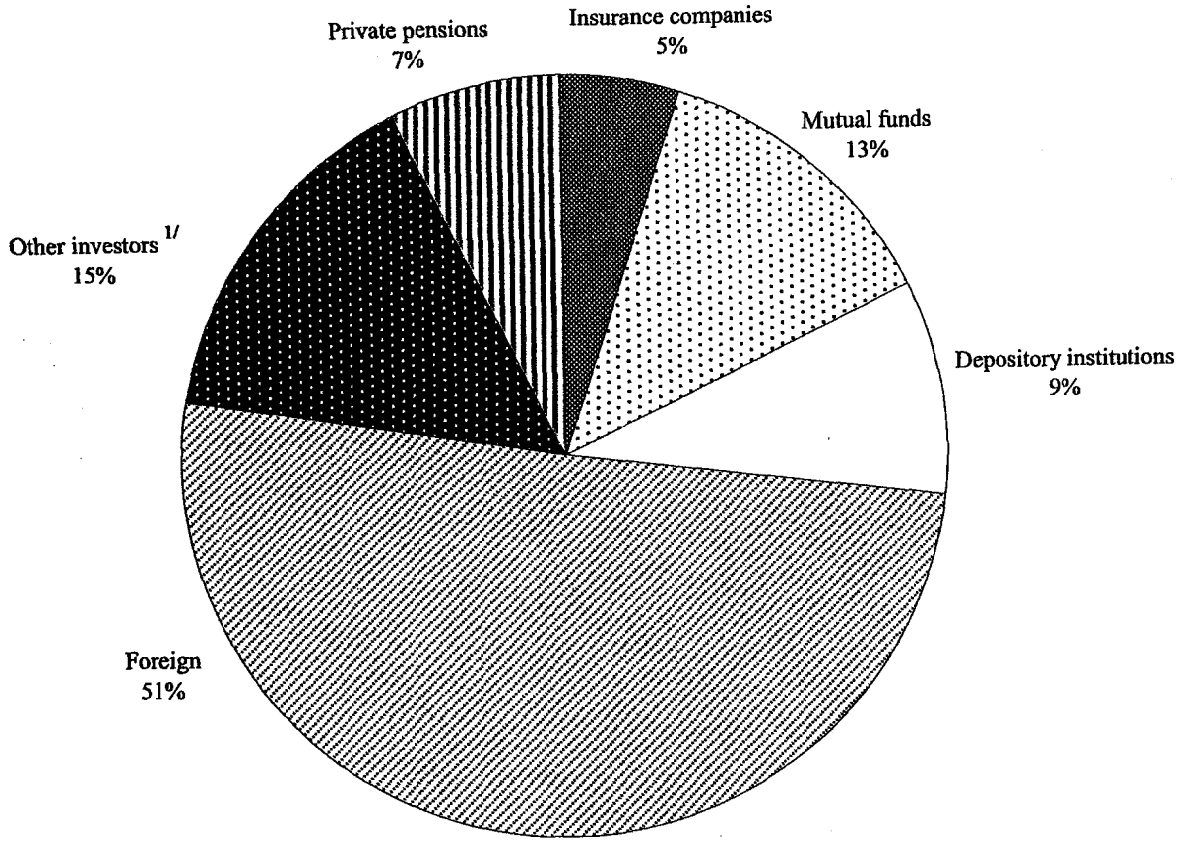
Figure 4. Ownership of U.S. Treasury Securities
(In percent of total as of end-June 2000)



Source: Department of the Treasury, *Treasury Bulletin* (December 2000).

Figure 5. Ownership of U.S. Treasury Securities Oustide of U.S. Federal, State, and Local Government Accounts

(In percent of total as of end-June 2000)



Source: Department of the Treasury, *Treasury Bulletin* (December 2000).

1/ Includes individuals, government sponsored enterprises, brokers and dealers, bank personal trusts and estates, corporate and noncorporate businesses, and other investors.

States, which is more than the outstanding amounts of domestic private debt securities in all other countries combined.[7] Moreover, U.S. debt securities markets have historically been a viable source of funds for a wide range of (larger) firms, both from the United States and from other countries. This has not historically been the case in most other advanced economies—issuance in most domestic markets outside the United States has overwhelmingly been by domestic financial institutions.

Although there are various factors that help explain cross-country differences in the historical development of fixed-income securities markets, some relatively unique features of the U.S. treasury market may have been important to the development of U.S. fixed-income markets. The U.S. treasury has emphasized liquidity in benchmark issues covering the full range of maturities at intervals along the yield curve from the very short-term—T-bills and the repo market—to 30-year "bellwether" treasury bonds. Many other countries have generally avoided issuing along the entire yield curve. In particular, in most advanced economies significant segments of the yield curves—mainly at the short-end—have deliberately been neglected, usually on the grounds that it could reduce the effectiveness of monetary policy. In government bond markets in Japan and the euro area, liquidity remains concentrated in 10-year maturities.

C. The Actual and Projected Decline in the Supply of U.S. Treasury Securities

U.S. federal government debt has increased every year since 1970, and it is expected to increase over the next decade. By 2011, official projections place the federal debt at about $6.7 trillion, up about 20 percent from its current level (see Figure 6). The "shrinking supply" issue relates to the stock of *publicly-held securities* or, even more narrowly, to the stock of *privately-held securities*—that is, publicly-held securities less securities held by the Federal Reserve, state and local governments, and foreign official institutions.

Two factors explain why the federal government debt is projected to increase over the next decade while at the same time the publicly-held debt is projected to decrease. First, "off-budget" surpluses must be invested in treasury debt. Second, not all publicly-held debt is available for repurchase by the Treasury. Projected "off-budget" surpluses (especially surpluses of the Social Security trust fund) tend to increase federal government debt because trust funds by law must invest surpluses in treasury debt. Of course, the net effect on the overall federal government debt depends on whether the surplus cash of trust funds are in turn spent by the Treasury on programs, used to buy back publicly-held debt, or simply accumulate in the Treasury (referred to as "balance of uncommitted funds" in Figure 6). While current practice is to use off-budget surpluses to retire publicly-held debt (the "lockbox"), some long-term bonds and savings bonds

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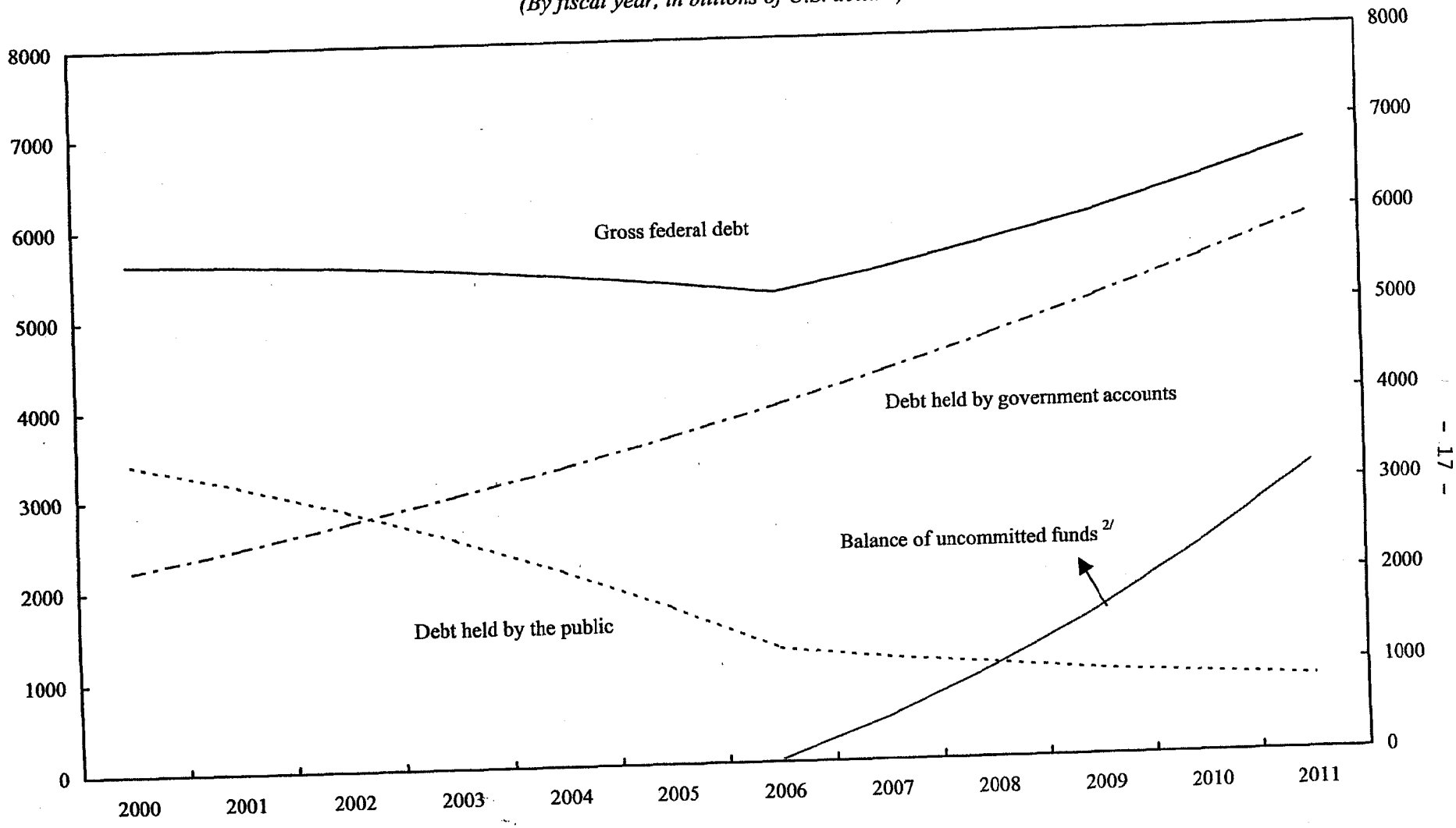
[7] See Bank for International Settlements (2000). This figure includes corporate bonds, commercial paper, mortgage-backed securities, and other open-market paper issued by the financial and non-financial sectors. It does not include debt securities issued by the Government-Sponsored Enterprises (GSEs), which amounted to $1.6 trillion at end-1999 (*Federal Reserve Bulletin*, Table 1.59).

Figure 6. Projected Treasury Debt [1/]

(By fiscal year, in billions of U.S. dollars)



Source: Congressional Budge Office.

[1/] Debt projections assume that discretionary spending grows at the rate of inflation (the "baseline projection" of the Congressional Budget Office).

[2/] CBO's term for the surpluses remaining in each year after paying down publicly held debt available for redemption. Uncommitted funds accumulate from one year to the next.

are not available for early redemption. As a result, (in the absence of secondary-market buybacks) "uncommitted funds" will accumulate in the Treasury (even though there remains debt in the hands of the public).[8] Projected "on-budget" surpluses also contribute to excess cash reserves. Estimates by the Congressional Budget Office put these excess cash reserves at $3.2 trillion by 2011.

In adjusting to reduced funding requirements, the U.S. Treasury has altered its issuance policy and begun buying back some debt. Regarding changes to issuance policy, the Treasury has begun issuing fewer new treasury securities than are maturing and is focusing issuance on a few benchmark maturities. Between 1996 and mid-2000, the Treasury reduced bill issuance by almost 30 percent, and decreased issuance of coupon securities by more than 50 percent.[9] The Treasury also reduced the frequency of issuance of some maturities. For instance, the Treasury has stopped issuing one-year bills and three-year notes and cut the number of annual auctions of 30-year bonds from two to three.

Regarding repurchases of debt by the U.S. Treasury, in early 2000 the Treasury began buying back longer-term issues in secondary markets—the first buy back in 70 years. The plans announced by the Treasury in January 2000 involved buying back up to $30 billion (par value) in publicly held debt during the year. The actual amount of buybacks was $30 billion. These buybacks have concentrated on more seasoned, higher-interest debt, in order to offset the lengthening of the maturity of the treasury debt that had taken place during the past several years. The Treasury has also announced plans to buy back another $18 billion in debt during the first half of 2001.

Against this background, the stock of actively-traded treasury debt could decline very rapidly. Although the federal government debt is presently about $5.6 trillion, almost half this amount is held in U.S. Federal, state, and local government accounts (see Figure 4), and another 21 percent is owned by the U.S. Federal Reserve Board and foreign official institutions. In other words, the "free float" of treasury securities is less than $2 trillion. During the first three years of successive budget surpluses in the United States, 1998-2000, the publicly-held treasury debt fell by $363 billion. The most conservative of the projections by the Congressional Budget Office would produce a publicly-held stock of debt equal to just five percent of GDP in ten years (Figure 7); the free float of treasury securities would, under these projections, disappear within five years.

There are, however, at least three possible reasons why the shrinking supply of treasury securities may be a temporary phenomenon. As a result, any analysis of the costs and benefits of

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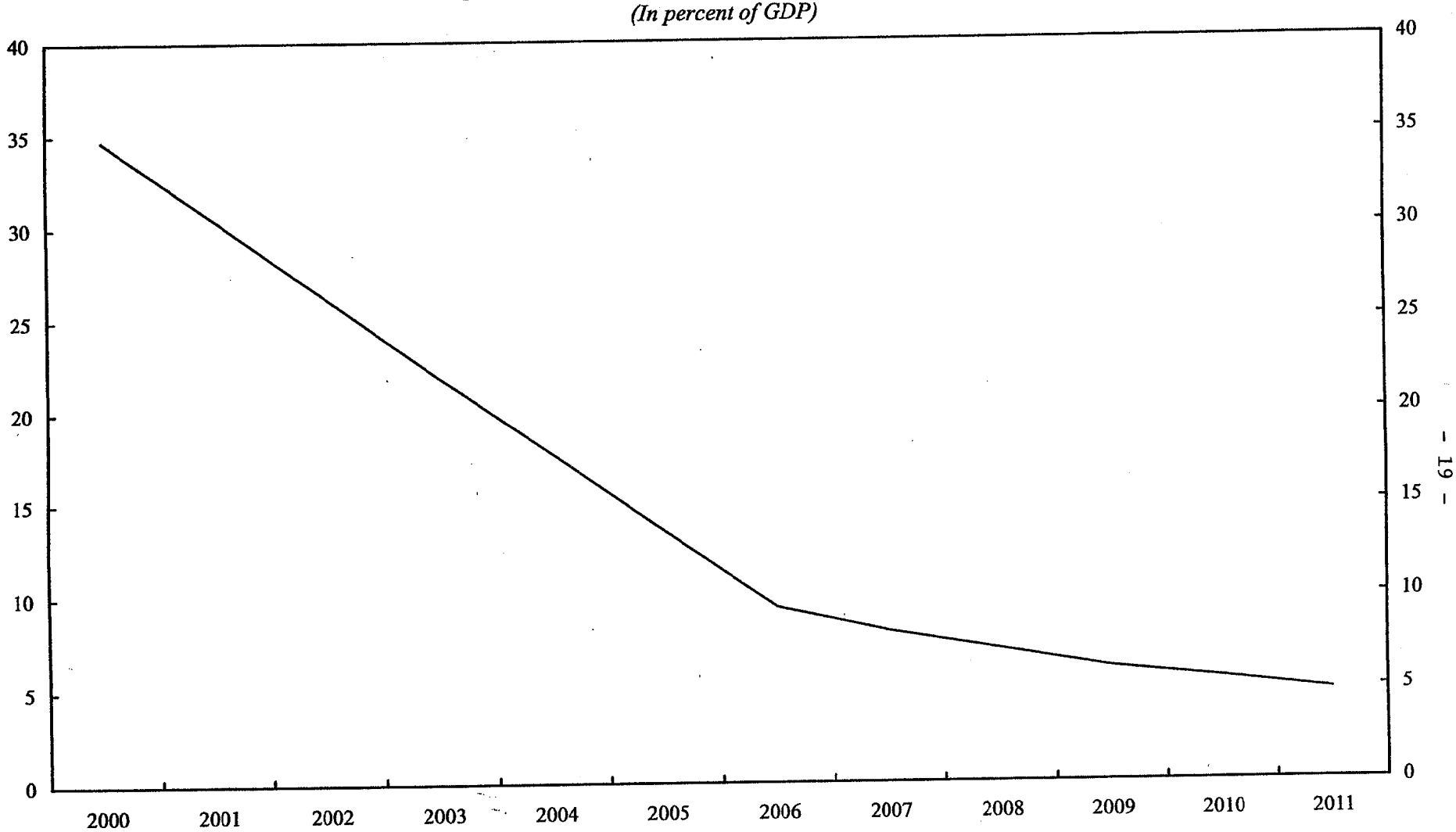
[8] The Treasury cannot buy back any outstanding bond it chooses. Original Issue Discount (OID) rules restrict the treasury from repurchasing securities whose prices have fallen more than a minimal amount below the issuance price.

[9] See Gensler (2000).

Figure 7. Projected Path of Publicly Held Treasury Debt [1/]

(In percent of GDP)



Source: Congressional Budget Office.

[1/] Projected treasury debt corresponds to the "baseline" projection by the Congressional Budget Office in January 2001.

the shrinking supply of treasury debt should consider the potential costs of resuscitating the market.

The first reason the publicly-held supply of treasury securities could reverse course is that tax revenues may turn out to be significantly below the levels projected by the Congressional Budget Office. President Bush's recently released budget proposal involves a tax cut that would, if implemented, lead to lower projected tax revenue than under current policies. Currently there are $3.4 trillion of marketable treasury securities outstanding. President Bush's proposal includes paying down a little better than $2 trillion of marketable treasury securities over the next decade (most of which comes from not rolling over debt that matures during this period). By 2011, under the President's plan, the marketable treasury debt would be about $1.2 trillion, which is about $400 billion higher than the January-2001 estimate of the CBO which is based on no change in policy (the CBO estimates are shown in Figure 6). Under the President's proposal, the remaining debt of $1.2 trillion in 2011 would be accounted for by currently outstanding long-term treasury bonds with maturities after 2011. These securities could in principle be bought back by the treasury before maturity, but this amount is deemed (in the budget proposal) to be "non-retireable" in the sense that they are held by foreign central banks and other investors that would sell the securities only at high cost to the U.S. Treasury. In summary, therefore, the shrinking supply of treasury securities is expected to continue under the recent budget proposal.

Second, longer-term budget projections—that is, beyond 2011–suggest that, the U.S. fiscal balance would, under current tax and expenditure policies, eventually reverse course and thus so would the path of publicly-held treasury debt.[10] The reason for this is that, as the baby-boom generation moves into retirement, the cost to the U.S. government of Social Security and Federal health care programs is expected to rise faster than tax revenue may. Even if large surpluses do occur over the next decade, the Congressional Budget Office estimates that the publicly-held debt as a percentage of GDP will begin increasing by around 2020 (or possibly later) and will reach higher than current levels fairly soon after that. An important determinant of how soon the stock of publicly-held debt begins to increase is how the accumulated surpluses over the next decade are used (i.e., spent on programs or used to retire debt).

A third reason why the path of treasury debt might change course is if the investment policy of the Social Security trust fund is changed so that some private assets can be held. Under current rules, the trust fund must hold 100 percent of its portfolio in treasury securities. As a result, any liberalization of this investment policy could result in an increase in the supply of publicly-held treasury securities (e.g., if the trust fund were to sell some of its holdings of treasury debt and buy private securities). This issue—which has been discussed widely both in and outside of government recently—raises questions about the appropriate role of government in financial intermediation.

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[10] See Congressional Budget Office (2000).

The issue of the federal government, through the Social Security Trust Fund, investing in private financial assets is not unrelated to aspects of the recent discussion about the large "agencies" (mainly Fannie Mae, Freddie Mac, and the Federal Home Loan Bank (FHLB)) that aim to establish themselves as substitutes for treasury securities. Although some of these agencies—in particular, Fannie Mae and Freddie Mac—are private, shareholder-owned, profit maximizing firms, they operate under federal charter and have some privileges, including a credit line with the Treasury and tax benefits. They have also grown rapidly in recent years. During the three consecutive years of U.S. budget surpluses 1998-2000, while the publicly-held treasury supply has declined, the major agencies have increased supplies of their debt from $1.1 trillion to $1.7 trillion.[11] Some estimates have the amount of agency debt surpassing the publicly-held treasury debt within the next three years or so. Because of the high growth rates and large amounts of agency debt, some commentators have questioned whether the agencies have become of major systemic importance—i.e., too big too fail—and the associated moral hazard has contributed to their growth.

III. Key Characteristics and Roles of Government Securities and Government Securities Markets

A. Key Characteristics

Government securities and government securities markets have several characteristics that, together, distinguish them from private securities. These characteristics may include:

- *Minimal credit risk*—due to taxation authority and/or the power to monetize debt.[12]
- *Well-developed market infrastructure*—due to broad investor bases for government securities, efforts by issuing governments to minimize the cost of the public debt, and the use of government securities for implementing monetary policy.
- *Dense and broad yield curve*—government securities are issued in a fairly small number of maturities (to maximize liquidity) but spaced out to cover a fairly wide range of maturities.
- *Supporting repo and derivatives markets.*

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[11] The figure for 2000 is for September. Figures are from The Bond Market Association.

[12] Among G10 countries, Moody's presently gives seven countries the highest possible rating, and the remaining countries have ratings just slightly lower. Specifically, with regard to domestic currency government bonds issued by the eleven members of the G10, Moody's (December 4, 2000, "Summary Opinion") assigns Aaa ratings to France, Germany, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States. The remaining members received the following ratings: Canada (Aa1), Belgium (Aa1), Japan (Aa2), and Italy (Aa3).

Not all of these characteristics are present, or present to the same degree, in all government securities markets. Central governments in some European countries have, for example, not issued shorter-term debt securities, thus effectively "truncating" government yield curves in these countries. The U.S. Treasury market exhibits all of these characteristics.

B. Roles of Government Securities in National and International Markets

The combination of the above characteristics has meant that government securities and government securities markets often have roles in countries' financial systems that may not be easily played by private financial products and their markets: benchmark interest rates for reference or pricing in fixed-income markets; hedging vehicles; vehicles for funding financial market positions and managing liquidity; vehicles for investment and taking positions on general level of interest rates; government securities as "near-money" and safe havens.

Benchmark interest rates

Government yield curves sometimes serve as benchmarks for quoting and pricing yields on private (credit-risky) securities. From the issuer's point of view, the key advantage of having debt securities used as benchmarks is that they are heavily traded and that usually means the yield is the lowest possible for that particular market segment. Benchmark interest rates are most useful when they allow investors to clearly distinguish fluctuations in premia for credit risk from fluctuations in the general level of interest rates. Changes in benchmark interest rates are therefore usually passed-through one-for-one to other fixed-income instruments with the same maturity. The benchmark role of government securities may be important not just for quoting yields on private securities, but more fundamentally for pricing those securities. The set of U.S. treasury securities, for instance, provides a uniform set of discount rates for discounting dollar-denominated cashflows. Such discount rates form the basis for the zero-coupon yield curves and forward rate curves that can be key building blocks in some asset pricing methodologies.

Hedging interest rate risk

Because of the above-mentioned pass-through, the correlations between government yields and private yields of similar maturity are usually high. This makes government securities and associated derivative markets useful for hedging general interest rate risk. The reason is that, for example, the value of a short position in treasury securities will offset to a large degree price movements of a long position in other fixed income instruments, such as corporate bonds. However, correlations may break down during extreme market events when a "flight to quality" causes movements in prices of the safest investments (normally government securities) to move opposite prices of riskier fixed-income securities. For example, in the autumn of 1998, the correlation between U.S. treasury yields and high-yield bond yields dropped markedly amid the

1998 market turbulence associated with the near-collapse of LTCM.[13] Credit spreads rose sharply even though corporate bond yields remained broadly stable, as a flight to quality drove treasury yields sharply lower. Similar shifts in correlations have occurred during other major disturbances, such as the turbulence surrounding the collapse of Continental Illinois in 1984.

Position funding and liquidity management

Cash and repo markets in government securities are often used to borrow funds ("funding") and manage liquidity by a variety of market participants, including proprietary trading desks, bond dealers, investors, and portfolio managers. In the United States, U.S. treasury bills—because they are liquid, regularly issued, and have limited interest-rate risk—are premier vehicles for managing funds on a short-term basis. Treasury bills with 13 and 26 weeks to maturity are auctioned every week, and the bid-asked spreads on treasury bills have a median of ½ basis point (with a range of 0-2 basis points). [14] For these reasons, the U.S. treasury bill market is viewed as a good substitute for bank deposits and other short-term investment vehicles. The high substitutability between treasury bills and alternative short-term vehicles is such that corporate treasurers often refer to treasury bills as "cash."

Repo markets in government securities support both position funding and liquidity management. In the United States, there are also active repo markets in agency, mortgage-backed, and corporate securities, but they are currently less active and liquid than the U.S. treasury repo market. In countries with active repo markets, a holder of a government security can readily raise short-term funds and/or finance the position by using the government security as collateral in a short-term repo operation. Since repo transactions are collateralized, repo rates are lower than unsecured interbank rates.

Investment and position taking

Minimal credit risk and relatively low market risk in U.S. treasury securities makes them relatively safe long-term investments for pension funds, insurance companies, and other institutional investors. Moreover, rating agencies and investment restrictions (e.g., U.S. Employee Retirement Income Security Act "prudent man" guidelines for pension funds) can provide a strong incentive for institutional investors to focus on low-credit-risk instruments with long maturities. For example, a pension fund may purchase a range of maturities of bonds that make payments around dates when its pension obligations are expected to come due.

Speculators and arbitrageurs also use government securities markets for taking positions on the general level of interest rates. One reason for this is that one can quickly and cheaply trade in and out of positions in liquid government securities markets and in related repo and derivatives

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[13] See Fleming (1997).

[14] See Fabozzi and Fleming (2000).

markets in order to take views on the future path of interest rates or exploit arbitrage opportunities. Trading and investment strategies involving government securities frequently are oriented toward taking advantage of anticipated changes in the slope or shape of the yield curve. For example, a trader that expects the yield curve to steepen (expects long-term bond prices to fall relative to short-term bond prices) might sell short long-term bonds and buy short-term bonds.

Government securities as near-monies and safe havens

Government securities are close substitutes for the currency of the issuing country. At very short maturities, government securities have little market risk and thus are reliable stores of value. As a result, government securities are a medium of exchange—they are widely accepted as collateral against the future delivery of cash (including transfers of central bank reserves and bank deposits).[15] For example, U.S. treasury securities can be used to settle certain kinds of financial obligations, with fast and cheap settlement across Fedwire, and European government securities can be used as a collateral to obtain intraday liquidity (central bank funds) for transactions settled on the European payments system Target.

This near-money property has created a safe haven role for U.S. treasury securities, some euro-denominated government securities, and Japanese government securities, during periods of financial stress. The safe-haven role is supported by the use of these markets by central banks for monetary policy, foreign-exchange reserves management, and financial stability purposes, since central banks readily deliver central bank deposits (base money) against government securities. Specifically, while by definition any liquid asset can be converted into a safe asset by selling the asset and buying a safe asset, during extreme market events when there is an increase in the aggregate demand for liquidity, the central bank has almost monopoly control over the supply of liquidity. This reinforces the safe haven role of government securities.

IV. Recent Market Developments and Private and Official Reactions to the Shrinking Supply of U.S. Treasuries

The declining stock of U.S. treasury securities has already significantly affected the characteristics and roles of treasury securities and the treasury market. This section reviews the salient features of these effects, and then describes how private market participants and the Federal Reserve are adapting.

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[15] It is possible that government securities will become close substitutes for the currencies of non-issuing countries. There is a push for global collateral pools, that is, for U.S. treasuries and sovereign debt of other countries to be acceptable collateral for liquidity provision by central banks.

A. Recent Financial Market Impact

Rising interest-rate spreads

During the past three years, the widening of spreads between U.S. treasury securities and private debt securities has been affected to some extent by events, such as the LTCM crisis (especially the subsequent deleveraging in fixed-income markets), and also perceptions about rising private credit risk related to the maturation of the U.S. business and credit cycles (see Figure 8). However, part of this widening—and perhaps a significant part—seems to be related to idiosyncratic (supply and demand driven) factors related to the shrinking supply of U.S. treasuries and the associated rise in their scarcity value.

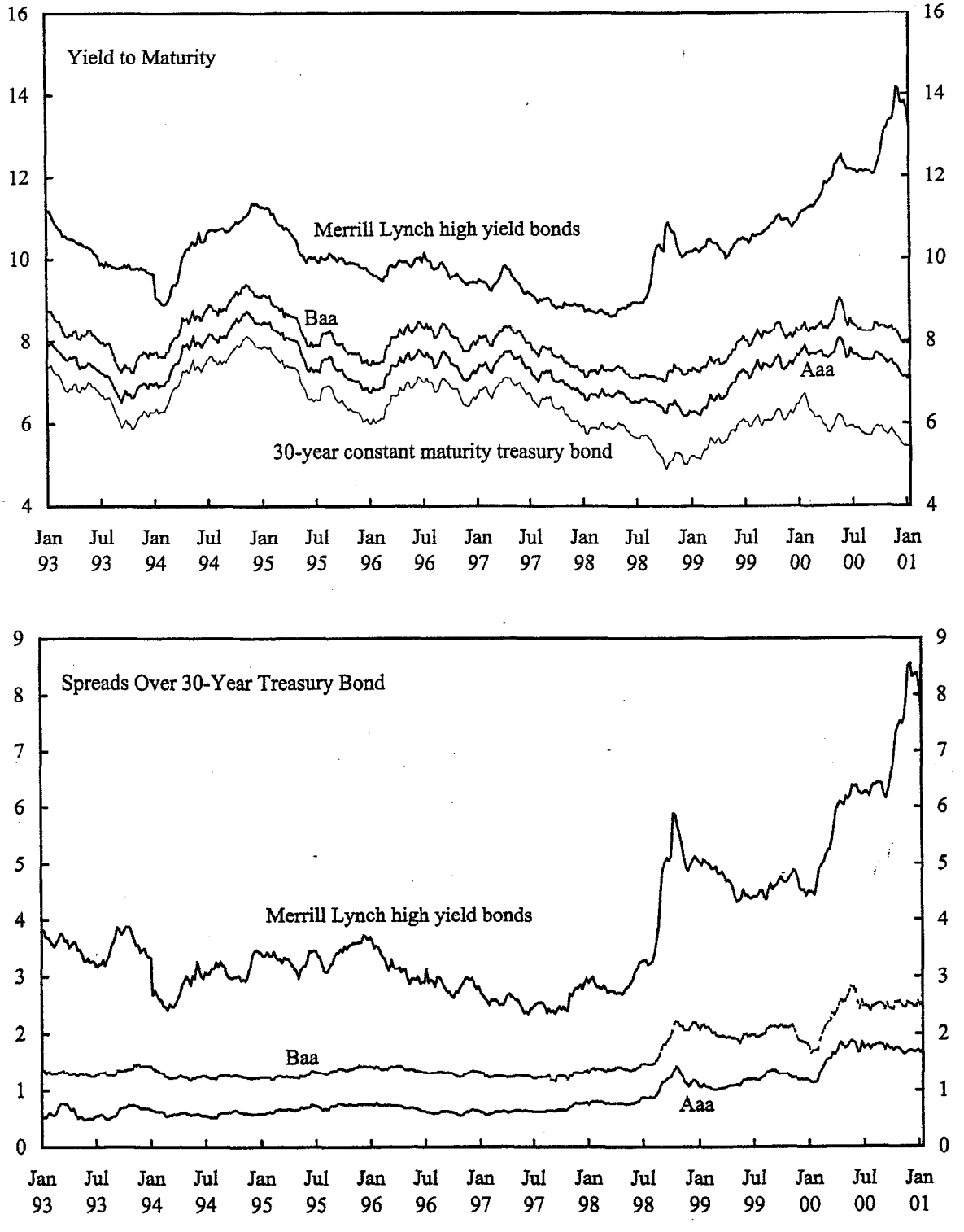
The influence of the confluence of all of these factors, and the divergence of pricing between treasury markets and other dollar fixed-income markets, can be seen most clearly in the relative behavior of yields on private interest-rate swaps and on U.S. treasury securities. The upper panel of Figure 9 shows that beginning sometime in 1997, the pass-through of changes in treasury yields to yields on other fixed-income securities (that is, the comovements between them) seems to have systematically diminished somewhat. As noted, U.S. treasury prices and yields increasingly have been driven by supply and demand factors that have not been shared by prices and yields in other markets, owing to the increased anticipation, starting in 1997, of changes in the size and composition of the stock of U.S. treasury securities. As a result, the 10-year swap spread shown in the bottom panel—the swap rate minus the treasury rate—began to rise gradually in 1997, partly due to the first clear evidence that the supply of treasury securities would decline systematically.

In 1998, the impact of these structural shifts seems to have been exacerbated by the flight to quality associated with the LTCM-crisis related turbulence. The event itself created perceptions of rising private credit risk. This further pushed U.S. treasury yields down (an expression of the flight to quality) while it was also pushing up yields on relatively low-credit-risk private instruments up, including interest-rate swaps (Figure 9) and top-rated corporate bonds (Figure 8). The ten-year swaps spread ratcheted upward during this period of turbulence. Relative prices and yields were pushed further apart beginning in mid-1999, when the U.S. Treasury announced that it would begin buying back treasury securities beginning in early 2000. This can also be seen in the swaps spread, which ratcheted up further with the announcement and subsequent buybacks of treasury securities by the U.S. Treasury. Overall, beginning in 1997, the 10-year swaps spread increased from about 40 basis points to over 100 basis points in 2000.

Seeing through the fluctuations in the ten-year swaps spread along the rising trend over the past three years, and reflecting upon the various reasons why this may have happened, the rise in the ten-year swap spread is fully consistent with reduced reliance on ten-year U.S. treasuries, and increased reliance on ten year interest-rate swaps, for hedging market risks on corporate debt securities. Reduced hedging in the ten-year treasury would reduce the extent of short selling and thereby raise its price (and reduce its yield), while increased short selling of the ten-year swap would put downward pressure on its price and upward pressure on its yield. Either shift would support an increased ten-year swap spread.

Figure 8. U.S. Corporate Bonds: Yields and Spreads

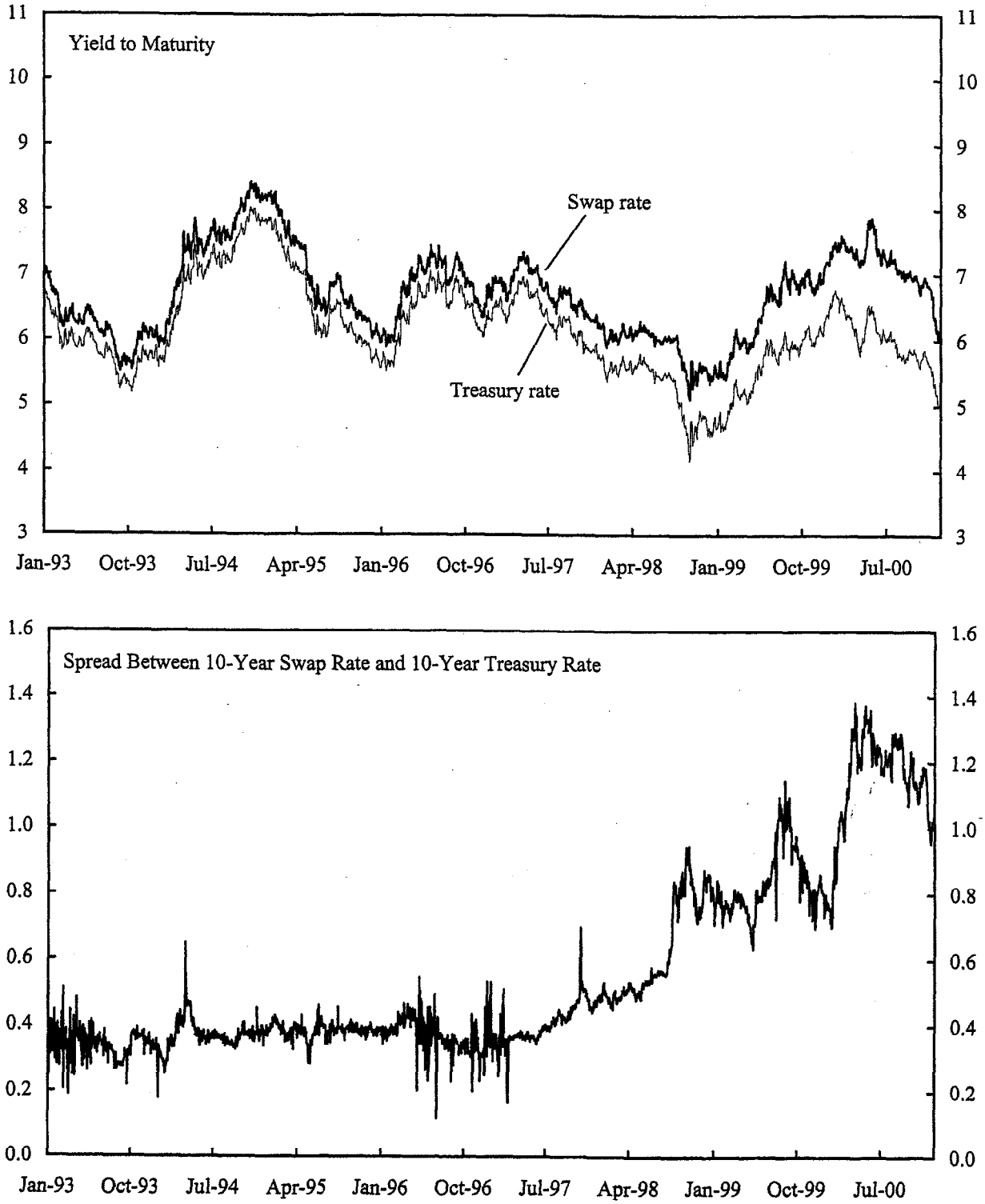
(In percent)



Sources: Federal Reserve; Merrill Lynch; and Bloomberg Financial Markets, L.P.

Figure 9. 10-Year Swap and Treasury Rates

(In percent)



Source: Bloomberg Financial Markets, L.P.

Reduced liquidity and greater volatility

The shrinking supply of U.S. treasury securities appears also to have reduced liquidity in U.S. treasury markets and markets for some treasury derivative contracts. This has occurred for a number of reasons, the most important of which is that the commercial and investment banks that deal in these markets have systematically reduced the amount of capital devoted to market-making.[16] The risk-adjusted return to capital of market making in fixed-income markets has declined, in some markets dramatically, in part because the costs and financial risks associated with owning, maintaining, and hedging large inventories of U.S. treasuries has increased significantly. As a result, dealers are holding leaner inventories of fixed-income securities, including U.S. treasuries, and are managing their risks more carefully. This has resulted in a reduction in trading activity, market turnover, and market liquidity.

This reduced market making and liquidity is reflected in standard barometers of treasury market liquidity. While fewer market makers may not necessarily imply reduced market it is noteworthy that the number of treasury primary dealers is decreasing, and is presently down by nearly half from its historical peak a decade ago. Consolidation of large financial institutions recently has significantly reduced the number of firms making these markets. At a more technical level, bid-ask spreads in treasury bill and treasury note markets clearly ratcheted up in line with the series of events mentioned above (Figures 10-11). Similarly, the spread in yields between off-the-run and on-the-run treasury securities—an often-used indicator of overall liquidity in the treasury market—has increased sharply in 2000 (Figure 12).

The increasingly idiosyncratic behavior of treasury yields has also been reflected in higher volatility of private credit spreads measured relative to treasury securities. For example, the volatility of the 10-year swap spread has increased markedly since 1998 (Figure 13). There probably are various sources of this higher volatility, including the concern that U.S. economic growth would eventually slow. But reduced liquidity in treasury securities as well as the LTCM crisis raised concerns about market and liquidity risks associated with owning U.S. treasury securities and private fixed-income securities as well. According to market participants, these concerns have led to a situation in which the overall riskiness of treasuries (liquidity, credit, and market risks together) is perceived to be higher now than it was a few years ago. Some market participants believe that longer-term U.S. treasuries are presently more risky than private fixed-income instruments that have a "thin sliver" of credit risk (such as interest-rate swaps that are carefully managed through daily marking to market) but lower market risk.

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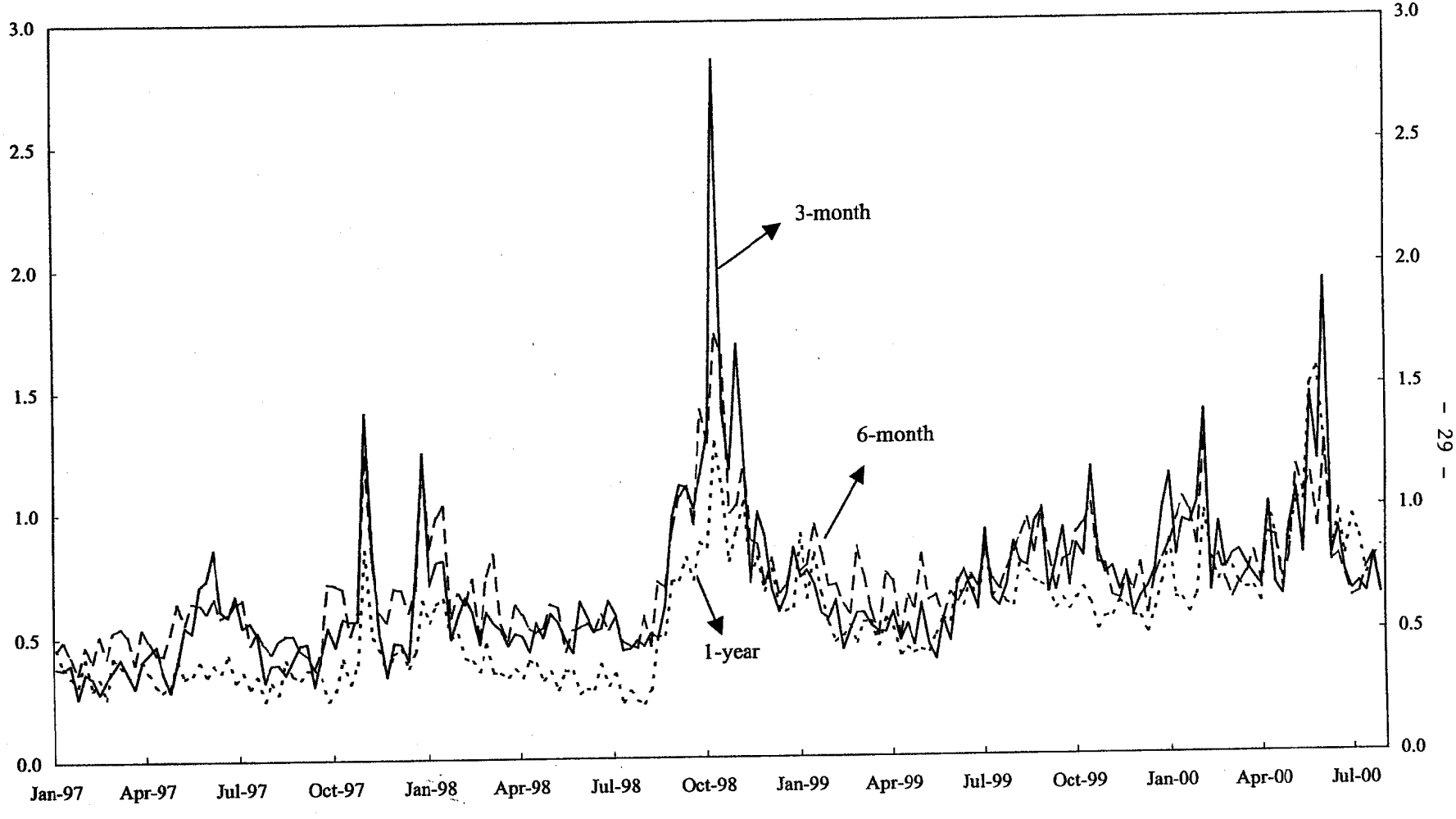
[16] Liquidity in a wide range of financial markets may have been reduced by the growth of electronic trading systems—i.e., the fragmentation of trading activity as more trading platforms have been introduced. See, for example, Committee on the Global Financial System (2001).

Figure 10. Bid-Ask Spreads of U.S. Treasury Bills

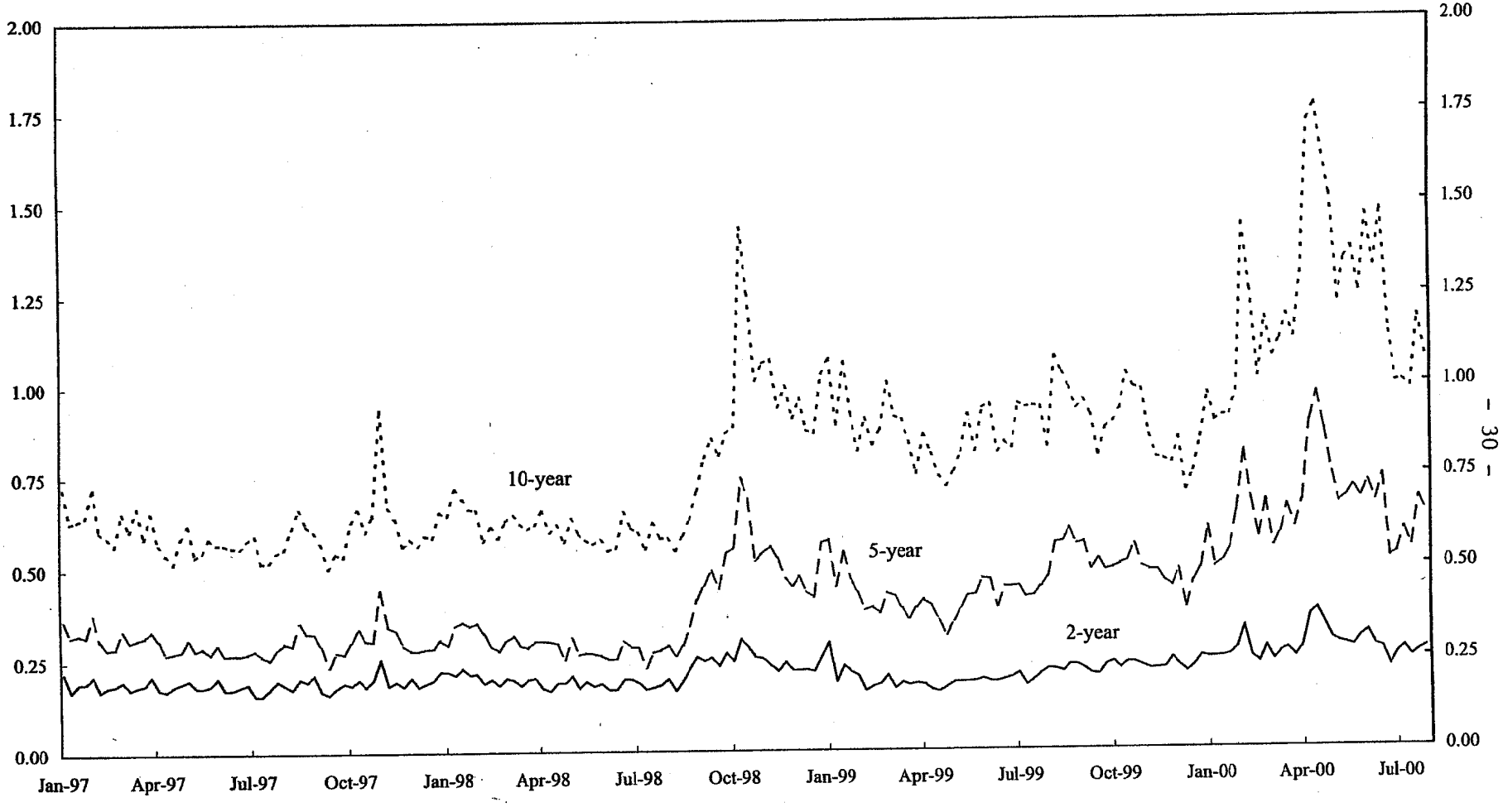
(In basis points)



Source: Michael J. Fleming, "*Treasury Market Liquidity,* " June 2000, Federal Reserve Bank of New York.
Note: The figure plots mean interdealer bid-ask spreads by week for the on-the-run bills. Bid-ask spreads are reported in basis points (based on the discount rate).

Figure 11. Bid-Ask Spreads of U.S. Treasury Notes

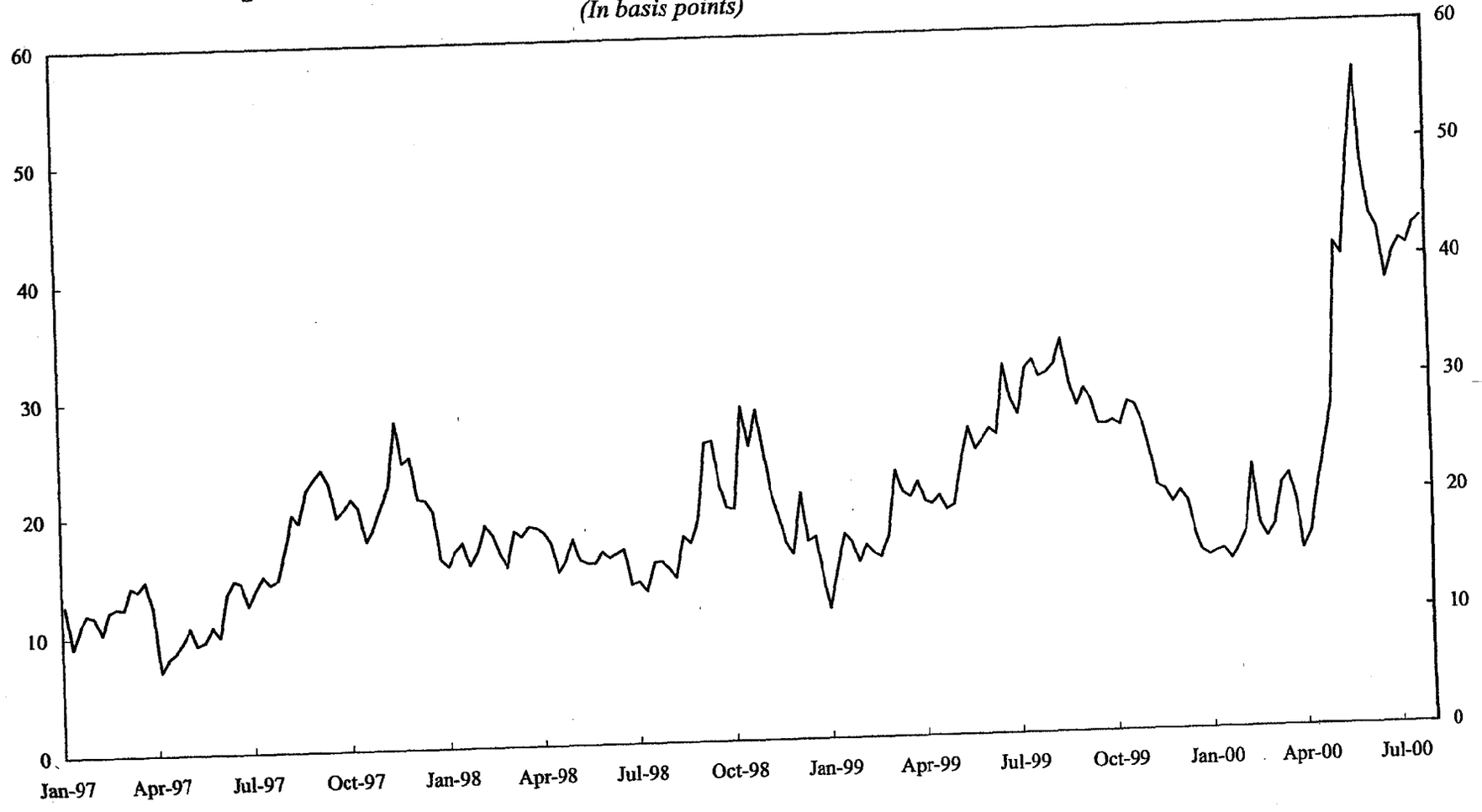
(32nds of a point)



Source: Michael J. Fleming, "*Treasury Market Liquidity,* " June 2000, Federal Reserve Bank of New York.
Note: The figure plots mean interdealer bid-ask spreads by week for the on-the-run notes. Bid-ask spreads are reported in 32nds of a point (where one point equals one percent of par).

Figure 12. Off-the-Run On-the-Run Yield Spread of One-Year U.S. Treasury Bills

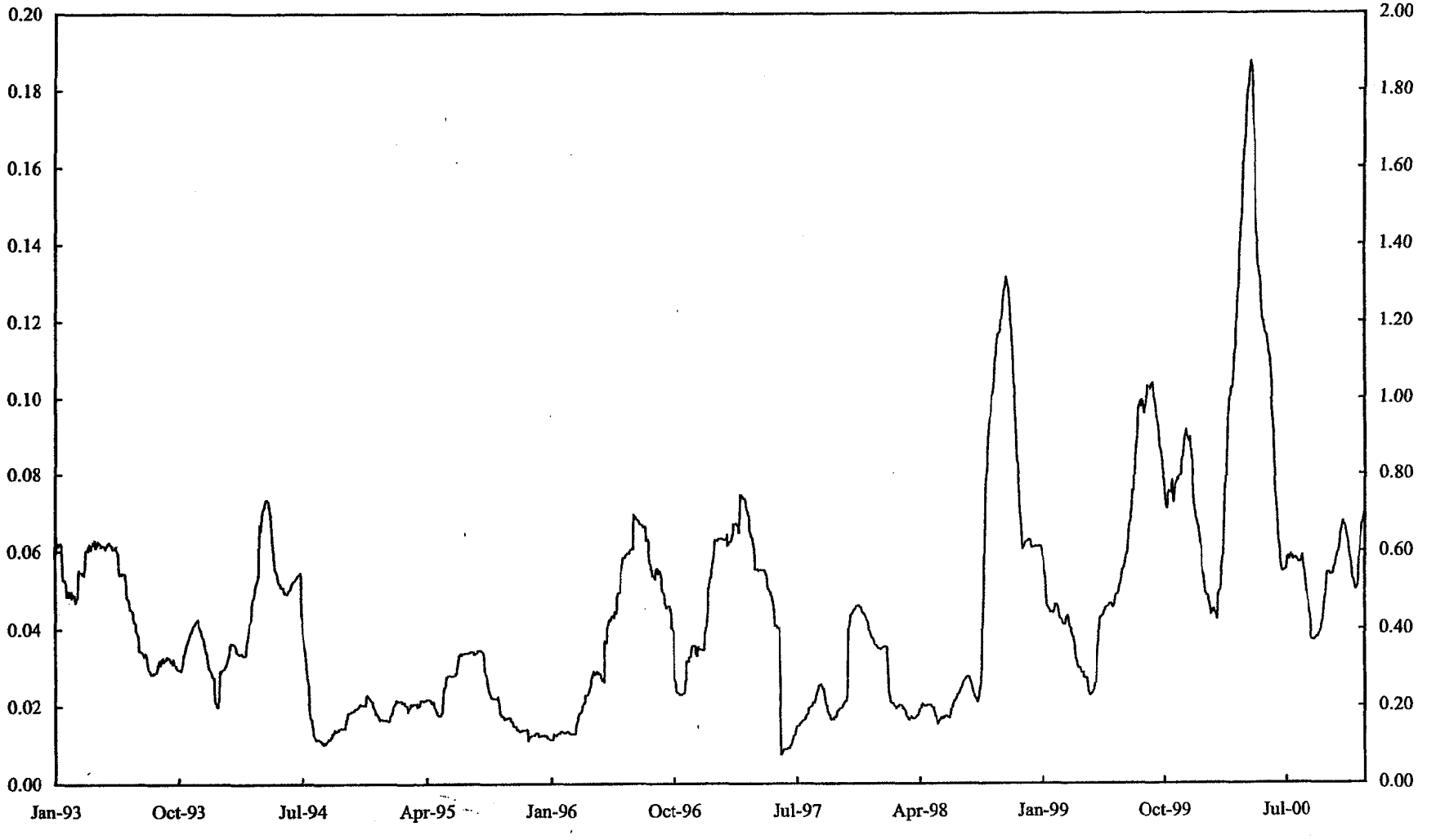
(In basis points)



Source: Michael J. Fleming, "*Treasury Market Liquidity,* " June 2000, Federal Reserve Bank of New York.
Note: The figure plots the mean off-the-run/on-the-run spread by week for the one-year bill. The spread is calculated daily as the yield of the coupon security with the maturity closest to that of the on-the-run one year bill less the yield of the bill. When two or more coupon securities have the closest maturity, the average coupon yield is used.

Figure 13. Volatility of 10-Year Swap Spread

(In percent)



Source: Bloomberg Financial Markets, L.P.

Note: Estimated standard deviation using daily data and a 90-day rolling window.

Less reliable U.S. treasury yield curve

The behavior of the treasury yield curve—notably, its sharp inversion during 2000—also has been affected by the idiosyncratic behavior of treasury yields (see Figure 14). At end-1999, the treasury yield curve had a typical upward slope of about 125 basis points, consistent with expectations of strong future economic growth and possibly firmer monetary policy. By mid-2000, subsequent to the U.S. treasury's announcement that it would buy back more long-term debt than originally anticipated, the yield curve flattened markedly reflecting partly the relative scarcity-value of U.S. treasuries. The flattening picked up pace through the second half of 2000, as 30-year yields continued to plummet.[17] By end-2000, the treasury yield curve assumed an inverted hump shape—medium-to-long term yields stood 50 to 75 basis points below short-term yields. These shifts in the yield curve seem to have obscured signals about future economic activity and monetary conditions derived from the yield curve. Some market participants and analysts believe that U.S. private yield curves are presently providing more accurate gauge of U.S. cyclical and monetary conditions than the treasury yield curve.[18]

Diminished reliability of U.S. treasuries

According to a varied group of market participants engaged in a wide range of financial businesses (both buy side and sell side), present conditions in U.S. treasury markets suggest that U.S. treasury securities have become less reliable, or at least more expensive to use, in several of their most important roles. First, in repo markets, the scarcity of some maturities of treasuries has raised the level of price volatility in repo markets. One study notes that scarcity in the one-year bill market has caused large movements in repo rates with one-year bills as collateral. For example, the cost of lending funds against this bill in the repo market was 4 percent at an annual rate on April 30, 2000, compared with 5.75 percent on general collateral on the same day.[19] Such events, where a specific security is "on special," have become common as the supply of treasuries decreases. Second, the increasing prices of treasury securities compared with other fixed income securities with similar maturities has made them more expensive to post as collateral to support a range of financial transactions. Third, the idiosyncratic, supply-demand driven volatility in treasury yields has reduced the usefulness of the treasury yield curve as a benchmark for credit risk and as a barometer of future economic and financial developments. Finally, the usefulness of treasuries for hedging interest rate risks has deteriorated. "Flight to quality" effects on treasury prices during major market adjustments, in particular, have become such an important factor driving treasury yield dynamics that comovements with other fixed-

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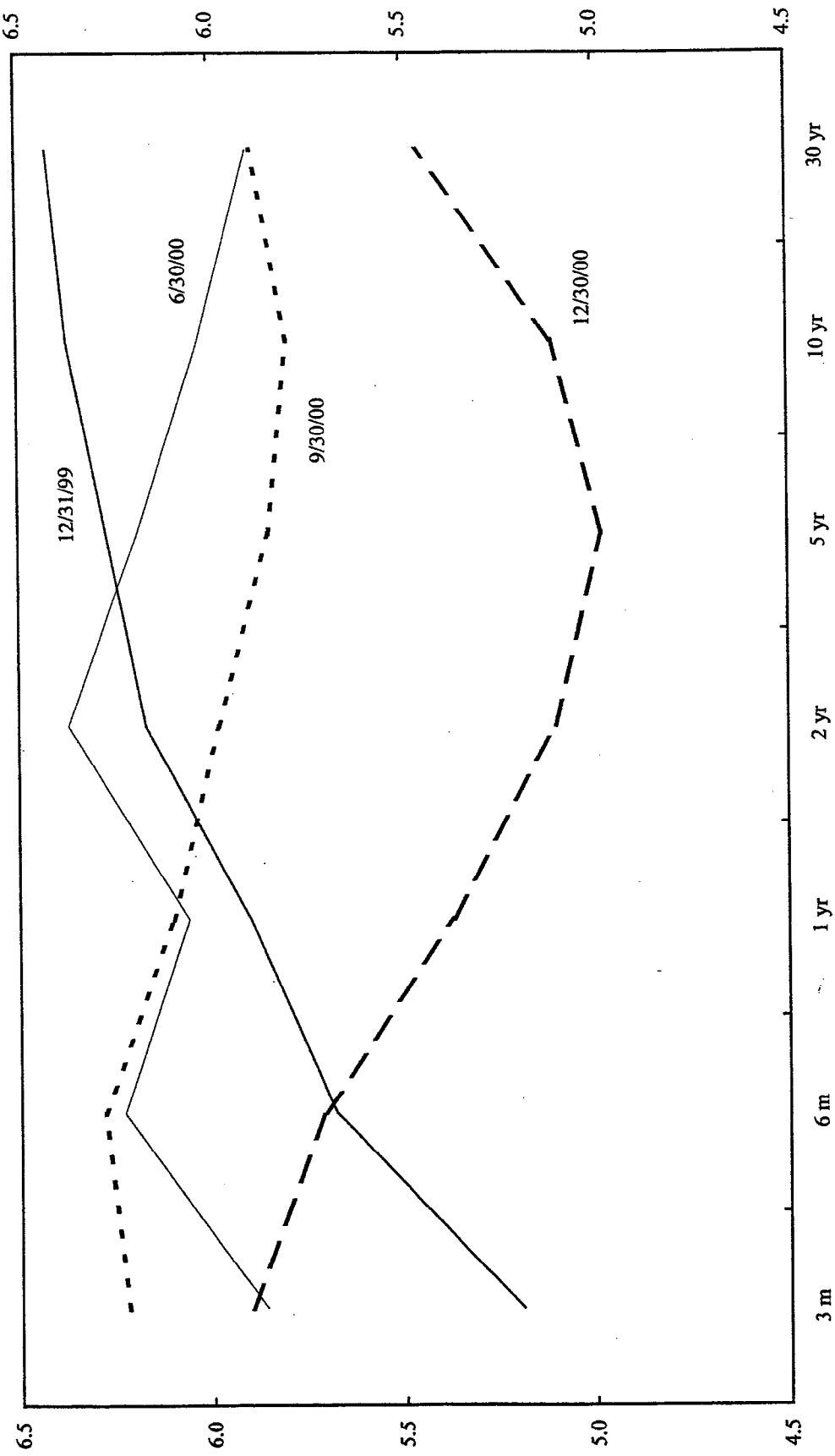
[17] The behavior of 30-year treasury yields has induced some borrowers to price their issues off shorter maturity government bonds. For example, a recent 30-year issue by Vodafone Airtouch was priced relative to a 10-year issue.

[18] See Showers (2000).

[19] See Fleming, Hall, and Krieger (2000).

Figure 14. U.S. Treasury Yield Curve
(In percent)



Source: Bloomberg Financial Markets, L.P.

income yields tend to reverse at precisely those times when "short hedgers" rely most on high positive correlations.

B. Private Efforts to Become Benchmark Issuers

Reduced liquidity in the treasury market and the increased importance of supply and demand factors on treasury yields have been the main reasons behind the efforts of three U.S. agencies (Freddie Mac, Fannie Mae, and FHLB) to establish themselves as the new benchmarks at certain maturities and therefore capitalize on the lower costs of issuing in those segments. The agencies have announced the regular issuance of large amounts (around $3-6 billion each[20]) of non-callable bonds in a range of maturities, paralleling the Treasury's practice. Fannie Mae and Freddie Mac have also introduced benchmark bill programs, thus more-or-less filling out the yield curve. In addition, the infrastructure for agency securities is developing: they are more widely used in repo operations, some agency issues are strippable, and in March 2000, the Chicago Mercantile Exchange, the Chicago Board of Trade and the (electronic) Cantor Exchange launched futures and options contracts on agency bonds. The agencies' competition for benchmark status extends beyond the U.S. dollar markets: certain euro-denominated agency issues are designed to be substitutes for euro-area government bonds—the November 2000 issue by Freddie Mac of a 5 billion euro five-year bond is an example.[21] Bid-ask spreads for agency securities are currently on the order of one-half to one basis point for the most liquid securities, compared with about four basis points just a few years ago.

Some large corporate borrowers are also positioning themselves as benchmark issuers, including Ford Motor Credit (with its GLOBUS program), and the General Motors Acceptance Corporation. As yet, the corporate markets appear to lack much of the infrastructure and supporting markets that underpin liquidity in the treasury market. Market participants point out that the development of corporate bond futures would add liquidity to benchmark corporate bonds and promote their benchmark status. A task force formed by the Bond Markets Association was studying the issue in late 2000; a key issue identified by the task force is whether investors will be willing to take long positions in the contract (a lack of interest in long positions in a similar futures contract floated in the late 1980s led to a one-sided market and cancellation of the contract). The creation of alternative, private benchmarks is also supported by the development of private fixed-income indexes. In the last two years, major fixed-income dealers have redoubled their efforts to devise and market private credit indexes, based on cash bond prices, for use as performance measurement and benchmarking.

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[20] See Fleming (2000).

[21] See Van Duyn (2000). The yield was quoted relative to the swap curve, not a government benchmark.

C. Changes in U.S. Federal Reserve Balance Sheet

The U.S. Federal Reserve currently relies almost exclusively on U.S. treasury securities for outright purchases and treasury and agency repo markets for controlling the supply of base money (Table 3). However, the Federal Reserve Act gives authority to the Federal Reserve to purchase a broader menu of financial instruments.[22] Specifically, the Federal Reserve has express authority (under sections 14(b)(1)-(2) of the Federal Reserve Act) to purchase debt issued or guaranteed by the U.S. government or any agency of the U.S. government, some debt obligations of state and local governments, as well as direct obligations and securities fully guaranteed by a foreign government. It also has the authority to purchase not only direct debt obligations of the major agencies (Freddie Mac, Fannie Mae, and the FHLB), but also "guaranteed certificates of participation" such as mortgage-backed securities (MBS). On the other hand, there is no express authority for the Federal Reserve to purchase most other private sector obligations, including corporate bonds, commercial paper, mortgages, equity, or land.

As the Federal Reserve Board is both a major holder and a major net purchaser of treasuries,[23] it has taken two steps to limit the adverse effects of its monetary operations on treasury market liquidity.[24] First, in August 1999, the Federal Reserve Bank of New York, as manager of the System Open Market Account, asked for and was given authority to accept a broader range of collateral in repurchase agreements (it did not request permission to make outright purchases of other assets).[25] For such purposes, the Federal Reserve Bank of New York currently has the authority from the Federal Open Market Committee to accept treasury securities (including strips) as well as direct agency debt, as well as temporary authority to accept pass-through mortgage securities of GNMA, FNMA, and FHLMC. Second, the Fed has established as guidelines caps on its holdings of individual issues of treasury securities, as a percentage of the publicly-held supply, and it has also concentrated its outright purchases in less liquid, "off-the-run" securities (Table 4).

In an environment of shrinking supply of publicly-held treasuries and trend growth in the Federal Reserve's holdings of Treasuries, under current operating procedures the Federal Reserve will likely reach the caps on its treasury holdings within just a few years. At that

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[22] See Clouse, Henderson, Orphanides, Small, and Tinsley (2000).

[23] Based on figures obtained from the IMF's *International Financial Statistics* database, the stock of base money—currency in the hands of the public plus bank reserves—in the United States has grown at about 8 per cent annually on average over the past decade (which is also true when averaged over the past three decades). This is an approximate indicator of the scale of annual purchases by the Federal Reserve of treasury securities.

[24] See Federal Reserve Bank of New York (2000).

[25] See The Federal Reserve Board (2000)

Table 3. Assets of U.S. Federal Reserve Board
(In percent of total assets)

	1950	1960	1970	1980	1990	2000 [1/]
Assets						
Gold, SDRs	50.1	33.1	12.1	8.2	6.6	2.6
Loans to depository institutions	0.0	0.0	0.0	1.0	0.1	0.1
Federal agencies						
Outright	0.0	0.0	0.0	5.1	1.9	0.0
Repos	0.0	0.0	0.0	0.3	0.4	0.0
U.S. Treasuries						
Outright	47.3	50.9	69.0	69.6	71.8	87.3
Repos	0.0	0.8	0.0	1.2	5.2	0.0
Other assets [2/]	2.6	15.3	18.9	14.7	14.0	9.9
Memorandum item:						
Total assets						
(In billions of U.S. dollars)	42.9	52.9	90.0	171.5	327.6	585.6

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

[1/] As of September.

[2/] Including items in process, bank premises, and other assets (net).

Table 4. U.S. Federal Reserve Holdings of U.S. Treasury Securities

Maturity	Self-Imposed Cap on Holdings of Outstanding Stock	Remaining Slack [1/] (billions of U.S. dollars)
Bills and less than 1 year	35%	126
1-2 year	From 35% to 25%	48
2-5 year	From 25% to 20%	37
5-10 year	From 20% to 15%	6
10+ year	15%	14
Total		231

Sources: Federal Reserve Bank of New York, and Folkerts-Landau, David, Peter Garber, and Trevor Dinmore, "Treasury Drought 2003," Deutsche Bank, Global Markets Research, January 2001.

[1/] Estimates by Deutsche Bank.

juncture, the Fed will have two main options. First, the Federal Reserve could relax the caps on its holdings of treasury securities at additional cost to market liquidity. However, this option would only delay the problem caused by a shrinking supply of treasury securities and the Federal Reserve's increasing ownership of treasury securities. The second option is that the Federal Reserve could begin selling its treasury holdings and accumulating alternative assets. This is the only long-term option if the supply of treasury securities continues to decrease.

The Federal Reserve's present practice of relying almost exclusively on treasury securities for maintaining monetary stability is therefore not sustainable with a shrinking supply of treasury securities. The Fed will have to consider broadening the menu of securities that it uses to conduct its monetary operations, and especially those that the Fed buys and sells to control the supply of high-powered money. As mentioned above, the Federal Reserve already has the authority to purchase both direct debt obligations and MBS issued by the large agencies, as well as certain debt obligations of state, local, and foreign governments. Paralleling the present practice in several major advanced economies, the Federal Reserve has in fact historically relied heavily on discounting private financial instruments. There is, therefore, considerable precedent in the United States and in other countries for central banks accumulating private financial assets in order to affect the money supply. A likely reason the Federal Reserve has not recently exercised its authority to purchase securities outright other than treasuries is a concern that this could alter the perceived risks from investing in those securities.[26] Another option—that may require legislative action—is to fundamentally alter the way in which the Federal Reserve controls the money supply.[27] For instance, the Federal Reserve could discount assets of banks through its discount window. The Federal Reserve is currently studying these and related questions surrounding Federal Reserve operating procedures.

V. Private and Public Policy Questions Raised by the Shrinking Supply of Treasury Securities

The potential for the supply of U.S. treasuries to diminish beyond the point where treasury markets are no longer able to fulfill their present roles raises important issues of immediate interest to active private market participants and policy makers. The objective of this section of the paper is to identify and analyze questions, and to provide insights about how market participants, policy makers, and the authors are thinking about these questions.

Most questions being discussed in the markets are relatively technical and oriented towards maintaining the profitability—in some cases, the viability—of some of their businesses. They immediately involve whether private substitutes exist or can be created for pricing and quoting private debt securities, for hedging private financial risk, and for cost-effective and reliable collateralization of financial transactions. Market participants are already shifting, to some

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[26] See Clouse, Henderson, Orphanides, Small, and Tinsley (2000).

[27] See Goldman Sachs (2000).

extent, towards using private substitutes in dollar and euro markets—such as swaps—for price quotation, hedging, and investment, and they recently have begun using private securities and even delivery of cash in the form of bank deposits as substitutes for collateral. This reflects to a considerable extent that dollar fixed-income markets are sufficiently developed that reasonably safe private instruments exist for benchmarking, hedging, and as collateral, at least during normal levels of financial activity. In euro markets, there is no uniform government benchmark yield curve and so private benchmarks were the only reasonable alternative. Based on our discussions with a wide variety of market participants, it appears as if many of them have not yet grappled with some aspects of how their portfolio and risk management might be affected and transformed, and how market dynamics might be affected, particularly during times of stress and turbulence.

The transition to using private substitutes is not without costs, some transitional and others possibly more permanent. The relatively higher costs of using private substitutes are related directly to the unique characteristics of government securities and the roles they have played (as discussed above). These unique characteristics may account for why government securities markets in some advanced countries have developed—partly because market participants found them attractive—into some of the deepest and most liquid domestic markets. This may be particularly so for the U.S. treasury markets, which reach far beyond U.S. borders. Taking this logic further, U.S. treasuries may be providing public benefits in U.S. and international financial markets—as reliable near monies and safe havens—that might be difficult or impossible to replicate fully with private instruments. A key policy question is: is it possible for the private sector to rely exclusively on private instruments as near-monies and safe havens—in the presence of sound central bank policies—without necessarily sacrificing a significant part of the efficiency gains of modern finance and the ability to ensure financial stability within the present international policy framework? As far as can be discerned, there are no answers to this question in the various literatures, think tanks, and policy-making institutions.

A. Are There Private Substitutes for Government Benchmarks?

In dollar and euro markets, government securities prices typically are *not used to determine prices* for new issues of private fixed-income securities. In dollar markets, U.S. treasury securities are one of several reference points used for *quoting* yields on both new and existing fixed-income instruments. Current methodologies for *pricing* new issues of private debt securities are based on market prices of existing debt securities that are similar in terms of credit risk characteristics, the particular structure of the security (coupons, maturity), the industry of the issuer, and the liquidity of the issue. In other words, new issues of U.S. dollar corporate bonds are priced with reference to market prices of close substitutes in the corporate bond market. Treasury securities may enter into this arithmetic as one of several available reference

points and as the discount rate for future profit streams when more fundamental models are used for pricing.[28]

In fixed-income markets in the major continental European countries (France, Germany, Italy), before the introduction of the euro, government securities provided *quotation* benchmarks for maturities in which deep and liquid markets existed, usually in the very short (France and Italy) and long (all three) maturities. However, government benchmarks are no longer consistently relied upon, because a uniform euro-denominated government yield curve does not presently exist. Instead, because the interbank market—the so-called Libor or swap curve—is well developed in Europe and liquid at all maturities, it is the main instrument used as a benchmark for pricing and quotation purposes. In fixed-income markets in other countries, the value of having government benchmarks for pricing and quotation could be high, particularly where good alternative benchmarks are absent, such as in most, if not all, developing and transition countries.

In summary, the science and art of pricing and quotation of fixed-income instruments in advanced countries, and in particular in U.S. dollar and euro markets is unlikely to be significantly affected by the possible disappearance of government securities. There are a variety of non-treasury benchmarks, including swaps, agency securities, and some large corporate issues, that can be and are used for these purposes.

B. What Are the Possible Consequences for Day-to-Day Liquidity Management and Portfolio Management?

Treasuries have become increasingly expensive for use in repos and they have also become less reliable for such purposes (which has led to larger "haircuts") because of increased market risk. For these reasons, market participants have shifted some short-term liquidity and funding activities toward high-quality, liquid alternatives to the treasury bill and repo markets—mainly agencies and some corporate bonds. As a result, cash and repo markets in agency securities in particular have become even more liquid and active.

The shrinking supply of treasury securities may also have important consequences for investors. First, treasury securities are free of private credit risk and such low risk investments may be important for the feasible set of portfolios that investors have available to them.[29] Second, long-term treasuries serve an important role for investors with long-term investment horizons–e.g., investors that have long-duration liabilities, including pension funds and insurance companies. Rating agencies encourage insurance companies to invest in long-term securities if they have long-term liabilities. Market participants consider that the shrinking supply of treasury securities

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[28] Dealers of dollar fixed-income instruments use multiple quotation benchmarks, partly because the usefulness of treasuries as a benchmark has been eroded significantly as treasury yields have become more sensitive to supply and demand factors.

[29] See Bomfin (2001) and Reinhart and Sack (2000).

presents an important challenge for investors that have rigid requirements to hold long-duration assets (which is often further complicated by the presence of restrictions on the amounts of credit risk that may be taken by portfolio managers). In large part for this reason, The Bond Market Association—the membership of which includes financial institutions that are active in U.S. fixed-income markets—has advocated maintaining issuance of 30-year treasury bonds.[30] Maintaining some issuance of 30-year bonds may be beneficial to the long end of the strips market, which is of further help to those investors that wish to match long-duration liabilities. Treasuries are important to portfolio managers also because the performance of portfolio managers is assessed against benchmark portfolios, and all of the main benchmark fixed-income portfolios presently attach a significant weight to U.S. treasury securities. The shrinking supply of treasuries is reducing the share that treasuries have in the main benchmark portfolios. There are two main consequences of this. First, other fixed income market segments, and particularly the U.S. and European corporate sectors, are receiving higher weights in benchmark portfolios. This has produced increased demand for bonds in these segments of the fixed-income markets. Second, some market participants report that higher weights on corporate markets in benchmark indexes may have altered market dynamics in that the price of private credit is dependent on the portfolio rebalancing operations of a wider range (including geographically) of institutions. It is unclear whether this has raised or lowered the volatility of interest rates. It is noteworthy that some market participants point to this as a key factor underlying the increase in spreads in the higher-yield market bond markets in late 2000.

Overall, the shrinking supply of treasury securities is likely to continue to have important consequences for short-term liquidity management and funding as well as longer-term portfolio management. The consequences for short-term liquidity management and funding appear largely transitional, and market participants have already made significant headway in adjusting their businesses to the shrinking supply of treasuries. The consequences for longer-term portfolio management appear to be less easily accommodated. There tends to be a dearth of high quality, long-maturity fixed-income instruments that are desired by investment mangers that have long-duration liabilities. Managers may need to manage growing "gap risk" caused by a greater mismatch between the maturities of their assets and liabilities. This challenge could pose particular challenges to important classes of institutional investors, such as insurance companies and pension funds. If these private risks are not well managed, they could pose financial stability challenges in some national markets.

C. How Might the Ability to Hedge Interest-Rate Risk be Affected?

While liquidity in the U.S. treasury market is still unmatched—and the cost of establishing or removing positions is still comparatively low—for several reasons U.S. treasuries have become less reliable, and more expensive, for hedging interest rate risk. Most importantly, increased market risk on treasury securities and reduced correlations between treasury yields with other

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[30] See The Bond Market Association (2001).

fixed income instruments has impaired the usefulness of treasuries, as well as some derivatives instruments based on prices of treasury securities, for managing interest rate risk.[31]

The consensus among market participants is that the reduced ability to hedge interest rate risk in the treasury market does not present a major concern during periods of normal financial activity, that is, when interest rates fluctuate within normal trading ranges. A variety of alternative financial instruments can be used to manage these risks. Swaps, and to a lesser degree agency and corporate bonds, have higher correlations with most other instruments than do treasuries. As a result, a considerable amount of hedging activity that had been conducted in the treasury market is now being conducted in swaps and corporate/agency bond markets.

The minimal credit risk and high degree of liquidity in the swaps markets have positioned swaps as the leading contender to replace the U.S. treasury market both as pricing benchmarks as well as for hedging interest rate risk. Counterparty (or credit) risks in swaps are usually small and are more-or-less limited to one-days worth of interest-rate exposure, because they are managed through daily mark-to-market practices, collateralization, and the statistical "cleansing" of riskier bank quotes from Libor rates (the rates that are the basis of the swaps market). Of course, during periods of financial stress the amounts of credit risk in swaps could increase significantly. In any event, two transitional issues remain before hedging in swaps markets will ever fully replace treasuries in this role.

The first transitional issue is that the swaps market is insufficiently "commoditized" to hedge the various risks that have historically been hedged in the treasury market. This is partly a result of the broader important difficulty in creating traded futures and options markets in non-government securities because private credit risks are heterogeneous. Some market participants suggest that the swaps market needs to mature to a point where participants can freely trade and unwind swaps of all maturities as easily as they currently trade treasury instruments, instead of booking long-term credit obligations as is currently done. Infrastructure improvements, possibly including a central clearinghouse, might be needed to deal with the potential for a build-up of counterparty risks. Some securities traders suggest that a swap futures market could complement the swaps market and help it to serve the hedging role, much as the highly liquid market for treasury futures has complemented the cash treasury markets.

A second, closely related, transitional issue concerns the relatively lower liquidity of swaps (as well as agency securities) compared with the treasury market. Most market participants agree that, over time, liquidity will further migrate from the treasury market to other fixed income markets, particularly the swaps market. However, because swaps are bilateral contracts that are not "traded" in a market the same way that treasury securities are, there exists a concern by some market participants that there may never be the degree of liquidity in swaps market that had existed in the treasury market. In turn, this depends on how commoditized the swaps market

[31] For example, supply effects on the 30-year treasury yields have caused some substitution of activity from the 30-year futures contract into five- and 10-year contracts.

becomes. If "liquidity" in the swaps market—defined as the cost of putting on and removing hedges—does not achieve the degree of liquidity that has existed in the treasury market, then there may be a potentially a significant effect on pricing in fixed-income markets due to a higher long-term cost of "insurance." This increased cost of hedging has apparently already reduced the willingness of securities dealers to hold inventories in primary and secondary markets, and could over time affect the pricing of initial offerings.

In summary, historically the treasury market and related repo and derivatives markets have served as excellent markets in which to hedge interest rate risk. The shrinking supply of treasury securities has affected the reliability, and therefore, the usefulness of these markets for these purposes. As a result, a considerable amount of hedging activity has already migrated from the treasury and related markets to the swaps and agency/corporate bond markets. This transition would likely strengthen if the swaps market were to become both more liquid and more commoditized.

D. Are There Natural Substitutes for U.S. Treasuries as a Universally Accepted Collateral?

A key reason that treasury securities have been useful as collateral underlying repos and other transactions is that their current market value is easily observed and is always current, so that appropriate collateral amounts and haircuts can be applied. It is more difficult to use assets that are less actively traded, because the value of the collateral is not as apparent.

The shrinking supply of U.S. treasury securities has made U.S. treasuries increasingly expensive to provide as collateral. This increased expense has occurred because treasury yields have fallen relative to the Libor curve and because heightened market risk and lower liquidity of treasury securities has led to increased haircuts on treasuries when they are posted as collateral. For these reasons, market participants report that they are using fewer treasuries to collateralize transactions. In their place, they are using agency securities, high-grade corporate paper, and even cash (bank deposits). This has been a key reason why repo markets in agencies and high-grade corporates have flourished recently.

A complementary reason for the richening of the menu of acceptable collateral in U.S. and international financial markets is the recent behavior of central banks. Specifically, central banks, both in the United States and elsewhere, have expanded the menu of securities that they use for liquidity and reserve management purposes. Whereas domestic government securities used to be the only intervention vehicle of many central banks, an increasing number of central banks are using other countries' government securities, agency securities, supranational bonds, and asset-backed securities—e.g., the benchmark for the U.S. dollar reserves of the European Central Bank now includes agency securities, and in 1999 the Bank of England expanded its list of eligible collateral for open market operations to include bonds issued by European Economic Area governments. It has also become increasingly common for central banks to use derivatives instruments for specific purposes.

There are important transitional issues in shifting to an environment in which the menu of acceptable collateral is much broader than government securities. As government bond supply diminishes, perhaps other securities could be admitted as collateral for settlement systems (with larger haircuts)—which would then take on some of the role as medium of exchange. In any event, probably the key, on-going adjustment is a greater focus on the management of collateral risk, including the magnitudes of required haircuts to compensate for the increased credit and liquidity risks of non-treasury collateral. This adjustment could pose considerable challenges to financial institutions, especially those that have less sophisticated risk management and control systems. It appears likely that these forces will complement other forces leading to financial consolidation. Specifically, large institutions with sizeable capital bases and sophisticated risk-management and collateral-management systems possess a natural advantage in dealing with riskier collateral. In addition, the increased reliance on Libor-based instruments (swaps) for hedging and on cash (deposits) for collateral management implies an expanded role for the major internationally-active banks in financial intermediation.

In summary, there are some transitional issues to be resolved in moving to an environment with a broad menu of securities that are acceptable as collateral. Large, internationally-active financial institutions have a cost advantage in managing riskier pools of collateral. As a result, on the one hand the trend toward higher concentration in global financial intermediation may smooth this transition, but on the other hand it may reinforce this trend toward higher concentration of global financial intermediation. Overall, discussions with market participants suggest that these transitional issues are manageable.

E. How Might Market Dynamics be Altered by the Absence of a Credit-Risk Free Safe Haven?

Another important question involves the role of U.S. Treasury securities as a "shock absorber" when there are significant economic or financial shocks that cause investors to seek to reduce the riskiness of their portfolios. During such events, short-term debt is either rolled over at higher prices or not at all, and prices of long-term debt and equity fall sharply. A large and liquid treasury market implies that there is a large pool of investments—treasuries—that are completely free of private financial risk. In recent financial history, the treasury market has been the main "safe haven" to which investors flee during major market adjustments.

However, it is not at all obvious that the presence of the treasury market necessarily buffers the amount by which the "price of risk" rises when major adverse shocks occur. It is possible that having a "safe asset" to move into during crises is associated with larger changes in asset prices and/or volumes of new private financing than if there did not exist a safe asset. The converse also cannot be ruled out. Further, agency securities and bank deposits, for example, may be close substitutes for treasury securities in that these investments appear to contain small amounts of private credit risk. Overall, the consequences for market dynamics of not having a

large and liquid U.S. treasury market are not clear.[32] Reflecting this ambiguity, there are two main views among market participants.

The first view is that other instruments will substitute for treasury securities in all the roles that they have played. According to this view, U.S. treasury securities have served as an "anchor" that supports a broad range of financial activity, and markets will adapt to a shrinking supply of treasury securities by "shifting the anchor." While treasury securities have the desirable property of being free of credit risk, highly rated corporate and agency debt securities as well as some bank liabilities have very little private credit risk as well. In addition, the U.S. Treasury will need to maintain at least a deep and liquid short-term bill market for cash management purposes. According to this first view, the adjustment to a shrinking supply of treasury securities is not a cause for alarm. The second view is that private financial instruments cannot substitute for treasury securities in their role as a safe haven. As a result, the disappearance of a large, deep and liquid treasury market will fundamentally alter the operation of the U.S. financial system and even international finance, especially during periods of stress.[33] According to this view, investors engage in a wide variety of risky financial activities on the premise that treasury securities are there in the event that they need to shed risk. Without treasury securities, there may be larger required adjustments in market prices when large adverse shocks occur. Of course, a complete assessment requires weighing these potential benefits of treasury securities against the direct costs to taxpayers of servicing debt (net of the return on government assets accumulated as a result of issuing debt) as well as any macroeconomic effects of public debt.

A key to assessing potential changes in market dynamics during periods of stress is whether other instruments could substitute for treasuries as a safe haven. Although there is no direct evidence on the link between what assets are considered by market participants as safe havens and the set of assets that central banks have on their balance sheets, some market participants suggest that it is reasonable to expect that the class of instruments (or range of securities) that could serve as a substitute safe haven for government securities is the class of assets that central banks hold and use for monetary interventions. In U.S. dollar financial markets, possible substitutes for treasury securities as safe havens could include claims on U.S. financial institutions and securities issued or guaranteed by the agencies in the United States (notably Fannie Mae, Freddie Mac, and FHLB). The supply of agency securities is presently not much less than the free-float of treasury securities. However, even agency securities have some private credit risk, and since the magnitude of credit risk will be time-varying, this magnitude must be continuously gauged.[34]

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[32] For a discussion of the potential impact on investors of disappearing U.S. treasuries and the availability of portfolio substitutes, see Reinhart (2000).

[33] See, Wojnilower (2000).

[34] It may be possible to manufacture a debt security that is virtually risk-free in the form of a high-quality tranche of a collateralized bond or loan obligation (CMOs and CLOs). These vehicles pool bonds or loans and issue different tranches of claims, differentiated by their

(continued...)

Shifting into private assets may be interpreted by market participants as tantamount to the Fed underwriting some of the risks associated with the issuing counterparty. This raises at least two important questions. First, to what extent should central banks systematically incur credit risk, and other financial risks, in order to achieve its monetary and financial stability objectives? Second, to what extent is it prudent for central banks to become engaged in monetary and financial stability decisions that also, by there very nature, allocate capital to competing sectors or firms within the economic and financial system?

In summary, U.S. treasury securities have historically been a safe-haven for U.S. and international investors. It is, however, unclear whether this served to buffer financial asset prices and markets from significant shocks. Regardless of the answer to this question, the markets may identify and come to rely on new "safe haven" assets. How smooth this transition will be, whether market dynamics will be significantly altered, and how the nature of domestic and international systemic risks will be altered, are questions that can not yet be answered.

F. Is the International Role of the Dollar Likely to be Affected?

The U.S. dollar is the main currency of denomination for international financial transactions, accounting for about 40 percent of international bonds and bank loans.[35] The predominant role of the dollar in international financial markets reflects at least three factors. First, market participants consider the U.S. economic and financial system as stable, resilient, transparent, and well-managed and possessing a robust legal and operational infrastructure. Because of this, the risk of an isolated, unilateral and catastrophic collapse in the U.S. economy and financial system is seen as remote. Second, U.S. dollar fixed-income markets are arguably the deepest and most liquid in the world. Third, the main intervention tool in foreign exchange markets by central banks around the world has historically been U.S. treasury securities.

Central banks and private market participants have responded to the shrinking supply of treasury securities by substituting into other dollar financial instruments. In light of the historical international role of the dollar, this raises the question of whether that role will shift as financial instruments increasingly substitute for treasuries in their traditional functions. The predominant view among market participants is that it will not. The role of U.S. treasuries in

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seniority of claim to the underlying cash flows. Thus, in principle one tranche could be senior enough that the credit risk is nil. Whether it is feasible to create a large enough supply of this senior-most tranche appears unlikely. The publicly-held stock of treasury securities is currently more than half as large as the entire stock of private corporate debt securities outstanding in the United States. In addition, if it was to serve also as the instrument of Fed intervention then the supply of it would have to grow at least at the rate of base money growth, which has been close to 8 percent on average over the past several decades.

[35] See Moody's Investors Service (2000).

international finance appears to be in large part due to the role of the U.S. economy and dollar financial markets in international finance, rather than the converse. The shrinking supply of treasury securities has already resulted in a shift in the menu of securities that are used to support international financial activities, rather than resulting in a marked shift in the uses of the major currencies in international financial activities. Moreover, the shrinking supply of treasury securities has not reduced the significance of U.S. dollar markets. The groups of market participants that we meet with regularly almost uniformly believe that the relative roles of the major currencies in the future will depend importantly on how well the respective economies and financial systems are managed.

VI. CONCLUSIONS

Government securities have characteristics that make them attractive to market participants for a variety of reasons and in a number of important roles. The reduction in the supply of U.S. treasury securities during the past few years already has had some impact in markets, and is affecting the behavior of market participants in their roles as suppliers and demanders of financial services. It is also leading to changes in the asset composition of the U.S. Federal Reserve System.

In the roles of pricing and quotation of private fixed-income instruments, hedging market risks, and to some extent in collateralizing counterparty risks, market participants have shifted significantly to private financial instruments (interest-rate swaps, and to a lesser extent high-grade corporate debt securities). In some of the other roles played by U.S. treasury securities there are concerns that private financial instruments may neither easily nor fully substitute for treasury securities. The paper discussed three main concerns in this regard. First, it may take a considerable period of time before market participants fully and completely adapt in using private instruments—embodying credit risk—to substitute reliably for U.S. treasury securities as universally accepted collateral. This adaptation produces costs of adjustment. As the large internationally-active financial institutions appear to have a cost advantage in the management of risky collateral, this influence may be adding to increased concentration in U.S. and international financial markets. In addition, it remains to be seen how private collateral will perform during periods of stress, and this uncertainty may be why some market participants have increasingly come to rely on cash (bank deposit transfers) as collateral instead of U.S. treasuries.

The second concern is that it may be difficult to find or produce reliable substitutes for U.S. treasuries in their roles as domestic and international safe havens. While it is difficult to discern the consequences of this for market dynamics and systemic risk, this issue has received relatively little attention both by policymakers and by market participants.

The third concern is that the ability of some investors to achieve desired portfolios may be impaired by the shrinking supply of treasury securities. An important instance of this is insurance companies and pension funds for which there do not appear to be available sufficient amounts of private substitutes for long-term treasury securities. As a result, if the supply of long-term government securities in the United States and in some other countries continues to

fall, these types of institutional investors may need to contend with greater mismatches between the maturities of their assets and liabilities.

In general terms, government securities may provide public benefits in national (and for U.S. treasuries, also in international) markets—by providing deep and liquid security markets, for example—that might be difficult or impossible to replicate with private instruments. These benefits may be higher in less developed financial systems in advanced countries, and in most financial systems in developing and transition countries that often lack developed, liquid private fixed-income securities markets and reliable infrastructures for pricing, trading, and managing private financial risks. Reliable private substitutes for government securities simply do not exist in many, if not most, financial systems. The public benefits of effective, if not efficient, government securities markets for pricing, quoting, and hedging private financial risks can be significant. Moreover, in providing some of the important characteristics of base money, and in serving as a safe haven during periods of turbulence, well developed markets for government securities, in adequate supplies in a range of maturities, may provide significant public benefits that would be difficult, if not impossible to replicate, even in the comparatively well-developed dollar fixed income market.

If the public benefits are perceived as significant—both in the United States and elsewhere—then a key policy concern is: should the supply of government securities be allowed to shrink below a critical threshold beyond which they no longer reliably provide or support these valuable public benefits? The resolution of this question requires knowledge about the financial market benefits of government securities markets, whether reasonably cost-effective (including in terms of efficiency and financial stability) private substitutes are possible, as well as other costs and benefits of public debt. It may also be prudent to factor in the costs of having to resuscitate government securities markets if government financing needs change course as the baby-boom generation moves into retirement. Ultimately, countries must decide what role government securities markets can play in providing public benefits in the form of a financial market structure that fosters efficient finance and one that encourages, and helps manage, systemic financial stability. The forthcoming 2001 International Capital Markets report will delve more deeply into some of these issues.

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