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Globalization's Effect on Interest Rates and the Yield Curve

by Tao Wu

From June 2004 to July 2006, the Federal Open Market Committee raised the target federal funds rate in 17 consecutive meetings, taking it from 1 percent to 5.25 percent. The puzzling feature of this round of monetary tightening is that long-term interest rates didn't increase as much as they did in previous tightening cycles. In fact, long-term rates declined most of 2004 and 2005, despite the steady increases in short-term rates. In 2005, former Federal Reserve Chairman Alan Greenspan characterized this divergence in the path of short- and long-term rates as a "conundrum."

Recent declines in long-term rates aren't a phenomenon peculiar to the United States. Over the past few years, long-term rates around the

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world have exhibited similar declining patterns, reaching lows unseen in the past 25 years (*Chart 1*). Economists have offered a variety of explanations for this, but the trend has spread across so many countries that a good number of analysts now suspect globalization may be playing a key role in decoupling short- and long-term interest rates. Recent decades have seen globalization proceed at a rapid pace, tying nations' economies closer together through the freer movement across borders of goods, services, money and ideas. This has brought important changes in the forces that determine interest rates.

Monetary policy's effects on the economy stem largely from how long-term interest rates respond to central banks' actions. In most industrialized nations, central bankers have direct control over short-term interest rates and use them as their main policy instrument. When central banks raise short-term rates, it usually leads to increases in market-determined long-term rates, including those for mortgages and commercial loans. Higher

long-term rates curb aggregate consumption and investment, ultimately helping contain inflation. Cutting short-term rates, on the other hand, usually leads to lower long-term rates, providing a stimulus for economic activity. Any lasting changes in the links between short- and long-term rates will thus have important implications for the timing and impact of monetary policy actions.

Long Rates' Recent Behavior

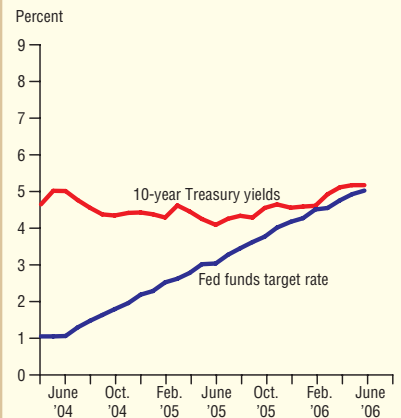
The conventional relationship between short- and long-term interest rates appears to have broken down in the most recent round of monetary tightening. Although the target federal funds rate has been gradually rising over the past two years, the 10-year Treasury yield remains about where it was in mid-2004 (*Chart 2A*). Indeed, during the first year and a half of the monetary tightening—June 2004 to December 2005—the 10-year Treasury yield fell by about a quarter percentage point despite a 3.25 point increase in the target fed funds rate.

This pattern contrasts sharply with

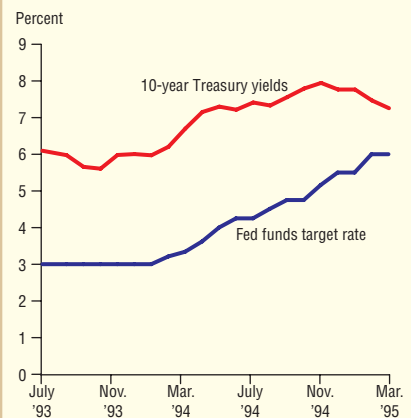
Chart 2

Interest Rates Behave Differently in Two Eras

A. 2004–06 Tightening



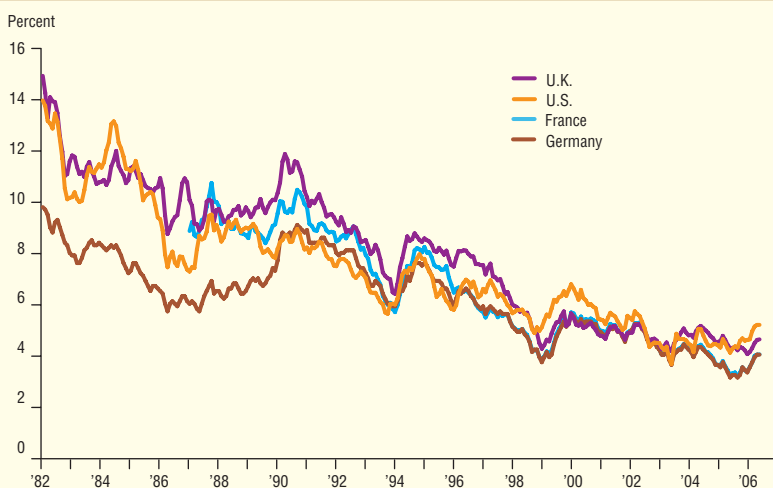
B. 1994–95 Tightening



SOURCE: Haver Analytics.

Chart 1

Long-Term Rates Fall Worldwide



NOTE: Data are monthly.
SOURCE: Haver Analytics.

past experience. For instance, during the last round of monetary tightening a decade ago, the 10-year Treasury yield rose by about 1.5 percentage points, while the target fed funds rate rose 3 percentage points from January 1994 to February 1995 (*Chart 2B*). A simple correlation analysis suggests that over the two decades up to mid-2004, a 1 percentage point increase in the target fed funds rate was accompanied by, on average, a 0.3 percentage point increase in the 10-year



Treasury yield. If such a relationship had persisted, the 4.25 percentage point increase in the target fed funds rate over the past two years would have led to a 1.3 percentage point rise in the 10-year Treasury yield. In other words, the 10-year Treasury yield would have risen to more than 6 percent, instead of hovering around 5 percent.

With short-term rates steadily rising from a very low starting level and long-term rates steady, the yield curve no longer exhibits its normal upward slope; instead, it has become almost flat or even inverted (*Chart 3*). In the past, a flattening yield curve had been a good indicator of recessions. The yield curve inverted eight times during the past half century, and the U.S. economy ended up in recession seven times.¹

Lacking a clear understanding of the new relationship between short- and long-term rates, many investors rely on history and interpret today's inverted yield curve as a harbinger of economic slowdown or recession. This time, however, the overall economy looks strong, making the recent behavior of long-term interest rates a puzzle worth solving.

Explaining the Low Bond Yields

Several studies analyzing the bond rate conundrum have shown that the recent declines in long-term yields are unlikely to be a sign of an impending recession. Instead, they're more likely a reflection of several fundamental changes in the macroeconomy and financial markets—most notably, increasing globalization.²

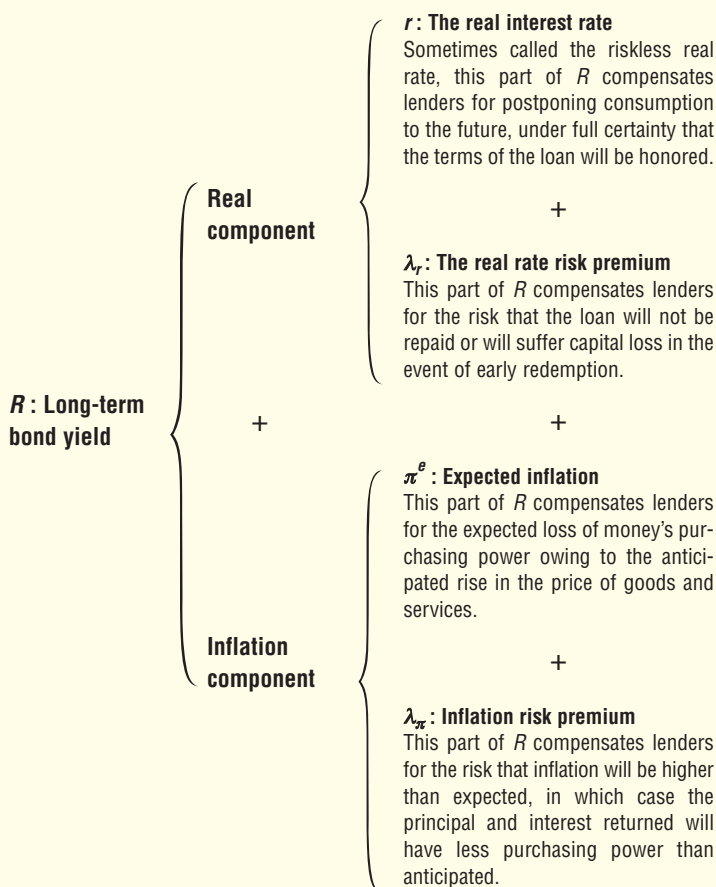
In principle, bond yields are the product of two main components—one related to real returns and the other to inflation (*see box*). The first component is the real interest rate, which compensates lenders for forgoing consumption now in return for the promise of future consumption. This promise inherently has two parts—risk and return—that stem from different sources, making it useful to split them

Determining Bond Yields: A Primer

The following equation sums up the factors that determine the interest rate on bonds:

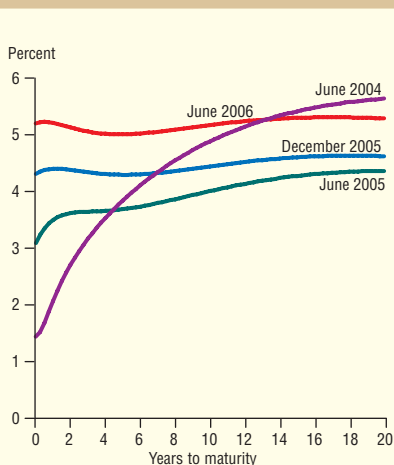
$$R = r + \lambda_r + \pi^e + \lambda_\pi,$$

where R is the long-term bond yield, r is the expected real interest rate, λ_r is the real rate risk premium, π^e is expected inflation, and λ_π is the inflation risk premium. Each of these factors stems from a potentially different source, and thus each should be explained to clearly delineate the reasons interest rates can be high or low.



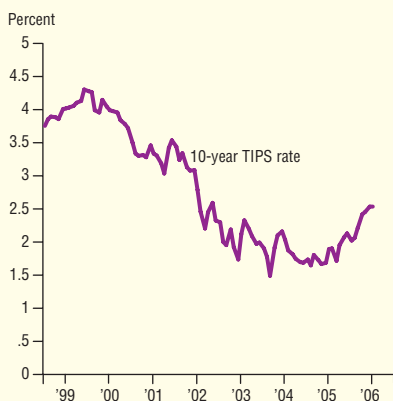
The decline in bond yields (R) over the past 2½ decades has come from reductions in all four factors. Expected inflation (π^e) has fallen from about 10 percent in the early 1980s to roughly 2.5 percent today, and the inflation risk premium (λ_π) is down from about 3 percent in the early 1980s to less than 1 percent today. The real interest rate component ($r + \lambda_r$) is also lower, likely due to a fall in both the expected real rate (r) and the real rate risk premium (λ_r). Improved monetary policy, a more stable real economy, the development of deeper and more integrated global financial markets, and a global savings glut have brought lower long-bond yields virtually worldwide. Globalization has contributed to each of these factors.

Chart 3
Yield Curves Have
Flattened



SOURCES: FAME Database; Federal Reserve Board.

Chart 4
Interest Rates on Inflation-
Indexed Securities Lower



SOURCES: FAME Database; Federal Reserve Board.

apart conceptually and observe, if possible, the behavior of each.

First, the expected real rate (sometimes called the riskless real rate) is the interest required to reward lending under full certainty that the loan agreement will be honored. It equilibrates the market demand for and supply of loanable real funds. Because the borrower may default or either party may need to exit the contract prematurely (leading to possible capital loss), however, lenders also require a risk premium. It reflects the degree of uncertainty, stemming primarily from volatility in the underlying real economy (business cycle swings).

The second component is inflation related and derives from the fact that contracts are made in terms of money, not goods and services. As a result, investors must be compensated for the inflation they expect and the risk that inflation won't be what they anticipated.

High inflation can severely erode the purchasing power of nominal interest payments on bonds and the principal repayment upon maturity. For this reason, bond yields tend to be lower when inflation is tame. Similarly, when inflation volatility is low, investors will be more confident about receiving the real value of their expected nominal returns and will require lower premiums for bearing the risk of future inflation.

Financial markets aggregate these four forces. Changes in any one of them will push interest rates up or down. When inflation uncertainty or expectations recede, for example, borrowing costs fall, reflecting increased confidence in price stability. When the economy becomes more stable or the supply of loanable funds expands relative to demand, real borrowing costs decline as well. Over the past two decades, both the real and inflation components have contributed to holding down long-term interest rates in many parts of the world.

Globalization and Real Interest Rates

Despite a recent run-up, interest rates on 10-year Treasury Inflation-Protected Securities (TIPS) are about 2 percentage points below their early 2000 levels (*Chart 4*). The decline is likely related to the decreased volatility in real economic activity, as reflected in the deviations from trend growth rates of GDP and its three major components—goods, services and structures (*Chart 5*). Since the mid-1980s, fluctuations in real GDP growth have declined roughly 35 percent from levels seen during the 1950s to 1970s.³ Spending on goods, services and structures is far less volatile than it once was. Additionally, there has been a long-run shift of America's economic base from highly cyclical, goods-producing industries to more stable services. This "great moderation"—to borrow a phrase Fed Chairman Ben Bernanke used in 2005—has helped investors become more confident about future economic stability, justifying lower risk premiums.

The substantial decline in macroeconomic volatility is largely, but not entirely, rooted in domestic factors. Globalization may have also played a role. When economies are more interdependent, booms and busts may become muted as excess demands in one part of the globe are filled by excess supplies in other parts, and vice versa. The economy's equilibrating mechanism can dampen local shocks better when connected to a large market of diversified sectors with integrated flows of goods, services, financial capital and people than when the shock must be borne entirely locally. By helping stabilize the business cycle and enhance investors' confidence about future economic stability, globalization reduces the real component of long-term rates and thus cuts risk premiums.

At the same time, the available pool of world savings has increased significantly—what Bernanke has called the "global saving glut." It has

Chart 5
Real GDP Components Show Less Volatility



NOTE: Volatility is measured by deviations from trend rates of growth.
 SOURCE: Bureau of Economic Analysis.

brought additional loanable funds to increasingly open markets, helping hold down real interest rates worldwide. Several factors have contributed to the savings increase: the revenues surge of oil and commodity exporters, the rapid income growth of high-saving East Asian households, increases in the foreign exchange reserves held by East Asian central banks and Latin American countries' reduced fiscal

deficits (*Chart 6*). With the development of deeper and more integrated global financial markets, the savings flows from these developing countries were freely directed to the U.S. and other advanced nations, helping keep long-term real interest rates there low.

Globalization and Inflation

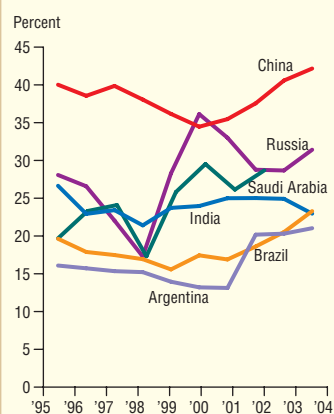
Bond yields' inflation-related components have also moved lower

in recent years. U.S. inflation has been trending downward over the past two decades, as measured by the Consumer Price Index and Core Personal Consumption Expenditures Price Index (Core PCEPI). Similar declines show up in measures of one-year-ahead and long-run inflation expectations (*Chart 7*).⁴ Both actual and expected inflation have gradually fallen from around 10 percent in the early 1980s to about 2 to 2.5 percent today.

The trend toward lower inflation has been a worldwide phenomenon, with prices in most other industrialized countries behaving much as they have in the U.S. Among the seven largest industrial nations, average annual inflation has fallen from 10 percent in 1973–83 to less than 2 percent in the past decade (*Chart 8*). The sustained and widespread decline in inflation has put significant downward pressure on long-term bond yields in both advanced and emerging-market economies.

Inflation volatility and the inflation risk premium on long-term

Chart 6
Saving Rates in Emerging-Market Economies Rise
Savings as a percentage of GDP

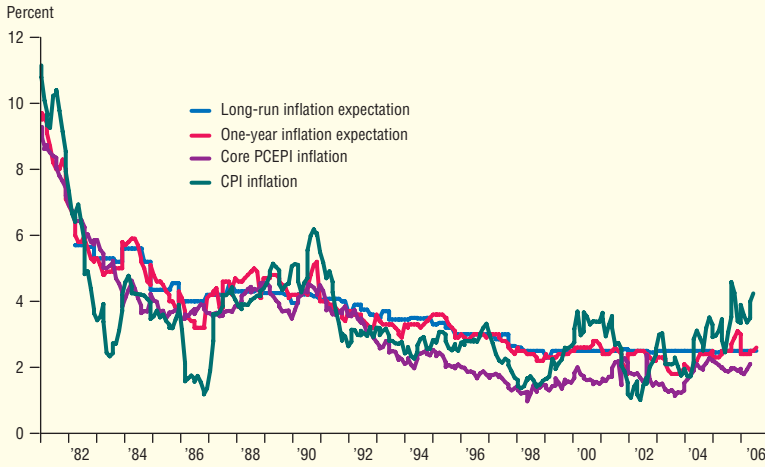


SOURCE: World Development Indicators, World Bank.



Chart 7

Actual and Expected U.S. Inflation Trend Downward



Treasury bonds have both retreated over the past two decades (*Chart 9*).⁵ Greater price stability has led to a substantial reduction in the inflation risk perceived by investors, and, as a consequence, both inflation premiums and long-term bond yields are lower.

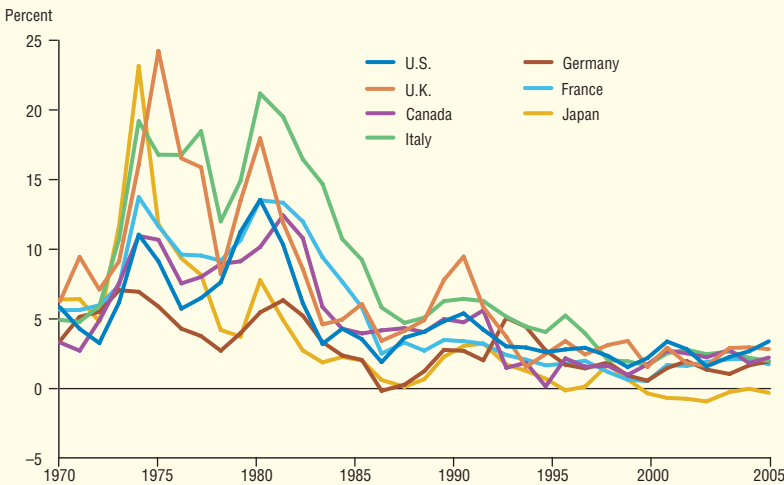
Money has become more internationally mobile over the past two decades. Cross-border bond and equity transactions now exceed \$90 trillion a year, and the total value of global financial markets has reached \$118 trillion, three times global GDP.⁶ Financial market integration has effectively increased potential competition among national currencies, significantly contributing to the low and stable inflation that produces greater stability of long-term bond yields around the world.⁷

Many nations once imposed rigid controls that hindered foreigners' ability to invest in the country and kept their citizens from investing abroad. Now, capital is less likely to be held captive to nationality. In a globalized world with highly mobile capital, it is much easier for investors to convert their assets into other nations' currencies should they become concerned about the inflation risk of their local money. Currency competition forces national governments to discipline their economic policies and pursue price stability.

The conventional wisdom, of course, still holds: Inflation is largely a monetary phenomenon. But nations have resorted to various methods to enforce the monetary discipline required in an era of globalization. Since the early 1990s, central banks in a number of countries—among them, the U.K., New Zealand, Canada, Sweden and Australia—have adopted an inflation-targeting approach to monetary policy, making clear their priority is to maintain price stability. Setting an explicit target has substantially enhanced the banks' credibility. Inflation volatility and the perceived inflation risk have declined substantially in those countries. Even in the

Chart 8

Declining Inflation Seen Around the World





U.S. and other nations that haven't explicitly set numeric targets, central banks' efforts to restrain inflation have decreased its average level and volatility, thereby strengthening investors' confidence in long-run price stability.

Globalization's influence on inflation isn't limited to money and financial markets. Increased international competition in product and labor markets has also contributed to price stability. With goods, services and information crossing borders more readily than ever, producers are forced to match foreign competitors' prices and quality by increasing productivity and decreasing costs. Greater factor mobility has also helped lower costs and inflation around the world because it allows labor and capital to flow more freely toward centers of comparative advantage, where they can be their most productive.

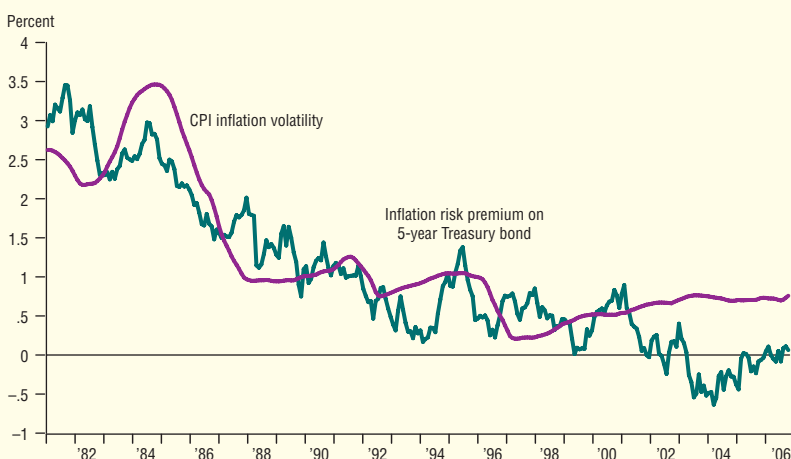
Globalization has reduced long-term interest rates and made long-term lending instruments more substitutable internationally. It has done so in three ways: by reducing the level and volatility of inflation across many nations, by helping stabilize the business cycle and reduce investors' uncertainty regarding future economic shocks, and by encouraging the development of deeper, more integrated global financial markets that help direct loanable funds into a common pool. The upshot is a higher interest elasticity of bond demand than existed in yesterday's more insular world.

Monetary Policy Implications

Today, investors have greater opportunity to choose from among a globally diverse range of assets. As domestic and foreign financial instruments become more substitutable, each country's interest rates—in particular, the medium- to long-term maturities—will be determined more by global influences and less by domestic factors. Central banks' ability to affect long-term rates may be severely eroded, as we have seen in the recent "conundrum" period.

Chart 9

Less Inflation Volatility Leads to Lower Risk Premiums



NOTE: Data are monthly.
SOURCE: Bureau of Labor Statistics.

Consequently, the effects of monetary policy tightening or loosening may be substantially weakened. Because long rates are less sensitive to short rates, the response of aggregate demand to monetary policy moves may prove sluggish. One example is the lack of response in the mortgage and housing markets in 2004 and early 2005, when homebuyers' borrowing costs changed little as the Federal Reserve tightened. Low rates kept the housing boom in high gear, stimulating sales and providing builders with incentives to expand operations despite the Fed's attempt to slow the economy.

Globalization's impact on the relationship between short- and long-term interest rates poses potentially formidable challenges for central banks around the world. It underscores the importance of formulating monetary policy in a credible, consistent and forward-looking way and better communicating it to the public. Adopting these virtues will help anchor long-run inflationary expecta-

tions and decrease associated risk premiums. It will also help the public better understand central banks' behavior and decrease the perceived uncertainty of future monetary policy. Globalization may also call for greater cooperation and coordination of policy worldwide because international financial conditions increasingly affect the price of credit in all major countries.

New economic realities and relationships have challenged the basic assumptions of monetary policy in the past. Two decades ago, for example, a strategy of relying on monetary aggregates proved ineffective, leading the Fed to shift its primary policy focus to actual inflation and capacity measures. Now, just as then, a deeper understanding of the factors in play will allow central bankers to achieve their mandate of non-inflationary economic growth.

Wu is a senior economist in the Research Department of the Federal Reserve Bank of Dallas.

Notes

¹ This calculation is based on the yields of three-month and 10-year Treasury bonds.

² For instance, "The Bond Yield 'Conundrum' from a Macro-Finance Perspective," by Glenn Rudebusch, Eric Swanson and Tao Wu, presented at the 13th Bank of Japan International Conference, "Financial Markets and the Real Economy in a Low Interest Rate Environment," Tokyo, June 1, 2006.

³ This is according to calculations found in the following: "Has the U.S. Economy Become More Stable? A Bayesian Approach Based on a Markov-Switching Model of the Business Cycle," by Chang-Jin Kim and Charles R. Nelson, *The Review of Economics and Statistics*, vol. 81, November 1999, pp. 608–16; also in "Output Fluctuations in the United States: What has Changed Since the Early 1980's," by Margaret M. McConnell and Gabriel Perez-Quiros, *American Economic Review*, vol. 90, December 2000, pp. 1464–76.

⁴ The one-year-ahead inflation expectation is the

year-ahead CPI inflation expectation from the Blue Chip survey, and the long-run inflation expectation is the 10-year inflation expectation from the Survey of Professional Forecasters.

⁵ The inflation volatility in Chart 9 is measured by the five-year trailing standard deviation of the annual CPI inflation. The inflation premium on a five-year Treasury bond is calculated using a no-arbitrage-based term structure model.

⁶ "Internationalisation of Financial Services: Implications and Challenges for Central Banks," by Hervé Hannoun, presented at the 41st Conference of the South East Asian Central Banks Governors, Bandar Seri Begawan, Brunei Darussalam, March 4, 2006, and "\$118 Trillion and Counting: Taking Stock of the World's Capital Markets," McKinsey Global Institute, February 2005, www.mckinsey.com/mgi/publications/gcm/index.asp.

⁷ Remarks by Federal Reserve Governor Randall S. Kroszner at the Institute of International Bankers, New York, June 16, 2006.

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