The Federal Reserve Board

Meeting of the Federal Open Market Committee
June 24-25, 2003 Presentation Materials -- Text Version

Presentation Materials (8.75 MB PDF)

Pages 163 to 211 of the Transcript

Appendix 1: Materials used by Mr. Reinhart

Exhibit 1

Top panel
Federal funds rate

The top panel displays a long time series of the effective federal funds rate extending from 1955 to 2003. The chart indicates that the effective federal funds rate currently had dropped to the lowest levels since the 1950s.

Bottom panel
Costs associated with a low overnight nominal interest rate

Bottom-right panel
Selected interest rates
May 20, 2003

The bottom-right panel displays a bar chart showing rates of return on selected money market instruments (Super NOW, MMDA, Retail MMMF, I/O MMMF, RP). The chart indicates that various deposit rates and yields on money market funds are well below the intended federal funds rate.

Source: Bank Rate Monitor

Bottom-left panel

- Compressing rates on those instruments that typically provide returns below the overnight federal funds rate.
- Thinning brokering; and
- Fostering the misimpression that monetary policy has become ineffective.

Exhibit 2
The Implementation of Monetary Policy

Top panel

- Monetary policy actions are implemented by altering the Federal Reserve System's balance sheet.

Combined balance sheet of the Federal Reserve System

Billions of U.S. dollars, 6/11/2003

ASSETS		LIABILITIES & CAPITAL	
Treasury securities	652	*Currency*	693
of which:		*Deposits*	
Bills	238	*of depositories*	21
Notes & bonds	399	*of U.S. Treasury*	7
Loans to depositories	0.06	*Other liabilities & capital*	20
Other assets	89		

- Changes in the size of the balance sheet

  are reflected directly in the overnight federal funds rate until it is driven to zero

- Changes in the composition of the balance sheet

  potentially could influence term premiums

- Both could influence expectations about the expected path of policy.

Exhibit 3

Top panel
The Transmission of Monetary Policy

- The principal channel of transmission of monetary policy to spending is through the prices and returns of long-lived assets.
- Those returns depend on the current and expected future path of short-term interest rates as well as risk premiums.
- Some economists argue that the quantity of liquidity has an effect on spending independent of its influence on the current overnight interest rate.

Bottom panel
Three forms of monetary impetus

The Committee can provide impetus to the economy at an unchanged current short-term interest rate

By encouraging investors to expect short rates to be lower in the future than they currently anticipate, and

By shifting relative supplies to affect risk premiums.

If the overnight rate is already at zero, the Committee may be able to provide additional impetus to the economy

By oversupplying reserves at the zero funds rate.

Exhibit 4
Shaping interest rate expectations

How can the Federal Reserve encourage lower interest rate expectations?

Top panel
Commitment can take two forms

- Unconditional commitment

  The Committee pledges to hold short-term rates at a low level for *x* period of time.

Two charts display the potential effects of an unconditional commitment policy on longer term interest rates. The left chart displays a term structure of the expected short-term interest rate implied by swap yields as of June 3, 2003. The curve is upward sloping with maturity. The chart also displays two alternative paths for the expected short-rate--one that would hold the short-rate constant at its current level for one year and another than would hold the short-rate constant at its current level for three years. A chart at the right displays the impact of these alternative expected short-rate paths for the swap yield curve. For the case in which short-rates are held at the current level for just one year, the swap yield curve is lowered only a little from the current market reading. If the short-rate were maintained at a low level for three years, the implied swap yield curve would drop significantly.

- Conditional commitment

  The Committee pledges to hold short-term rates at a low level until *y* happens.

Bottom panel
Caveats

- Words ultimately have to be matched by deeds for the public to believe.
- The Committee may be concerned about its credibility.

Exhibit 5
Altering the composition of the central bank balance sheet

Exhibit 5 examines how the Federal Reserve might alter the composition of its balance sheet to achieve policy objectives.

Top panel
Average Maturity of Treasury Debt

The top panel is a line chart showing a long history of the average maturity of Treasury debt held by the public and by the Federal Reserve. The chart indicates that the average maturities have varied significantly over time. Over recent years, the average maturity of the System portfolio of Treasury securities has been in the neighborhood of 30-40 months while the average maturity of Treasury debt held by the pubic has been somewhat higher at around 60 months.

Middle panel

- Acquiring longer-term securities

  could lower risk premiums on Treasury securities, and

  may convince investors that the Committee intends to keep interest rates low because lengthening the maturity of the portfolio would impose capital losses in the future should the Committee put policy on a firmer course than currently anticipated.

- The Committee could alter the composition of the System Open Market Account

  ***indirectly**, by instructing the Desk to tilt its purchases toward longer-term issues (perhaps by targeting a longer average maturity of the System Open Market Account), or*

  ***directly**, by putting a ceiling on one or more points along the structure of interest rates.*

Bottom panel
Caveats

- There is little empirical evidence to suggest that relative supplies influence risk premiums.

- Purchases of securities might have to be massive to enforce a ceiling if investors came to doubt that the FOMC would keep interest rates low.

  At that point, there would be a risk that the targeted securities would become disconnected from the rest of the yield curve and private rates.

- Why should a central bank issuing a fiat currency care about capital gains or losses?

Exhibit 6
Altering the size of a central bank's balance sheet

This exhibit focuses on the effects of expanding the size of the central bank's balance sheet.

Top panel

The top-right panel includes two charts that display a downward sloping demand for reserves as a function of the overnight interest rate. This demand curve becomes flat when the overnight interest rate is zero. A set of bullet points in the top-left panel notes that most central banks operate on the downward sloping portion of the curve by expanding or contracting the quantity of reserves to achieve a target short-term rate. This typical scenario is depicted in the first chart.

- A central bank usually eases monetary policy by expanding the stock of reserves.

- Currently, most central banks calibrate their easing in terms of the price of reserves--i.e., the overnight federal funds rate.

The second chart in the top-right panel depicts the scenario in which the central bank supplies a very large quantity of reserves so that demand and supply intersect along the flat portion of the demand curve at the zero bound.

- The Committee could switch its focus from the price of reserves to the quantity of reserves (or the growth of reserves).

  to drive the funds rate to zero and possibly provide further monetary stimulus by oversupplying reserves at the zero funds rate.

Middle panel
Oversupplying reserves could affect the economy

- by lowering the returns on the assets purchased to supply those extra reserves,
- by convincing market participants that the overnight interest rate will be kept low, and
- by working through a quantity channel, if it exists.

Bottom panel
Caveats

- A long-run association does not provide much guidance about the short-run performance of the economy, implying it would be difficult to calibrate the effects of policy and risks confusing market participants.
- The public has to be convinced that the increase in reserves will stick around, so there still will be a communications challenge.

Exhibit 7
Some precedents

This exhibit reviews a range of operational approaches that the Federal Reserve has employed over time in pursuing its macroeconomic objectives.

Top panel

- The Federal Reserve has always appreciated the importance of correctly aligning market expectations.

Top-left panel
Expected federal funds rate

A chart in the top-left panel displays the expected path of the funds rate on May 5 and May 6 of 2003. This expected funds rate path shifted down significantly following the Committee's decision to leave the target rate unchanged. This type of reaction underscores the importance of aligning market expectations with policy intentions.

Top-right panel
Y2K Options sold by the Desk

A chart in the top right panel illustrates the Federal Reserve's willingness to utilize its balance sheet to promote financial stability. The chart shows the quantity of options on repurchase agreements that the open market manager auctioned in advance of Y2K. The chart shows the quantity of such options offered in three separate auctions before the year-end that together provided more than $500 billion

of potential liquidity to primary dealers over the year-end.

Middle panel

- The Federal Reserve operates in all segments of the Treasury market, and

  from 1942 to 1951 enforced a ceiling on the yield curve.

Middle-left panel
Federal Reserve Holdings of U.S. Treasury Securities

The middle left panel displays a time series of the Federal Reserve's holdings of Treasury securities as a percent of debt outstanding over the period from 1938 to 2003. During the period from 1942 to 1951, the Federal Reserve's holdings of Treasuries did increase appreciably.

Middle-right panel
…and by maturity

A bar chart at the right displays the composition of the Federal Reserve's portfolio between bills and notes in three years--1942, 1946, and 1950. The chart illustrates that in 1946, the Federal Reserve held about 90 percent of the bills outstanding in order to enforce the ceiling on short-term yields.

Bottom panel

- The Federal Reserve targeted nonborrowed reserves from 1979 to 1982.

Monetary Base

The bottom panel displays a long times series of the monetary base from 1960 to 2003. Over the period from 1979 to 1982, the Federal Reserve targeted nonborrowed reserves and the level of the monetary base fell quite sharply.

Exhibit 8

Top panel
Issues regarding sequencing

These forms of monetary policy stimulus could be put in place

- Once the overnight rate has already been driven to zero;
- As a way of driving the overnight rate to zero; or
- Before the overnight rate hits zero (and perhaps as a result it need never get there).

Bottom panel
Other alternatives

The Federal Reserve could

- lower the primary credit rate and loosen other discount window policies;

- purchase other assets, perhaps including by seeking legislation to expand its authority; or
- coordinate policy with the Treasury.

Exhibit 9

Top panel
Four questions

- Are there any alternatives that the Committee particularly favors for additional study?
- Are there any alternatives that should be dropped immediately from consideration?
- How does the Committee assess the costs of very low nominal overnight interest rates, and are they such that an alternative policy should be put in place at a funds rate above zero?
- How should the Committee's assessment of these policy alternatives be conveyed to the public in the months ahead?

Appendix 2: Materials used by Mr. Kos

Exhibit 1
The F.R. Balance Sheet & Domestic Financial Portfolio

Top panel
Combined balance sheet of the Federal Reserve System

Billions of U.S. dollars, 6/11/2003

ASSETS		LIABILITIES & CAPITAL	
Treasury securities	652	F.R. Notes	659
of which:		Deposits	
Bills	238	of depositories	29
Notes and bonds	399	of U.S. Treasury	6
TIIS	14		
RPs	32	Reverse RPs in the market	0
		Other liabilities	32
Loans to depositories	<1		
		Capital	18
Other Assets	60		
Total Assets	744	Total Liabilities & Capital	744

Middle panel
The Domestic Financial Portfolio includes

- Outright Holdings of Treasury Securities (domestic SOMA)
- RPs, and Reverse RPs arranged in the market

Bottom panel
Working Assumption

- only operate in assets currently authorized to hold

Exhibit 2
Size and Composition of SOMA Holdings of Treasury Securities by Remaining Maturity

Top panel

Title: Size and Composition of SOMA Holdings of Treasury Securities by Remaining Maturity
Series: Size of SOMA's Treasury Security Holdings by Remaining Maturity
Horizon: 1941-2003
Description: The size of the SOMA portfolio's Treasury security holdings has been increasing.

Data from 1971 to 1978 are at an annual frequency.

Bottom panel

Title: Size and Composition of SOMA Holdings of Treasury Securities by Remaining Maturity
Series: Percent of SOMA's Treasury Security Holdings by Remaining Maturity
Horizon: 1941-2003
Description: Treasury bills have become a larger percentage of the SOMA portfolio's Treasury holdings.

Data from 1971 to 1978 are at an annual frequency.

Exhibit 3

Top panel

Title: Targeting a Positive Federal Funds Rate
Series: Fed Funds Target Rate, Period Average Excess Reserves
Horizon: 1985-2003
Description: Period average excess reserves increase as the fed funds target rate decreases.

Plotted values reflect experience with excess levels and target funds rates since 1985

Bottom panel
Excess Reserve Levels and the Federal Funds Rate

- Changes in the *target* funds rate have had little impact on excess demand

- Deviations from period-average excess demand cause sharp rate swings

    - *within a maintenance period, wide daily swings in excess can occur*

- The size of the Domestic Financial Portfolio is set exogenously by:

    - *excess demand associated with the funds rate target*

    - *banks' requirements to hold reserve balances*

    - *autonomous factors (e.g., currency, float)*

Exhibit 4
Alternative Approaches for Conducting Monetary Policy

Top panel
Change the Composition of the Balance Sheet

- *Extend Average Maturity of the domestic SOMA*

- *Set Ceilings on Treasury Yields*

- *Use of Derivative Instruments*

    - excess reserves stay low and can target a positive funds rate

Bottom panel
Expand the Size of the Balance Sheet

- *Use reverse RPs or raise requirements with the above alternative methods*

    - excess reserves remain low in this case

- *Do not sterilize the impact of the above approaches on excess reserves*

- *Quantitative Easing Objective*

    - excess rises and short-term rates fall to zero in these cases

Exhibit 5

Top panel
Issues Associated with Alternative Approaches

- Operating Objectives
- Instruments and Market Intervention Techniques
- Achieving Policy Objectives
- Exit Strategies
- Co-Ordination with Treasury Debt Management
- Potential for Capital Losses

Bottom panel

Title: Average Maturity of SOMA and Public Holdings of Treasury Debt
Series: Average Maturity of SOMA and Public Holdings of Treasury Debt
Horizon: 1955-2003
Description: The average maturity of Treasury debt held by SOMA and by the public has been increasing since 1975.

Exhibit 6
Extend Average Maturity of the Domestic SOMA

Top panel

- redeem $200 billion of bills over six months (≈$8 billion per week)
- buy 3- to 10-year coupon issues (equal percentage holdings of each issue)
- this extends average maturity of SOMA from 42 to 64 months
- but eliminates most liquidity in the domestic SOMA

SOMA Holdings

Middle panel

Title: SOMA Holdings: Value of Holdings
Series: Size of the SOMA Portfolio's Bill and Coupon Holdings by Years to Maturity
Horizon: June 2003 - December 2003
Description: Currently, SOMA holdings of Treasury securities are concentrated in bills and coupons with less than 3 years to maturity. The maturity profile of the SOMA portfolio's Treasury holdings is projected to increase in 6 months, with Treasury securities concentrated in coupons maturing in 0-10 years.

Bottom panel

Title: SOMA Holdings: Percent of Outstanding Supply
Series: Percent of the SOMA Portfolio's Bill and Coupon Holdings by Years to Maturity
Horizon: June 2003 - December 2003
Description: Currently, most of the SOMA portfolio's holdings of Treasury securities are concentrated in bills. In 6 months, the concentration is expected to shift to coupons with 3-10 years to maturity.

Exhibit 7

Ceilings on Treasury Yields

Top panel
Structure of Ceilings

Treasury yield ceiling structures and their application to monetary policy. A chart illustrates three possible design features for Treasury yield ceilings: a step function, a smooth function, and discrete points. The x-axis is labeled Years to Maturity, and the y-axis is labeled Yield. The step function increases 25 basis points at approximately regular intervals. A superimposed line with gradual upward slope represents the smooth function, and several dots along the line represent discrete points.

Bottom panel
Design Issues

- Ceiling structures: step function; smooth function; discrete points, etc.
- Desk Operations: "Hard" versus "Soft" ceilings
- Broader Policy Context

    - the primary mechanism for influencing longer term yields

    - supports commitment to a path of future short-term rates

Exhibit 8
Use of Derivative Instruments

Top panel
Types of Instruments

- Sell options and forwards on term RPs with future settlement dates
- Sell put options on Treasury Securities

[Implies:] Best structure determined by other specific operating objectives

Middle panel
Impact on Portfolio

- None at time of sale
- potentially huge if exercised

    - *unless structured to make a net cash payout*

Bottom panel
Transmission Channel to Longer Term Rates

- provides symbolic support to other policy goals

- adds "credibility" by exposing the Fed to possible losses
- reduces risk premia

Exhibit 9
Reverse RPs and Higher Requirements

Top panel

Reverse RPs and higher requirements are additional tools that:

- blow up the size of the balance sheet
- but can still target a positive funds rate

Middle panel
Expand Level of Reverse RPs

- term operations, regular auction cycle
- financing through primary dealers' balance sheets may be a constraint
- replacing long-term Treasury debt with a short-term nonnegotiable debt
- but it may just recycle Treasury debt

Bottom panel
Expand Level of Requirements to Hold Balances

- imposes costs on banks unless pay interest
- or may be ineffective because of sweep programs

Exhibit 10
Expanding Excess Reserves

Top panel

Policies that entail an expansion of excess reserves

- also blow up the size of the balance sheet
- and push the funds rate to near-zero

Middle panel
Not Sterilizing Impact of Alternative Approaches

- e.g. extending maturity of portfolio, rate ceilings, use of derivatives

- enhances operational flexibility to pursue other operating objectives

Bottom panel
High Excess as an Explicit Objective: Quantitative Easing

- achieved with an orderly purchase of Treasury securities
- could be paired with an objective to extend the maturity of the SOMA

Exhibit 11
Summary Observations

Top panel
Achieving Policy Objectives

- through direct impact of SOMA holdings on supply and prices
- through market expectations about future policy rates

Bottom panel
Other Issues

- Exit Strategies
    - *market expectations can complicate a clean exit*
    - *length of time before the balance sheet returns to its original state*
- Co-Ordination with Treasury Debt Management
    - *critical if rely on direct impact of SOMA holdings to affect yields*
- Capital Losses
    - *potential for realized losses on the F.R. balance sheet*
    - *potential for private sector losses*

Appendix 3: Materials used by Mr. Kos

Page 1

Top panel

Title: Implied Rates on Eurodollar Futures Contracts
Series: Eurodollar futures curve as of 05/05/2003, 06/16/2003, and 06/23/2003
Horizon: May 5, 2003 - June 23, 2003

Description: The Eurodollar futures curve has flattened since the May FOMC meeting.

Source: Bloomberg

Middle-left panel

Title: U.S. Treasury Yields: 2-Year Note
Series: 2-Year Treasury Yield
Horizon: April 1, 2003 - June 23, 2003
Description: Two-year Treasury yields decline.

Source: Bloomberg

Middle-right panel

Title: U.S. Treasury Yields: 10-Year Note
Series: 10-Year Treasury Yield
Horizon: April 1, 2003 - June 23, 2003
Description: Ten-year Treasury yields decline.

Source: Bloomberg

Bottom-left panel

Title: Option-Adjusted Spreads of U.S. Corporates to 10-Year Treasuries: Investment Grade
Series: U.S. Investment Grade Corporate Option-Adjusted Spread
Horizon: April 1, 2003 - June 23, 2003
Description: The U.S. investment grade corporate option-adjusted spread has narrowed.

Source: Lehman Brothers

Bottom-right panel

Title: Option-Adjusted Spreads of U.S. Corporates to 10-Year Treasuries: High Yield and EMBI+
Series: EMBI+ Sovereign Debt Spread, U.S. High Yield Corporate Option-Adjusted Spread
Horizon: April 1, 2003 - June 23, 2003
Description: The EMBI+ sovereign debt spread and the U.S. high yield corporate option-adjusted spread have narrowed.

Source: Merrill Lynch, JP Morgan Chase

Page 2

Top panel

Title: U.S. Equity Indices
Series: S&P 500 Index, Nasdaq Index, DJ Industrial Average Index
Horizon: April 1, 2003 - June 23, 2003
Description: U.S. equity indices rise during the intermeeting period.

Source: Bloomberg

Middle panel

Title: Select Global Equity Indices

Series: DJ Euro Stoxx Index, Nikkei Index, DAX Index, FTSE Index, TSE 300 Index
Horizon: April 1, 2003 - June 23, 2003
Description: Global equity indices have risen during the intermeeting period.

Source: Bloomberg

Bottom panel

Title: Select Emerging Market Equity Indices
Series: Merval Index, Korea Composite Index, Mexican Bolsa Index, Hang Seng Index, Brazilian Bovespa Index
Horizon: April 1, 2003 - June 23, 2003
Description: Emerging market equity indices have risen during the intermeeting period.

Source: Bloomberg

Page 3

Top panel

Title: Euro-Dollar Exchange Rate
Series: Euro-USD
Horizon: April 1, 2003 - June 23, 2003
Description: The U.S. dollar has depreciated against the euro.

Source: Bloomberg

Middle panel

Title: Dollar-Yen Exchange Rate
Series: USD-Yen.
Horizon: April 1, 2003 - June 23, 2003
Description: The U.S. dollar has been relatively unchanged against the yen since the May FOMC meeting.

	Japanese Intervention
Since May 6:	$36.89 billion
YTD:	$56.37 billion

Source: Bloomberg

Bottom panel

Title: Trade Weighted U.S. Dollar
Series: Trade-Weighted U.S. Dollar
Horizon: January 1, 1999 - June 23, 2003
Description: The trade-weighted dollar has depreciated over the last year.

Source: Bloomberg (BoG index)

Page 4

Top panel

Title: Euro-Area 3-Month Deposit Rates and Rates Implied by Traded Forward Rate Agreements
Series: Euribor fixing, 3-month forward rate agreement, 6-month forward rate agreement, 9-month forward rate agreement
Horizon: April 1, 2003 - June 23, 2003
Description: Forward rate agreements and Euribor have decreased.

Middle panel

Title: Index of Euro Corporate Spreads to German Government Debt
Series: AAA-Rated, AA-Rated, A-Rated, and BBB-Rated Index of Euro Corporate Spreads to Comparable German Government Debt
Horizon: January 1, 2001 - June 23, 2003
Description: BBB-rated Euro corporate spreads to German government debt narrows. AAA-rated, AA-rated, and A-rated spreads also narrow, but to a lesser extent.

Bottom-left panel

Title: Japan: BOJ Current Account Balances
Series: Bank of Japan's Current Account Balance and Target Account Balance
Horizon: January 1, 2003 - June 23, 2003
Description: Bank of Japan's current account balance declines after the beginning of the new fiscal year.

Source: Bloomberg

Bottom-right panel

Title: Japan: 10-Year JGB Yield
Series: 10-Year JGB Yield
Horizon: January 1, 2003 - June 23, 2003
Description: Ten-year JGB yield increases sharply in recent weeks, but remains below levels seen earlier this year.

Source: Bloomberg

Page 5

Top panel

Title: Freddie Mac and Fannie Mae Equity Prices
Series: S&P 500 Index, Equity Price for Fannie Mae and Freddie Mac
Horizon: January 1, 2003 - June 23, 2003
Description: Fannie Mae and Freddie Mac's equity price declined sharply following a change in management at Freddie Mac.

Source: Bloomberg

Middle panel

Title: GSE 10-Year Debt Spread to 10-Year Treasury Note
Series: Spread between 10-Year Debt and 10-Year Treasury Note for Fannie Mae and Freddie Mac

Horizon: January 1, 2003 - June 23, 2003
Description: The spread between ten-year debt and ten-year Treasury yield for Fannie Mae and Freddie Mac has narrowed since Freddie Mac announced an earnings restatement.

Source: Bloomberg

Bottom-left panel

Title: Freddie Mac vs. Fannie Mae Spreads: 10-Year Debt Yield
Series: Spread between 10-Year Debt Yield of Freddie Mac and Fannie Mae
Horizon: April 1, 2003 - June 23, 2003
Description: The yield on ten-year debt for Freddie Mac rose above the yield for Fannie Mae after Freddie Mac announced management changes.

Source: Bloomberg

Bottom-right panel

Title: Freddie Mac vs. Fannie Mae Spreads: MBS
Series: Mortgage-Backed Security Yield
Horizon: April 1, 2003 - June 23, 2003
Description: Mortgage-backed security yields increase.

Source: Bloomberg

Appendix 4: Materials used by Mr. Oliner, Ms. Johnson, and Mr. Wilcox

Material for Staff Presentation on the Economic Outlook
June 24, 2003

STRICTLY CONFIDENTIAL (FR) CLASS I-FOMC*
*Downgraded to Class II upon release of the July 2003 Monetary Policy Report.

Chart 1
GDP Forecast and Recent Indicators

Top panel

	2003				2004
	Q1	Q2	Q3	Q4	Q4/Q4
1. Real GDP[1]	1.6	1.5	3.8	4.6	5.3
2. *(Jan. GB)*	*(2.6)*	*(2.9)*	*(4.3)*	*(4.6)*	*(4.7)*
Contributions to real GDP growth[2]					
3. Personal consumption expenditures	1.4	1.4	2.7	3.2	3.2
4. Equipment and software	-.6	.5	.5	.6	1.4
5. Inventories	-.6	-.5	-.5	.0	.8
Memo:					
6. Unemployment rate[3]	5.8	6.1	6.2	6.1	5.4

	2003				2004
	Q1	Q2	Q3	Q4	Q4/Q4
7. *(Jan. GB)*	*(6.2)*	*(6.2)*	*(6.2)*	*(6.1)*	*(5.4)*

1. Percent change. Quarterly figures at annual rates. Return to table

2. Percentage points. Return to table

3. Percent. 2004 figure is average for Q4. Return to table

Middle-left panel
Private Payroll Employment

The period covered is from 2001 to May 2003. The data are in millions of employees, are monthly, and plotted on a curve.

The curve starts at about 111.75 million in 2001:Q1 and declines to about 109.25 million in 2001:Q4. The data curve continues to decrease, dipping in mid-2002 to about 108.7 million. The curve then increases slightly, dips to about 108.5 million in 2002:Q4, and increases to about 108.75 million in 2003:Q1. The curve remains at about that point and ends in May 2003 at 108.5 million.

Middle-right panel
New Orders: Purchasing Managers Indexes

The period covered is from 2001 to May 2003. The data are diffusion index values and are shown as a range of regional reports and ISM, or Institute for Supply Management.

The data are presented as two curves. The bottom curve is labeled "Phila.," which represents the Federal Reserve Bank of Philadelphia's Business Outlook Survey, and the top curve is labeled "Empire State," which represents the Federal Reserve Bank of New York's Empire State Manufacturing Survey. During the period, the two curves move roughly in tandem. The data curves begin in 2001:Q1 with a range of about 40 to 52, decline to a range of about 36 to 44 in the second quarter, climb to a range of about 45 to 60 in 2001:Q3, and decrease to a range of about 38 to 45 by year-end 2001. In 2002:Q1, the data curves increase to a range of about 57 to 65, followed by a decrease to a range of about 42 to 52 in the third quarter. In 2002:Q4, the curves increase to a range of about 52 to 65 and then decrease to a range of about 40 to 44 in mid-2003. The chart shows a forecast for June 2003 that projects a range of about 50 to 59.

Bottom-left panel
Real PCE Goods Excluding Motor Vehicles

The period covered is from 2001 to May 2003. The data are in billions of 1996 dollars at an annual rate.

Nine dots denote quarterly averages and generally follow the contour of the curve. The data curve starts in 2001:Q1 at about 2,452 billion dollars. After a period of fluctuation, the curve drops to about 2,450 billion dollars in 2001:Q3 and then increases, reaching about 2,550 billion dollars in 2002:Q1. In the second and third quarters of 2002, the data curve shows a slight increase from about 2,550 billion dollars to about 2,551 billion dollars, dips, and then increases to about 2,650 billion dollars in 2003:Q1. The chart ends in May 2003 at about 2,651 billion dollars.

Note: May data are based on a staff estimate.

Bottom-right panel

Light Vehicle Sales

The period covered is from 2001 to May 2003. The data are in millions of units at an annual rate and are monthly.

In 2001:Q1, light vehicle sales are about 17 million. Sales fluctuate between about 16 million and a little less than 17 million in the second and third quarters of 2001 and then rise sharply, climbing to about 21 million in 2001:Q3. Sales then decline to about 16 million by year-end. The curve continues to fluctuate in 2002, with sales reaching about 19 million in 2002:Q2; afterward, sales slide to about 15.25 million in 2002:Q3, climb to about 18 million in 2002:Q4, and decrease to about 15 million in 2003:Q1. Sales reach about 16 million in 2003:Q2. The chart shows a range of automakers' forecasts to be between 16 million in May 2003 and about 17 million in June 2003.

Chart 2
Key Background Conditions

Top panel
Recently Enacted Tax Law

Anticipated Provisions

- Pull-forward of cuts in marginal tax rates
- Marriage-penalty relief
- Boost in child tax credit

Unanticipated Provisions

- Dividend and capital gains tax cuts
- Increase in partial expensing
- Grants to states

Middle-left panel
Fiscal Impetus

The period covered is from 1996 to 2004. The data are annual and are expressed as a percent of gross domestic product (GDP). The data are plotted on two curves--one curve is for state and local, and the other is for federal.

The state and local curve shows the change in the high-employment budget deficit, scaled by GDP. The curve starts at just below zero percent at the start of 1996, increases to about 0.2 percent in 2000, and remains almost flat in 2001. The curve declines in 2002 and drops to about negative 0.3 percent in 2003, then rises to about negative 0.2 percent in 2004. A forecast for the state curve from the April 2003 Greenbook starts at a bit above 0 percent in 2002 and decreases to about negative 0.3 percent in 2004.

The federal curve starts in 1996 at about negative 0.2 percent, increases to about 0.2 percent by 1999, and drops to about 0.1 percent in 2000. The curve then increases to a little above 1 percent in 2002 and about 1.25 percent in 2003. It drops to 1.2 percent in 2004. A forecast from the April 2003 Greenbook is shown as a curve and starts at a little above 1 percent in 2002 and decreases to about 0.8 percent in 2003, followed by an increase to a little above 1 percent in 2004.

Middle-right panel

Equity Prices, Wilshire 5000

The period covered is from 1996 to 2004. The data, plotted on a curve, are presented quarterly and expressed as index values.

The curve begins at about 6,000 in 1996 and continues generally upward. It reaches approximately 10,500 by mid-1998 and then dips to about 10,000 toward the end of the year. The curve increases until the start of 2000, where it reaches about 13,700, dips to about 13,500 by mid-year, and then increases to approximately 14,000 by year-end. The curve generally decreases through the beginning of 2003, dropping to about 8,000, after which it increases to approximately 9,600 in the first half of the year. It then increases steadily through 2004, ending just above 10,500.

The chart also shows a curve representing the forecast from the April 2003 Greenbook that starts at about 8,500 at the beginning of 2003, and increases to about 9,700 by year-end 2004.

Bottom-left panel
30-year Fixed Mortgage Rate

The data for the 30-year fixed mortgage rate are quarterly and expressed as a percent. The data are plotted on a curve, and the period covered is from 1996 to 2004.

The curve starts at about 7.25 percent at the start of 1996, increases to about 8.2 percent in about 1996:Q3, then decreases to about 7.75 toward the end of the year. The curve increases to about 7.9 percent in mid-1997, then decreases to about 6.75 in late 1998. The curve increases to about 8.3 percent in mid-2000, then decreases to about 7 percent by the end of that year. The curve decreases to just below 7 percent at the end of 2001 and continues to decrease to about 5.2 percent in mid-2003. The curve then increases and ends at about 5.4 percent toward the end of 2004.

A forecast from the April 2003 Greenbook is shown as a curve and starts at about 5.8 percent at the beginning of 2003, increases to about 6 percent in 2004:Q1, and stays at about that level until the end of 2004.

Bottom-right panel
Exchange Value of the U.S. Dollar

The period covered is from 1996 to 2004. The data, which are for the broad real index (1996 equals 100), are presented quarterly and plotted on a curve. The curve begins in 1996:Q1 at about 100 and stays at about that level through the end of the year, climbs to about 116 by mid-1998, and dips to about 111 by year-end. In mid-1999, it increases to about 114 and then falls to about 112. The curve increases, reaching about 125 in 2001 and dropping to about 124 by midyear. The curve then increases to about 127 in 2002 and then declines to about 122. The curve increases slightly and then decreases to about 114 in 2003 and ends at about 113 in 2004. The chart shows a forecast from the April 2003 Greenbook that indicates that the exchange value of the U.S. dollar will decline from about 119 in 2003:Q1 to about 117 by the end of 2004.

Chart 3
Household Financial Conditions

Top-left panel
Personal Bankruptcy Rate

The period covered is from 1991 to 2003:Q2. The data are filings per 100,000 persons, presented

quarterly at an annual rate, and shown as a curve.

The curve increases from about 315 in 1991 to about 365 in 1992. The curve then declines, dropping to about 290 in 1995. After this decrease, the curve rises to approximately 500 in 1997. The curve levels out somewhat in 1998 and then increases to about 510 in 1998:Q4. It decreases to about 425 in 2000, climbs to about 525 in 2001, and, after a slight dip, increases to about 575 in 2003:Q2.

Note: The personal bankruptcy rate is based on data through June 14, 2003.

Top-right panel
Household Delinquency Rates

The data are percentage values represented on two curves. The first curve is for auto loans at finance companies and covers the period from 1991 to April 2003. The second curve is for household loans at commercial banks and covers the period from 1991 to 2003:Q1.

The auto loan curve begins in 1991 at about 2.5 percent and fluctuates between a little less than 2.5 percent and about 2.6 percent in 1992. The curve dips to about 2 percent in 1993, then increases with periods of fluctuation in 1995 and 1996, and reaches about 3.6 percent in 1997. The curve declines to about 2 percent in 2000. After this drop, the curve fluctuates and then increases to about 2.4 percent in 2001. The curve stays roughly the same throughout 2002 and ends at about 2.2 percent in April 2003.

The household loan curve starts in 1991 at about 3.6 percent. The curve then decreases to intersect with the auto loan curve at about 2.4 percent in 1994, after which it starts to increase, reaching about 3 percent in 1997. The curve moves between about 2.5 percent and 2.7 percent from 1998 to 1999, dipping to about 2.6 percent in 2000. The curve begins to increase in 2001, climbing to about 2.8 percent. It drops to about 2.5 percent by 2003:Q1.

Note: The curve for household loans at commercial banks is for consumer and residential real estate loans.

Middle-left panel
Mortgage Market Indicators

The period covered is from 1991 to June 2003. The data are plotted on two curves: The first curve is for coupon gap, for which an asterisk denotes 30-year fixed mortgage rate minus average rate on mortgages in GSE pools. The data are in basis points and shown monthly. The other curve is for refinancing volume, and the data are shown as a percent of mortgage debt.

The refinancing volume curve begins at a little above 0 percent in 1991. The curve fluctuates in 1992 and 1993, ending at about 1.5 percent at year-end 1993. The curve then dips to about 0.2 percent in 1994 and stays at about that level through 1995, then gradually increases to a little less than 1 percent near the beginning of 1996. The curve then decreases in 1996 to about 0.5 percent and fluctuates through the end of 1997. The curve climbs to about 1.5 percent early in 1998, decreases to about 1.2 percent midyear, then increases to about 1.6 percent at year-end 1998. The curve decreases steadily to about 0.5 percent at year-end 1999 and stays at about that level throughout 2000. The curve then increases to just under 3 percent at year-end 2001, decreases to about 1.2 percent in the second half of 2002, then increases to just above 4 percent toward the end of 2002. The curve continues generally upward, ending at about 5.7 percent in June 2003.

The curve for the coupon gap is about 30 basis points at the beginning of 1991. The curve increases to about 140 basis points near the beginning of 1992, then fluctuates in a general upward trend to reach almost 200 basis points by the end of 1993. This increase is followed by a decline to about a

negative 100 basis points near the end of 1994. The curve then increases, reaching about 110 basis points near the end of 1995. The curve then decreases to about a negative 25 basis points in mid-1996, then reaches about 48 basis points in 1997. The curve stays near that point in 1998, then decreases steadily through 1999 and into 2000, when it reaches about a negative 110 basis points in 2000. The curve then increases to about 70 basis points in 2001, decreases to about 25 basis points in 2002, then increases to about 150 basis points in June 2003.

Middle-right panel
Augmented Debt Service Burden

The Augmented Debt Service Burden standard series is augmented to include rent payments, auto lease payments, property taxes, and homeowners' insurance. The period covered is from 1980 to 2004, and the data are plotted on a curve and are shown as a percent of DPI on a quarterly basis.

Three shaded vertical bars denote the recession periods of 1980, 1981 to 1982, and 1990 to 1991, as defined by the National Bureau of Economic Research (NBER). A vertical line indicates the NBER peak for the recession beginning in 2001:Q1.

The curve begins at just below 16 percent in early 1980, then increases slightly until about midyear and ends the year at about 15.25 percent. The curve fluctuates throughout the recession and exits at approximately 15.75 percent. After a slight fluctuation, the curve increases steadily to almost 18 percent near the start of 1987 before decreasing to about 17.25 percent at the start of the third recession near 1990:Q3. The curve decreases, exiting the recession at about 17 percent and continues to decline, dipping to just below 16 percent, where it remains until it begins to increase in mid-1994. It enters the NBER peak in 2001 at just above 18 percent, fluctuates a bit, and is at about 18.75 percent in 2002. Projections show the curve decreasing to just above 17 percent in 2004.

Bottom panel
Real House Prices

The figure shows real house prices, which are defined as OFHEO repeat sales index deflated by core PCE chain-weight price index. The period covered is from 1976 through 2004.

The data are plotted on a curve and represent a four-quarter percent change. A horizontal line is drawn at 0 percent. Three shaded bars denote the recession periods of 1980, 1981 to 1982, and 1990 to 1991, as defined by the National Bureau of Economic Research (NBER), and a vertical line indicates the NBER peak for the recession beginning in 2001:Q1. The curve begins at slightly less than negative 2 percent in 1976 and increases to about 7 percent in 1979. It decreases to about 5 percent at the start of the first recession in 1980:Q1 and drops to exit the recession at almost negative 2 percent. The curve continues its decline, reaching about negative 2 percent at the start of the second recession in 1981:Q3 and exiting the recession in 1982:Q4 at about negative 4 percent. The curve then rises to reach about 4 percent at the start of 1987 before decreasing again, entering the third recession in 1990:Q3 at about 0 percent and then dropping to exit the recession in 1991:Q1 at about negative 4 percent. It fluctuates and gradually increases to enter the NBER peak in 2001:Q1 at just below 6 percent and then drops to just over 4 percent in mid-2002. Projections show it reaching just above 2 percent at the end of 2004.

Chart 4
Corporate Financial Conditions

Top-left panel
Components of Net Debt Financing, Nonfinancial Corporations

The period covered is from 1999 to 2003:Q2. The data are represented as bars and in billions of dollars, presented at a monthly rate. The shaded part of each bar denotes bonds, and the white part of each bar denotes commercial paper and C&I loans that are seasonally adjusted. Approximate values for the six periods are as follows.

Billions of dollars

	Bonds	Commercial Paper and C&I Loans
1999	19	8
2000	12	10
2001	29	-14
2002	10	-11
2003:Q1	15	-5
2003:Q2 (staff estimate)	18	-10

Top-right panel
Debt Ratios for Nonfinancial Corporations

The period covered is from 1989 to 2003:Q1. The data are represented as percents. The data are plotted on two curves. One curve represents debt to assets. The other curve represents current debt to assets; note that current debt equals short-term notes and the portion of long-term debt due within one year.

The curve for current debt to assets starts at just below 6 percent in 1989 and increases to about 6.5 percent in 1990. It then decreases to just below 5 percent in 1994, increases to about 5 percent in 1995, dips to about 4.75 percent in 1996, and then increases to almost 6 percent near the beginning of 2001. The curve moves downward in 2001 and 2002 and declines to about 4.75 percent by 2003:Q1. The curve for debt to assets starts at about 32 percent in 1989 and decreases to just below 29 percent in 1994. It increases to just under 29 percent in 1995, falls to about 28 percent in 1996, then increases to about 31 percent in 1998. The curve dips in 1999 to about 30 percent, recovers slightly, then decreases to just above 29 percent in 2001. The curve increases to about 30.5 in 2002, then decreases to just under 30 percent in 2003:Q1.

Source: Compustat.

Middle panel
Debt Service Obligation of Nonfinancial Corporations

The debt service obligation of nonfinancial corporations is the ratio of interest expense plus current debt to after-tax cash flow. The period covered is from 1989 to 2003:Q1, and the data represent the median firm in each period and are presented as a percent of after-tax cash flow.

The data are plotted on two curves. One curve represents speculative grade, and the other curve represents investment grade. The curve for speculative grade starts at about 82 percent at the beginning of 1989 and increases to about 95 percent in mid-1991. It falls to about 72 percent in 1992, decreases to about 65 percent in 1994, remains at about that level in 1995 and mid-1996, then decreases to about 52 percent in 1997. The curve for speculative grade then increases to almost 70 percent in 1999, stays at about that level until early 2001, then decreases to about 59 percent in 2003:Q1. The curve for investment grade starts at just under 50 percent at the beginning of 1989,

then increases to about 55 percent in mid-1990. The curve decreases to about 38 percent in mid-1997, then increases to about 54 percent in mid-2000. The curve then decreases to about 40 percent around the third quarter of 2001. The curve decreases through 2002 and ends at about 35 percent in 2003:Q1.

Source: Compustat.

Bottom-left panel
Defined-Benefit Pension Plans

- Contributions by S&P 500 firms tripled in 2002, reaching $45 billion.
- Funding gap is concentrated among investment-grade firms.
- Even for these firms, last year's contributions amounted to only a small part of their cash flow.

Bottom-right panel
Market Indicators of Corporate Financial Positions

The data are plotted on two curves, and the information is monthly. One curve is for the 10-year BBB yield spread. The data are in basis points, and the period covered is 1998 to June 2003. The curve for the 10-year BBB yield spread starts at just under 100 basis points at the start of 1998 and increases to about 175 basis points by 1998:Q4. The curve decreases to about 130 basis points in 1999:Q2, then increases to 150 basis points in 1999:Q3. It falls slightly in 2000:Q1 but then increases, reaching 200 basis points in 2000:Q3. The curve decreases in 2001:Q2 to 190 basis points and increases to 215 basis points in 2001:Q4. At the start of 2002, the curve fluctuates and then increases to 300 basis points in 2002:Q3. The curve then decreases to 175 basis points in June 2003.

The other curve represents KMV expected year-ahead defaults; these data are weighted by firm-level liabilities and exclude defaulted firms. The period covered is 1998 to May 2003, and the data are in percent. The curve starts at about 0.2 percent in 1998:Q1 and increases to just over 0.5 percent in the third quarter. In 1999:Q2, the curve decreases to a little less than 0.5 percent and then increases to about 1.3 percent in 2000:Q4. The curve decreases in 2001:Q1 to about 1.0 percent and then fluctuates between about 1.0 percent and 1.3 percent between 2001:Q2 and 2002:Q1. The curve then increases to a peak of about 1.6 percent in 2002:Q3, then declines and ends at about 1.0 percent in May 2003.

Chart 5
Business Investment

Top-left panel
Nondefense Capital Goods Excluding Aircraft

The period covered is from 1998 to April 2003. The data are plotted on two curves and represent the three-month moving average, in billions of dollars. One curve is for orders, and the other curve is for shipments.

The curve for orders starts at just above 58 billion dollars in 1998:Q1 and increases to about 67 billion dollars in mid-2000. The curve decreases to about 51 billion dollars in late 2001, then increases to about 54 billion dollars in April 2003.

The curve for shipments starts at about 57 billion dollars in 1998:Q1 and increases to about 58 billion dollars by midyear. The curve stays at about that level through 1999:Q1, then increases to

about 61 billion dollars around 1999:Q3. The curve decreases to about 59 billion dollars in early 2000, then increases to about 64 billion in mid-2000, where it stays through the end of the year. The curve then decreases to about 54 billion dollars in late 2001, increases to about 55 billion dollars by mid-2002, then decreases to end at about 53 billion dollars in April 2003.

Top-right panel
Nonresidential Construction Put-In-Place

The period covered is from 1998 to April 2003. The data are plotted on a curve and represent a three-month moving average expressed in billions of dollars.

The curve starts at about 180 billion dollars at the beginning of 1998 and increases to about 200 billion dollars in the first half of 1999. The curve decreases to about 191 billion dollars near the end of 1999, then increases to about 217 billion dollars in early 2001. The curve decreases to about 159 billion dollars in 2002:Q3 and stays at about that level through April 2003.

Middle panel
Reserve Bank Survey of Capital Spending Plans

- 35 percent: increase spending. 20 percent: reduce spending.
- Two-thirds of those planning increases have already started to place orders.
- Few mentioned external finance or partial expensing.
- Sales growth cited most often, in accord with an accelerator model.

Bottom panel
Accelerator Effects

The period covered is from 1970 through 2004, annual. The figure is a scatter-plot graph. The x-axis is labeled Accelerator (8-quarter percent change in real business output less year-earlier 8-quarter percent change), and the range for that axis is between negative 6 and 6. The y-axis is labeled Four-quarter percent change in real E&S, and the range for that axis is between negative 10 and positive 25. A trend line extends from the lower left near point (-6, -7) to the upper right near point (6, 20). A vertical line is drawn at 0 on the x-axis, and a horizontal line is drawn at 0 percent on the y-axis; these two lines divide the figure into four quadrants.

Thirty-four data points, one for each year between 1970 and 2004, are plotted and indicated by dots; however, only four data points are identified by year: 2001, 2002, 2003, and 2004. Going clockwise, the lower-left quadrant contains the data point for 2001, which falls below the trend line, along with 6 unidentified data points, 5 of which fall below the trend line and 1 of which is on the trend line. The upper-left quadrant contains 10 unidentified data points, 1 of which falls below the trend line, 8 of which are above the trend line, and 1 of which is on the trend line. The upper-right quadrant contains the data points for 2002 and 2003, which are below the trend line, and the one for 2004, which is above the trend line, as well as 14 unidentified data points, 8 of which are above the trend line, 5 of which are below the trend line, and 1 of which is on the trend line. The lower-right quadrant contains no data points.

Chart 6
Financial Developments

Chart 6 is a three-by-two array of panels, including graphs for nominal dollar indexes, nominal exchange rates, long-term interest rate differentials, EMBI+ spreads, stock prices for industrial

countries, and stock prices for emerging markets.

Top-left panel
Nominal Dollar Indexes

Nominal Dollar Indexes, on a weekly basis for mid-2001 through mid-2003. The range of the y-axis is [70, 110]; index, Jan. 30, 2002 = 100. The two series are the major currencies index, which is the trade-weighted average against major foreign currencies, and the broad index, which includes major currencies and other important trading partners. The major currencies index starts at about 97, moves generally upward to about 100 by early 2002, and then declines to about 82 by mid-2003. The broad index begins at about 98, moves generally upward to about 100 by early 2002, and then declines to about 91 by mid-2003.

Top-right panel
Nominal Exchange Rates

Nominal Exchange Rates, Foreign currency/U.S. dollar, on a weekly basis for mid-2001 through mid-2003. The range of the y-axis is [70, 110]; index, Jan. 30, 2002 = 100. The three series are the euro, the yen, and the Canadian dollar. The Canadian dollar starts at about 95, rises to about 100 by early 2002, dips back to about 95 by mid-2002, rises back to about 100 by late 2002 and then declines to about 85 by mid-2003. The yen starts at about 93, dips to about 88 and then rises to about 100 by early 2002, declines to about 87 by mid-2002, and then fluctuates around 90 through the rest of the period, ending at about 89 by mid-2003. The euro begins at about 102, dips to about 95 and then rises to about 100 by early 2002, and then generally declines to about 74 by mid-2003.

Middle-left panel
Long-term Interest Rate Differentials

Long-term Interest Rate Differentials, U.S. minus foreign, on a weekly basis for Japan, Germany, and Canada for mid-2001 through mid-2003. Long-term interest rate differentials are defined as 10-year Treasury yields minus foreign government bond yields. The range of the y-axis is [-2, 5]; unit is percentage points. The differential for Japan starts just above 4 percentage points and, with some volatility, declines to about 2.8 percentage points by the end of the period. The differential for Germany starts at about 0.2 percentage point, and, with some volatility, declines to about -0.3 percentage point by the end of the period; the differential for Germany becomes negative in the second quarter of 2002 and remains negative through the end of the period. The differential for Canada begins about -0.6 percentage point, and remains negative throughout the period, declining gradually to about -1 percentage point by mid-2003.

Middle-right panel
EMBI+ Spreads

EMBI+ Spreads, on a weekly basis for mid-2001 through mid-2003 for Argentina and Brazil. For Argentina, the range of the left y-axis is [5, 75]. For Brazil, the range of the right y-axis is [5, 25]. Unit is percentage points. The spreads for Argentina start at about 10 percentage points at the beginning of the period, rise steeply to about 70 percentage points by mid-2002, fluctuate between about 60-70 percentage points through early 2003, and then decline to about 45 percentage points by the end of the period. The spreads for Brazil start at about 8 percentage points, rise to about 12 percentage points by late 2001, decline to about 7 percentage points by early 2002, rise sharply to about 22 percentage points by mid-2002, drop briefly to about 17 percentage points, rise again to about 23 percentage points by late 2002, and then drop to about 7 percentage points at the end of the period.

Bottom-left panel
Stock Prices: Industrial Countries

Stock Prices, Industrial Countries, on a weekly basis for the S&P 500, the DJ Euro Stoxx, and the TOPIX for mid-2001 through mid-2003. The range of the y-axis is [40, 160]; index, July 2, 2001 = 100. All the series start at 100. With some volatility, the S&P 500 generally declines to just below 70 by late 2002, fluctuates around 70 through early 2003, and then rises to just over 80 by the end of the period. With some volatility, the DJ Euro Stoxx generally declines to about 50 by early 2003 and then rises to just over 60 by the end of the period. With some volatility, the TOPIX generally declines to about 60 by early 2003 and then rises to nearly 70 by the end of the period.

Bottom-right panel
Stock Prices: Emerging Markets

Stock Prices, Emerging Markets, on a weekly basis for the Korean Kospi, the Mexican Bolsa, and the H.K. Hang Seng. The range of the y-axis is [40, 160]; index, July 2, 2001 = 100. The indexes for all the countries start at 100. With some volatility, the Korean Kospi declines to about 80 by late 2001, rises to nearly 160 by early 2002, falls to about 90 by early 2003, and then rises to nearly 120 by the end of the period. With some volatility, the Mexican Bolsa declines to about 80 by late 2001, rises to about 110 by early 2002, declines to about 90 by mid-2002, fluctuates around 90 through early 2003, and then rises to about 108 by the end of the period. With some volatility, the H.K. Hang Seng declines to just over 70 by late 2001, rises to about 85 by end-2001, gradually declines to about 62 by early 2003, and then rises to just under 80 by the end of the period.

Chart 7
Effects of U.S. Dollar Depreciation

Chart 7 includes five panels. The top two panels are titled "Constant Short-Term Interest Rates" and include graphs of U.S. PCE inflation and import price inflation, and of U.S. real GDP growth. The middle two panels are titled "Taylor Rule Case" and include graphs of U.S. PCE inflation and import price inflation, and of U.S. real GDP growth. The bottom panel is a table titled "Effects in Foreign Countries."

Constant Short-Term Interest Rates

Top-left panel
U.S. PCE Inflation and Import Price Inflation

U.S. PCE Inflation and Import Price Inflation. The effects of U.S. dollar depreciation on PCE inflation on a semi-annual basis as a line chart for 2002-2003, and the effects of U.S. dollar depreciation on import price inflation as a bar chart for 2002:H1, 2002:H2, 2003:H1, and 2003:H2. The range of the y-axis is [-0.5, 4.5]; unit is percentage point contribution, annual rate. The effects on PCE inflation start at zero and rise in a nearly straight line to 0.5 percentage point by the end of the period. Approximate values for the effects on import price inflation for the four periods are as follows: 1.3, 2.5, 4.3, 3.1.

Top-right panel
U.S. Real GDP Growth

U.S. Real GDP Growth. The effects of U.S. dollar depreciation on U.S. real GDP growth as a bar chart for 2002:H1, 2002:H2, 2003:H1, and 2003:H2. The range of the y-axis is [0.0, 1.0]; unit is

percentage point contribution, annual rate. Approximate values for the four periods are as follows: 0.0, 0.1, 0.5, 0.98.

Taylor Rule Case

Middle-left panel
U.S. PCE Inflation and Import Price Inflation

U.S. PCE Inflation and Import Price Inflation. The effects of U.S. dollar depreciation on PCE inflation on a semi-annual basis as a line chart for 2002-2003, and the effects of U.S. dollar depreciation on import price inflation as a bar chart for 2002:H1, 2002:H2, 2003:H1, and 2003:H2. The range of the y-axis is [-0.5, 4.5]; unit is percentage point contribution, annual rate. The effects on PCE inflation start at zero, rise to about 0.3 percentage point by 2003:H1 and remain at about 0.3 percentage point through the end of the period. Approximate values for the effects on import price inflation for the four periods are as follows: 1.2, 2.2, 2.8, 0.7.

Middle-right panel
U.S. Real GDP Growth

U.S. Real GDP Growth. The effects of U.S. dollar depreciation on U.S. real GDP growth as a bar chart for 2002:H1, 2002:H2, 2003:H1, and 2003:H2. The range of the y-axis is [0.0, 1.0]; unit is percentage point contribution, annual rate. Approximate values for the four periods are as follows: 0.0, 0.05, 0.15, 0.2.

Bottom panel
Effects in Foreign Countries

(Contribution in percentage points, AR)

	PCE Inflation				Real GDP Growth			
	2002		2003		2002		2003	
	Fixed*	Taylor**	Fixed	Taylor	Fixed	Taylor	Fixed	Taylor
Canada	-.1	.4	-2.7	.0	-.3	.0	-.8	.7
Euro area	-.9	-.7	-3.6	-1.6	-.5	-.3	-2.8	-1.2
Japan	-.4	-.4	-.3	.0	-.5	-.4	-.3	.0
U.K.	-.2	-.2	.3	-.1	-.3	-.3	-.8	-.6
Dev. Asia	.7	.6	2.0	.8	-.2	-.2	2.7	1.8
Mexico	2.7	.6	5.4	-.2	2.5	.5	6.4	-.1

* Exchange rates and short-term interest rates at 2002:Q1 values. Return to table

** Taylor Rules govern short-term interest rates. Exchange rates react. Return to table

Chart 8
Monetary Policy Stance Abroad

Chart 8 is a three-by-two array of panels focusing on the euro area and Canada. Down the left-hand side of the page are the panels for the euro area: graphs of the output gap, actual and projected policy rates, and policy rates implied by Taylor Rules. Down the right-hand side of the page are similar panels for Canada: graphs of the output gap, actual and projected policy rates, and policy rates implied by Taylor Rules.

Euro Area

Top-left panel
Output Gap

Output Gap, on a quarterly basis for the euro area for 2002:Q1-2003:Q1 (actual) and for 2003:Q2-2004:Q4 (forecast) as a bar chart. The output gap is defined as (Actual GDP-Potential GDP)/Potential GDP. The range of the y-axis is [-3, 2]. Approximate values for the twelve quarters are as follows.

Percent

	Output Gap
2002:Q1	-0.4
2002:Q2	-0.5
2002:Q3	-0.7
2002:Q4	-1.2
2003:Q1	-1.7
2003:Q2	-2.1
2003:Q3	-2.4
2003:Q4	-2.7
2004:Q1	-2.8
2004:Q2	-2.9
2004:Q3	-2.8
2004:Q4	-2.7

Middle-left panel
Actual and Projected Policy Rates

Actual and Projected Policy Rates, as a line chart for 2002:Q2 through 2003:Q2. The actual policy rate by the European Central Bank (ECB), the June 2002 Greenbook projection for the ECB rate, and the 3-month euribor futures as of the week of June 26, 2002. The range of the y-axis is [0, 5]; unit is percent. The actual ECB policy rate starts at 3¼ percent, and declines in steps to 2¾ percent in 2002:Q4, to 2½ percent in 2003:Q1, and to 2 percent in 2003:Q2, remaining there through the end of the period. The June 2002 Greenbook projection of the ECB policy rate rises in steps to 3½ percent at end-2002:Q2, to 3¾ percent at end-2002:Q3, and to 4 percent at end-2002:Q4, where it remains for the rest of the period. The three-month euribor futures as of the week of June 26, 2002, show market expectations for the ECB policy rate rising in a straight line from 3½ percent in 2002:Q3 to just over 4 percent by the end of the period.

Bottom-left panel
Policy Rates Implied by Taylor Rules

Policy Rates Implied by Taylor Rules, as a line chart for 2002:Q2 through 2003:Q2. The Taylor Rules give weights of ½ each on output gap and difference of inflation from 2 percent. It shows the actual policy rate by the European Central Bank (ECB), the policy rate path implied by Taylor Rule #1, and the policy rate path implied by Taylor Rule #2, which uses the six-quarter ahead staff forecast for headline inflation. The range of the y-axis is [0, 8]; unit is percent. The actual ECB policy rate starts at 3¼ percent, and declines in steps to 2¾ percent in 2002:Q4, to 2½ percent in 2003:Q1, and to 2 percent in 2003:Q2, remaining there through the end of the period. The path of Taylor Rule #1 starts at nearly 4 percent in 2002:Q2, stays roughly level until mid-2002:Q4, when it

starts to decline, ending at just below 3 percent in 2003:Q2. The path of Taylor Rule #2 starts at nearly 3 percent in 2002:Q2, drops to just below 2 percent in 2002:Q3, and stays roughly level through the end of the period.

Canada

Top-right panel
Output Gap

Output Gap, on a quarterly basis for Canada for 2002:Q1-2003:Q1 (actual) and for 2003:Q2-2004:Q4 (forecast) as a bar chart. The output gap is defined as (Actual GDP-Potential GDP)/Potential GDP. The range of the y-axis is [-3, 2]. Approximate values for the twelve quarters are as follows.

Percent

	Output Gap
2002:Q1	1.4
2002:Q2	1.7
2002:Q3	1.6
2002:Q4	1.3
2003:Q1	1.2
2003:Q2	0.7
2003:Q3	0.5
2003:Q4	0.7
2004:Q1	0.75
2004:Q2	0.8
2004:Q3	0.85
2004:Q4	0.9

Middle-right panel
Actual and Projected Policy Rates

Actual and Projected Policy Rates, as a line chart for 2002:Q2 through 2003:Q2. The actual policy rate by the Bank of Canada (BOC), the June 2002 Greenbook projection for the BOC rate, and the 3-month Banker's Acceptances futures as of the week of June 26, 2002. The range of the y-axis is [0, 5]; unit is percent. The actual BOC policy rate starts at 2 percent, and rises in steps to 2¼ percent and then to 2½ percent in 2002:Q2, to 2¾ percent in 2002:Q3, to 3 percent in 2003:Q1, and to 3¼ percent in 2003:Q2, where it remains until the end of the period. The June 2002 Greenbook projection of the BOC policy rate rises in steps to 3 percent at end-2002:Q2, to 3½ percent at end-2002:Q3, to 3¾ percent at end-2002:Q4, and to 4¼ percent at end-2003:Q1, where it remains for the rest of the period. The three-month Banker's Acceptances futures as of the week of June 26, 2002, show market expectations for the BOC policy rate rising in a straight line from about 3 percent at beginning 2002:Q3 to about 4 percent by the end of the period.

Bottom-right panel
Policy Rates Implied by Taylor Rules

Policy Rates Implied by Taylor Rules, as a line chart for 2002:Q2 through 2003:Q2. The Taylor Rules give weights of ½ each on output gap and difference of inflation from 2 percent. It shows the actual policy rate by the Bank of Canada (BOC), the policy rate path implied by Taylor Rule #1, and

the policy rate path implied by Taylor Rule #2, which uses the six-quarter ahead staff forecast for headline inflation. The range of the y-axis is [0, 8]; unit is percent. The actual BOC policy rate starts at 2 percent, and rises in steps to 2¼ percent and then to 2½ percent in 2002:Q2, to 2¾ percent in 2002:Q3, to 3 percent in 2003:Q1, and to 3¼ percent in 2003:Q2, where it remains until the end of the period. The path of Taylor Rule #1 starts just below 4 percent in 2002:Q2, rises sharply to over 8 percent in 2003:Q1, and then drops to about 6 percent by the end of the period. The path of Taylor Rule #2 starts at just over 5 percent in 2002:Q2, drops to just below 4 percent in 2002:Q3, rises to just below 5 percent in 2002:Q4, and then declines to about 4½ percent by the end of the period.

Chart 9
U.S. External Outlook

Chart 9 is a three-by-two array of panels including tables on real GDP growth for industrial countries and on real GDP growth for developing countries, graphs of the real exchange rate outlook, contribution to U.S. GDP growth by exports and imports, and the current account, and a table on financial flows.

Top-left panel
Real GDP Growth: Industrial Countries

Real GDP Growth: Industrial Countries (percent, SAAR) for 2002:H2 (actual), 2003:H1 (estimated), 2003:H2 (forecast), and 2004 (forecast).

Percent, SAAR*

	2002	2003		2004
	H2	H1	H2	
1. Total Foreign**	2.1	0.6	2.6	3.4
2. Industrial countries	1.9	1.0	1.8	2.5
of which:				
3. Euro Area	0.8	0.2	0.7	2.0
4. Japan	2.1	0.2	0.2	1.0
5. Canada	2.2	1.7	2.9	3.2
6. United Kingdom	2.9	0.9	1.8	2.5

* Years are Q4/Q4; half years are Q2/Q4 or Q4/Q2. Return to table

** Total foreign and industrial countries aggregates are weighted by shares of U.S. exports. Return to table

Top-right panel
Real GDP Growth: Developing Countries

Real GDP Growth: Developing Countries (percent, SAAR) for 2002:H2 (actual), 2003:H1 (estimated), 2003:H2 (forecast), and 2004 (forecast).

Percent, SAAR*

	2002	2003		2004
	H2	H1	H2	
1. Total Developing**	2.4	-0.0	3.8	4.8
2. Developing Asia	4.4	1.3	4.5	5.7

	2002	2003		2004
	H2	H1	H2	
of which:				
3. China	7.1	6.2	7.2	8.1
4. Korea	6.1	0.5	5.7	5.4
5. Latin America	0.7	-1.5	3.3	4.4
of which:				
6. Mexico	1.1	-0.7	2.8	5.0
7. Brazil	3.5	0.9	2.7	3.0

* Years are Q4/Q4; half years are Q2/Q4 or Q4/Q2. Return to table

** Total developing, developing Asia, and Latin America aggregates are weighted by shares of U.S. exports. Return to table

Middle-left panel
Real Exchange Rate Outlook

Real Exchange Rate Outlook, for 2001 through mid-2003 (actual), along with the January 2003 Greenbook forecast from early 2003 through 2004 and the June 2003 Greenbook forecast for mid-2003 through 2004. The range of the y-axis is [90, 105]; index, 2001:Q1 = 100. The actual broad real exchange rate starts at 100 at the beginning of the period, rises to about 103 by early 2002, and then declines to about 93 by mid-2003. The January 2003 Greenbook forecast starts at about 99 in early 2003 and declines to about 98 by the end of 2004. The June 2003 Greenbook forecast starts at about 93 in mid-2003 and declines to about 92 by the end of 2004.

Middle-right panel
Contribution to U.S. GDP Growth

Contribution to U.S. GDP Growth by Exports, Imports, on a semi-annual basis as a bar chart for 2002 (actual), 2003 (projected), and 2004 (projected). The range of the y-axis is [-3, 3]; unit is percentage points. Approximate values for the six periods are as follows.

Percentage points

	2002:H1	2002:H2	2003:H1	2003:H2	2004:H1	2004:H2
Exports (red)	0.8	-0.1	-0.2	0.8	0.8	1.0
Imports (blue)	-1.8	-0.6	0.1	-0.5	-1.4	-1.4

Bottom-left panel
Current Account Balance

Current Account Balance, in terms of percent of GDP and in terms of level (billions of dollars) for 1995 through 2002 (actual) and for 2003 through 2004 (forecast). The range of the left y-axis, measured in terms of percent of GDP, is [-7, 1]. The range of the right y-axis, measured in terms of level or billions of dollars, is [-700, 100]. The graph shows the current account to be in deficit for the entire period, and the two series track closely for the entire period. The current account in terms of level starts at a deficit of about $100 billion, which widens to about $550 billion by end-2002. The forecast shows the deficit widening further, to about $600 billion by end-2004. The current account in terms of percent of GDP starts at a deficit of about 1½ percent of GDP, which widens to a deficit of about 5 percent of GDP by end-2002. The forecast shows the deficit widening a bit further, to around 5¼ percent of GDP by end-2004.

Bottom-right panel
Financial Flows

Billions of dollars, AR

	2002	2003:Q1
1. Official capital, net	91	144
2. Private capital, net	437	307
of which:		
3. For. purch. of U.S. sec.	388	258
4. *of which:* Equities	55	-13
5. U.S. purch. of for. sec.	16	-103
6. *of which:* Equities	-18	-133
7. For. D.I. in U.S.	40	103
8. U.S. D.I. abroad	-138	-116

Chart 10
Inflation Outlook*

* In the four upper panels, figures for 2003:Q2 are staff estimates.

Top-left panel
Unemployment Rate

Percent

	Unemployment Rate	Forecast	NAIRU
1996:Q1	5.50	ND	5.20
1996:Q2	5.50	ND	5.20
1996:Q3	5.30	ND	5.20
1996:Q4	5.30	ND	5.20
1997:Q1	5.20	ND	5.20
1997:Q2	5.00	ND	5.20
1997:Q3	4.90	ND	5.20
1997:Q4	4.70	ND	5.20
1998:Q1	4.60	ND	5.10
1998:Q2	4.40	ND	5.10
1998:Q3	4.50	ND	5.10
1998:Q4	4.40	ND	5.10
1999:Q1	4.30	ND	5.10
1999:Q2	4.30	ND	5.10
1999:Q3	4.30	ND	5.10
1999:Q4	4.10	ND	5.10
2000:Q1	4.00	ND	5.00
2000:Q2	4.00	ND	5.00

	Unemployment Rate	Forecast	NAIRU
2000:Q3	4.00	ND	5.00
2000:Q4	3.90	ND	5.00
2001:Q1	4.20	ND	5.00
2001:Q2	4.40	ND	5.00
2001:Q3	4.80	ND	5.00
2001:Q4	5.60	ND	5.00
2002:Q1	5.60	ND	5.00
2002:Q2	5.86	ND	5.00
2002:Q3	5.77	ND	5.00
2002:Q4	5.91	ND	5.00
2003:Q1	5.76	ND	5.00
2003:Q2	6.10	6.10	5.00
2003:Q3	ND	6.22	5.00
2003:Q4	ND	6.14	5.00
2004:Q1	ND	6.03	5.00
2004:Q2	ND	5.93	5.00
2004:Q3	ND	5.69	5.00
2004:Q4	ND	5.36	5.00

Top-right panel
PCE Energy Prices

Four-quarter percent change

	PCE Energy	Forecast
1996:Q1	1.66	ND
1996:Q2	4.98	ND
1996:Q3	4.34	ND
1996:Q4	7.32	ND
1997:Q1	6.45	ND
1997:Q2	-1.12	ND
1997:Q3	0.50	ND
1997:Q4	-1.27	ND
1998:Q1	-8.27	ND
1998:Q2	-6.84	ND
1998:Q3	-8.52	ND
1998:Q4	-9.58	ND
1999:Q1	-5.93	ND
1999:Q2	2.13	ND
1999:Q3	7.55	ND

	PCE Energy	Forecast
1999:Q4	12.34	ND
2000:Q1	21.43	ND
2000:Q2	18.01	ND
2000:Q3	16.70	ND
2000:Q4	15.35	ND
2001:Q1	10.74	ND
2001:Q2	10.55	ND
2001:Q3	1.26	ND
2001:Q4	-10.30	ND
2002:Q1	-14.46	ND
2002:Q2	-10.92	ND
2002:Q3	-4.65	ND
2002:Q4	6.98	ND
2003:Q1	20.54	ND
2003:Q2	10.31	10.31
2003:Q3	ND	8.11
2003:Q4	ND	3.87
2004:Q1	ND	-6.71
2004:Q2	ND	-5.24
2004:Q3	ND	-4.65
2004:Q4	ND	-2.95

Middle-left panel
Core Non-oil Import Prices

Four-quarter percent change

	Core Non-oil	Forecast
1996:Q1	1.60	ND
1996:Q2	-0.11	ND
1996:Q3	-1.04	ND
1996:Q4	-0.74	ND
1997:Q1	-0.61	ND
1997:Q2	-0.93	ND
1997:Q3	-0.56	ND
1997:Q4	-0.82	ND
1998:Q1	-1.50	ND
1998:Q2	-1.40	ND
1998:Q3	-2.26	ND
1998:Q4	-2.03	ND

	Core Non-oil	Forecast
1999:Q1	-1.31	ND
1999:Q2	-1.03	ND
1999:Q3	0.10	ND
1999:Q4	0.37	ND
2000:Q1	0.79	ND
2000:Q2	1.49	ND
2000:Q3	1.63	ND
2000:Q4	1.61	ND
2001:Q1	1.89	ND
2001:Q2	0.12	ND
2001:Q3	-1.74	ND
2001:Q4	-2.88	ND
2002:Q1	-4.02	ND
2002:Q2	-2.29	ND
2002:Q3	-0.55	ND
2002:Q4	0.66	ND
2003:Q1	2.60	ND
2003:Q2	2.58	2.58
2003:Q3	ND	3.56
2003:Q4	ND	3.71
2004:Q1	ND	2.56
2004:Q2	ND	2.38
2004:Q3	ND	1.41
2004:Q4	ND	1.15

Middle-right panel
PCE Prices

Four-quarter percent change

	Total	Total Forecast	Core	Core Forecast
1996:Q1	2.06	ND	2.04	ND
1996:Q2	2.12	ND	1.87	ND
1996:Q3	2.06	ND	1.74	ND
1996:Q4	2.34	ND	1.83	ND
1997:Q1	2.35	ND	1.97	ND
1997:Q2	1.99	ND	2.11	ND
1997:Q3	1.90	ND	1.98	ND
1997:Q4	1.54	ND	1.73	ND

	Total	Total Forecast	Core	Core Forecast
1998:Q1	1.08	ND	1.54	ND
1998:Q2	1.04	ND	1.39	ND
1998:Q3	1.07	ND	1.52	ND
1998:Q4	1.09	ND	1.58	ND
1999:Q1	1.24	ND	1.50	ND
1999:Q2	1.57	ND	1.45	ND
1999:Q3	1.76	ND	1.42	ND
1999:Q4	2.01	ND	1.48	ND
2000:Q1	2.56	ND	1.71	ND
2000:Q2	2.56	ND	1.80	ND
2000:Q3	2.54	ND	1.76	ND
2000:Q4	2.50	ND	1.79	ND
2001:Q1	2.47	ND	1.94	ND
2001:Q2	2.36	ND	1.78	ND
2001:Q3	1.82	ND	1.65	ND
2001:Q4	1.46	ND	1.87	ND
2002:Q1	0.91	ND	1.52	ND
2002:Q2	1.14	ND	1.70	ND
2002:Q3	1.59	ND	1.96	ND
2002:Q4	1.84	ND	1.65	ND
2003:Q1	2.24	ND	1.48	ND
2003:Q2	1.71	1.71	1.25	1.25
2003:Q3	ND	1.53	ND	1.10
2003:Q4	ND	1.27	ND	1.01
2004:Q1	ND	0.82	ND	1.09
2004:Q2	ND	0.88	ND	1.09
2004:Q3	ND	0.83	ND	1.03
2004:Q4	ND	0.84	ND	0.94

Bottom panel
GDP Price Inflation and Related Items

(Percent change, Q4/Q4)

	2002	2003	2004
1. GDP	1.3	1.2	1.1
2. *(Jan. GB)*		*(1.2)*	*(1.3)*
3. PCE	1.8	1.3	.8
4. *(Jan. GB)*		*(1.3)*	*(1.2)*

	2002	2003	2004
5. Core PCE	1.6	1.0	.9
6. *(Jan. GB)*		*(1.3)*	*(1.2)*

Chart 11
The Probability of Deflation and Related Events

Top panel

To assess the risks in the outlook, we conduct stochastic simulations of FRB/US.

- Deflation defined as Q4/Q4 change in core PCE prices less than 0.5 percent.
- Hitting the zero bound defined as an annual average funds rate less than 25 basis points.
- Monetary policy assumed to follow a Taylor rule, but with the zero bound enforced.

Middle panel
Core PCE Prices

The data are plotted on a curve and represent the four-quarter percent change (shown on the y-axis in a range from negative 2 to 4) for core PCE prices for the period from 2001 to 2005. A horizontal line is drawn at 0.

The curve for core PCE prices starts in the beginning of 2001 at just under 2, decreases to about 1.5 in 2001:Q3, increases to just under 2 in 2001:Q4, then decreases to about 1.4 in 2002:Q1. The curve increases to about 2 in 2002:Q3, then decreases to end at about 0.7 in 2005:Q4.

The figure also has three shaded areas that represent a 90 percent confidence band, a 75 percent confidence band, and a 50 percent confidence band. These bands appear directly next to each other above and below the curve in equal amounts starting in 2003:Q2 and ending in 2005:Q4.

The 50 percent confidence band is the band that is nearest to the curve. The band starts at the curve itself in 2003:Q2 and expands above and below the curve to end in 2005:Q4 on the y-axis above the curve at approximately 1.8 and below the curve at approximately negative 0.2.

The 75 percent confidence band appears both directly above and directly below the 50 percent confidence band. This band starts in 2003:Q2 and expands above and below the 50 percent confidence band in equal amounts. It ends in 2005:Q4 on the y-axis above the 50 percent confidence band at between approximately 1.8 and 2.5 and below the 50 percent confidence band at between approximately negative 0.2 and negative 0.9.

The 90 percent confidence band appears both directly above and directly below the 75 percent confidence band. This band starts in 2003:Q2 and expands above and below the 75 percent confidence band in equal amounts. It ends in 2005:Q4 on the y-axis above the 75 percent confidence band at between approximately 2.5 and 3.3 and below the 75 percent confidence band at between approximately negative 0.9 and negative 1.7.

Bottom-left panel
Estimated Probabilities of Deflation and Related Events

(percent)

	2003	2004	2005

	2003	2004	2005
Deflation	15	37	41
Hitting the zero bound	0	22	17
Deflation and hitting the zero bound	0	18	14

Note. Calculated using the June Greenbook as baseline.

Bottom-right panel
Average Macroeconomic Performance at Different Average Inflation Rates

	Measured Average CPI Inflation	
	0	2
Standard deviation of the unemployment rate (percentage points)	1.8	1.5
Frequency of deep recessions (number per 100 years)*	5.2	4.6

* "Deep recessions" defined as downturns during which the unemployment rate peaks at or above 7-1/2 percent. Return to table

Chart 12
Implications for Monetary Policy

1. Put an additional cushion between zero and the long-run average inflation rate?

Top-left panel
Factors pointing to a larger cushion

- Concern about the adverse effects of the zero bound and nominal wage rigidity.
- Underlying volatility of the economy.

Top-right panel
Factors pointing to a smaller cushion

- Confidence in the efficacy of non-traditional forms of monetary policy.
- Concern about the efficiency losses associated even with low positive inflation.

2. Move aggressively to head off any incipient deflation?

Middle-left panel
Arguments for more aggressiveness

- Concern that non-traditional approaches would not be effective.
- Concern about the uncertainty surrounding non-traditional approaches.

Middle-right panel
Arguments for less aggressiveness

- Concern that markets would interpret an easing as signaling a downbeat assessment of the economy.
- Concern that markets would become unnerved when they saw that you had no more scope for

traditional actions.

3. Counteract deflation even if real activity is currently at a satisfactory level?

Bottom-left panel
Arguments for taking action

- Concern about the efficiency cost of deflation.
- Concern that deflation could limit your ability to fight a future downturn.

Bottom-right panel
Arguments for sitting tight

- Belief that the factors giving rise to deflation were temporary.
- Belief that the deflation would be self-correcting.

Chart 13

Top panel
ECONOMIC PROJECTIONS FOR 2003

	FOMC		Staff
	Range	Central Tendency	
Percentage change, Q4 to Q4			
Nominal GDP	**3½ to 4¾**	**3¾ to 4½**	**4.1**
February 2003	(4½ to 5½)	(4¾ to 5)	(4.8)
Real GDP	**2¼ to 3**	**2½ to 2¾**	**2.9**
February 2003	(3 to 3¾)	(3¼ to 3½)	(3.6)
PCE Prices	**1 to 1¾**	**1¼ to 1½**	**1.3**
February 2003	(1¼ to 1¾)	(1¼ to 1½)	(1.3)
Average level, Q4, percent			
Unemployment rate	**6 to 6¼**	**6 to 6¼**	**6.1**
February 2003	(5¾ to 6)	(5¾ to 6)	(6.1)

Central tendencies calculated by dropping high and low three from ranges.

Bottom panel
ECONOMIC PROJECTIONS FOR 2004

	FOMC		Staff
	Range	Central Tendency	
Percentage change, Q4 to Q4			
Nominal GDP	**4¾ to 6½**	**5¼ to 6¼**	**6.5**
Real GDP	**3½ to 5¼**	**3¾ to 4¾**	**5.3**
PCE Prices	**¾ to 2**	**1 to 1½**	**.8**

	FOMC		Staff
	Range	Central Tendency	
Average level, Q4, percent			
Unemployment rate	**5½ to 6¼**	**5½ to 6**	**5.4**

Appendix 5: Materials used by Mr. Reinhart

Exhibit 1

Exhibit 1 includes six charts and tables that provide information on monetary policy expectations and prevailing conditions in bond and equity markets.

Top-left panel
Expected Federal Funds Rates

The top-left panel is a line chart showing the expected federal funds rate path on May 5, May 6, and June 24, 2003 derived from federal funds and Eurodollar futures. The May 6 meeting announcement to keep rates at 1-1/4 percent caused a significant downward realignment in market expectations, which placed the rate path for May 6 below that of May 5. The June 24 path shows that the market expects the fed funds rate to trade below one percent for the remainder of 2003 and into 2004, with a gradual increase to around 2 percent by late 2005.

Top-right panel
Probability of Policy Action Implied by Option Prices on Federal Funds Futures

	May 5	June 24
	-percent-	
1. Easing	42	99
2. 25 bp	17	45
3. 50 bp	25	54
4. No Change	58	1

bp Basis points. Return to table

Middle-left panel
Implied Distribution of Federal Funds Rate Derived from Option Prices on Eurodollar Futures*

The middle-left panel is a bar and line graph showing the implied distribution of the fed funds rate derived from options on Eurodollar futures, five months hence on May 5 (line) and June 24, 2003 (bars). The market has considerably revised down its expectations since May 5 and expects the fed funds rate to remain below one percent for the next five months, with the most weight being placed on a rate of 75 basis points.

* Estimates from options on eurodollar futures contracts, adjusted to estimate expectations for the federal funds rate, five months hence. Return to text

Middle-right panel
Probability the Federal Funds Rate will be at or Below 0.50 Percent in Five Months*

The middle-right panel is a line chart showing the probability that the federal funds rate will be at or below 50 basis points in five months. The chart shows that since the May FOMC announcement, there has been an increase in this probability with the peak at approximately 20 percent in mid-June. Currently there is about a 14 percent chance that the fed funds rate will be at or below 50 basis points.

* Estimates from options on eurodollar futures contracts, adjusted to estimate expectations for the federal funds rate. Return to text

Bottom-left panel
Selected Equity Indexes

The bottom-left panel is a line chart displaying the conditions in equity markets as indicated by the Wishire 5000 and Nasdaq indexes. Since March 2003, the indexes have been steadily increasing and gained approximately 10 percent over the current intermeeting period. This intermeeting increase is consistent with the interpretation that investors expect the FOMC intends to keep the fed funds rate low for a longer than previously expected time period.

Bottom-right panel
Selected Ten-year Yields

The bottom-right panel is a line chart displaying the ten year yields on Treasury, AA* and BBB* corporate bonds. The panel plots the yields from December 2002 to June 2003. Over this time period these yields declined steadily, and lost approximately 60 basis points over the current intermeeting period.

* AA and BBB rates based on yield curves derived from Merrill Lynch data. Return to text

Exhibit 2
The Case for Easing 25 Basis Points

Exhibit 2 includes five panels that present a case for the FOMC to ease the fed funds rate by 25 basis points.

Top panel

- Ratify at least a portion of the easing currently built into market prices.
- Work down resource slack quicker.
- View the costs of insurance as low given that inflation expectations are well contained.

Middle-left panel
Unemployment Rate in the Greenbook

The middle-left panel is a line chart showing the Greenbook baseline path for the unemployment rate from March 2003 until January 2005. The chart shows the expected path for unemployment if the FOMC lowers the fed funds rate 25 basis points and if no action is taken. The paths indicate that no action being taken will result in higher unemployment throughout the end of 2003 and all of 2004. While the spread between the two lines is small (currently about 10 basis points) the difference cumulates over time to help to lessen pressures on disinflation.

Middle-right panel
Inflation Expectations

The middle-right panel shows inflation expectations from the Michigan survey* and TIPS markets** during the period from June 2001 to June 2003. The current levels of all of these measures indicate that inflation expectations remain subdued. Inflation expectations from the Michigan survey are within their recent range of between 2.5 and 3.0 percent. Meanwhile, the TIPS measure over the next one to five years is within its 1.0 to 2.0 percent range, while the TIPS measure from six to ten years is within its 2.0 to 3.0 range.

* Median five to ten-year inflation expectations. Return to text

** Measured as the inflation rate at which the price of the indexed security equals the value of a portfolio of zero-coupon securities that replicates its payments. Return to text

Bottom panel
Alternative Simulations of the FRB/US Model

The bottom two panels of Exhibit 2 show alternative simulations of the FRB/US Model under the assumption that the nominal funds rate moves down to 1 percent today.

Bottom-left panel
Unemployment Rate

The bottom-left panel is a line chart showing the effect this move would have on unemployment when the policy rate is not raised again until 2005, 2006 or 2007. The longer the pause before the eventual rate increase, the more the unemployment rate falls through 2008.

Bottom-right panel
PCE Inflation (ex. food and energy)*

The bottom-right panel is a line chart showing the effect a 25 basis point cut would have on PCE inflation in the same three scenarios. Assuming there is no policy action after the 25 basis point cut until 2005, the PCE Inflation rate will be near 0.75 percent at the onset 2009. However if the rate is not increased until 2006, the inflation rate rises to just above 1.0 percent and if there is no policy action until 2007 it rises to 1.5 percent. This leads to the conclusion that with a 25 basis point cut today, the risk to inflation is sufficiently low that the Committee could keep rates low for some time and still maintain a comfortable level of inflation.

* Four-quarter percent change. Return to text

Exhibit 3
The Case for Easing 50 Basis Points

The third exhibit includes four panels that present a case for the FOMC to cut the fed funds rate by 50 basis points.

Top panel

- Re-establish the degree of monetary policy accommodation of late last year.
- Fatten the cushion of inflation protection from the zero bound.
- Provide needed stimulus if the Greenbook assessment of aggregate demand is too optimistic.

Middle panel

Actual Real Federal Funds Rate and Range of Estimated Equilibrium Real Rates

The middle panel shows a time-series of the actual ex-post real federal funds rate and the range of estimated equilibrium real rates from staff models shown from 1990 through mid-2003 at a quarterly frequency. The historical average calculated over the 1966:Q1-2003:Q1 period is plotted as a horizontal line at 2.68 percent. The series range from -0.5 percent to 4.5 percent. The chart shows that the ex-post real funds rate has moved up slightly from its level in the second half of 2002 mirroring the decline in inflation, whereas the equilibrium value estimated from staff models has moved down over the same period.

Bottom-left panel
Interest Rate Prescription From a Forward-Looking Taylor-Type Policy Rule

The bottom-left panel plots the actual fed funds rate along with an interest rate prescription that is derived using a forward-looking Taylor-type policy rule which uses private sector forecasts of real GDP and unemployment for the period from 1999 on. The graph shows that if the committee were to operate as they have over the past ten years and follow the interest rate prescription time series, they should lower the policy rate to nearly 0.75 percent.

Bottom-right panel
Private Sector Forecasts

	2004	
	Q4/Q4 Real GDP	**Q4 Unemployment Rate**
1. Merrill Lynch (6/6/03)	3.80	6.00
2. Bear Stearns (6/12/03)	4.21	5.60
3. Morgan Stanley (6/19/03)	4.90	5.50
4. JP Morgan Chase (6/17/03)	2.80	6.00
5. Goldman Sachs (6/18/03)	2.00	6.50
6. Memo: Greenbook	***5.30***	***5.40***

Exhibit 4
The Case for Keeping the Funds Rate Unchanged

Top panel

- View easing as unnecessary because
  -- Considerable fiscal impetus is in train.
  -- The Greenbook is too gloomy about investment.
  -- Put some weight on the recent rapid expansion of liquidity.

Middle-left panel
Fiscal Impetus

The middle-left panel is a line chart that displays the historical movements of the staff's estimate of fiscal impetus as a percentage of GDP. The horizontal axis ranges from the years 1961 to 2005, and the vertical axis runs from -0.75 to 1.5 percent. The chart shows considerable volatility in fiscal

impetus in the years prior to 1991 as it fluctuates through the range of the vertical axis. During most of the 1990s, the fiscal impetus was around -0.5 percent of GDP. It then began to rise sharply in the late 1990s and early 2000s, and was expected to be about 1.25 percent in 2003 and to remain near that level in the following two years. This level of fiscal impetus is historically very high.

Middle-right panel
Equipment and Software Spending Relative to Economic Troughs

The middle-right panel is a line chart that displays real equipment and software spending relative to economic troughs. The horizontal axis has a range from -4 to 12, representing the number of quarters out from an economic trough. The vertical axis measures an index of equipment and software spending where an index level of 100 equals spending at an economic trough (i.e., at the zero period); it has a range from 80 to 160. A vertical line is drawn out from the zero point of the horizontal axis to emphasize that period. There are two lines and a shaded band in the chart. One line displays the average historical experience of equipment and software expenditures around four NBER-defined troughs: the fourth quarter of 1970, first quarter of 1975, fourth quarter of 1982, and the first quarter of 1991. The shaded band represents the range of experience across these episodes. The other line represents the behavior of equipment and software expenditures in the current episode, where the trough is assumed to be the fourth quarter of 2001 (at the time of the meeting the National Bureau of Economic Research [NBER] had not declared a trough to the 2001 recession), using the Greenbook forecast to extend it. The average history line indicates that equipment and software expenditures generally rise rapidly after a trough to an index level of about 140 (about 40 percent above the trough level) after 12 quarters. The current episode line lies below both the average history line and the shaded region--the Greenbook forecast would have the index level at about 125 after 12 quarters--indicating that if the Greenbook forecast was correct, equipment and software expenditures would be unusually sluggish. It is possible that such a forecast could be considered too pessimistic.

Bottom panel
Real M2 and Real Bank Credit

The bottom panel is a line chart where there are two lines that depict the seasonally adjusted four-quarter percent changes (i.e. growth rates) of real M2 and real bank credit (where both real values are calculated using the GDP deflator) across time. The horizontal axis ranges from 1960 to 2003 at a quarterly frequency. The vertical axis has a range of -5 to 15 percent. The chart also displays shaded regions that denote NBER-declared recessions. In general, the co-movement of the growth rate of M2 and real bank credit is visible. Of particular note is that both series generally were well above zero during NBER-defined economic expansions, but were close to or below zero around recessions. Both series were above 5 percent in the latest period, indicating robust growth for both that was in the range typically associated with economic growth.

Exhibit 5
The Assessment of Risks

Top panel
On May 6th, the Committee

- Separated the risk assessment,
  -- Risks regarding its objective of sustainable economic growth
  -- Risks regarding its objective of price stability

-- Balance of those two risks
- Voted only on the policy rate

Middle panel
A Proposal

- Return to the practice of voting on the assessment of risks
- Choose among generic formulations of the three sentences
- Allow discretion to the drafters

Bottom-left panel
For Today's Choice

- At a funds rate of 3/4, 1, or even 1-1/4 percent,
  -- Growth rate risks are balanced
  -- Inflation risks are to the downside
  -- Balance to the downside
- Arguably, at a funds rate of 3/4 percent,
  -- Risks may be seen as balanced

Bottom-right panel
Money Market Services Survey Results

Fraction of Respondents

Balance of Risks	Target Rate		Total
	0.75	1.00	
Downside	0.29	0.42	0.71
Neutral	0.21	0.08	0.29
Total	0.50	0.50	1.00

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