Appendix 1: Materials used by Mr. Kos
Current Deposit Rates and Rates Implied by Traded Forward Rate Agreements
October 1, 2001 to January 28, 2002

United States and Euro-area

Japan

LIBOR Fixing 3M Forward 9M Forward

United States

Euro-area

Japan

Source: Bloomberg
Fed Funds and Treasury Coupon Yields
October 1, 2001 to January 28, 2002

Performance of U.S. Equity Indices
October 1, 2001 to January 28, 2002

Source: Bloomberg
The Euro Against the U.S. Dollar
October 1, 2001 to January 28, 2002

Japanese Yen Against Major Currencies
October 1, 2001 to January 28, 2002

10-Year Japanese Government Bond Yield
October 1, 2001 to January 28, 2002

Source: Bloomberg
Sub-Components of the EMBI+ Spread
October 1, 2001 to January 28, 2002

Brazilian Real and Mexican Peso Against the Dollar
October 1, 2001 to January 28, 2002

30-Day Local Swap Rates
October 1, 2001 to January 28, 2002
Average Daily Value of RPs Outstanding, by Collateral Tranche
billions of dollars

- Mortgage-backed eligible
- Agency eligible
- Treasury only

2000:
- Short-Term RPs: 33%
- Long-Term RPs: 44%

2001:
- Short-Term RPs: 25%
- Long-Term RPs: 49%

January 29-30, 2002

- Excludes RPs arranged from Sep. 12-19

Page 5
Page 155 of 194
Appendix 2: Materials used by Mr. Reifschneider and Mr. Williams
Material for

Board Staff Presentation on the Implications of the Zero Bound on Nominal Interest Rates

Division of Research and Statistics

January 29, 2002
Exhibit 1
An Illustration of How the Funds Rate Could Hit Zero

- If the stock market crashes, the extent of monetary stimulus that could be put in place immediately might be less than desired.
- Worse, falling inflation would cause real rates to rise while the nominal funds rate is stuck at zero, exacerbating the situation.
- In this example the economy can recover because the baseline path incorporates enough potential stimulus to offset a major shock.
- But if the baseline outlook for the funds rate had been flat at its current level, the unemployment rate would have remained high and deflation would have set in.
Exhibit 2
The Economics of the Zero Bound

• Key assumptions for our analysis:
  ▶ monetary policy affects real activity primarily through its ability to alter the real funds rate, and thereby influence asset prices through arbitrage
  ▶ “quantity” effects of monetary policy are not that important
  ▶ inflation displays inertia and depends on expectations and resource utilization

• Under such conditions, the zero bound:
  ▶ limits the magnitude of the monetary stimulus immediately available to offset shocks
  ▶ leads to an erosion in monetary stimulus as inflation falls
  ▶ destabilizes the economy if the erosion problem is severe enough – a deflationary trap

• Practical importance of the stability threat depends on several factors:
  ▶ responsiveness of output and inflation to changes in the real funds rate
  ▶ magnitude and persistence of disturbances to the economy
  ▶ responsiveness of monetary policy to changes in output and inflation
  ▶ extent of average maneuvering room – inflation target plus $R^*$
Exhibit 3

Quantitative Implications of the Zero Bound for Economic Stability

• Goal – estimate the effect on average economic performance of lowering the target rate of inflation (which makes the zero bound more of a constraint on policy)

• Approach – simulate the FRB/US model under rational expectations, subject to shocks like those experienced over the past 35 years

• Policy assumption – the Taylor rule

\[ I_t = R^*_t + \pi_t + 0.5 \text{GAP}_t + 0.5 (\pi_t - \pi^*) \]

\( I \) is the nominal funds rate, \( R^*_t \) is the equilibrium real rate, \( \text{GAP} \) is the output gap, \( \pi \) is the four-quarter rate of core inflation, and \( \pi^* \) is the inflation target.

Main Lessons from Stochastic Simulation Analysis

• At low target rates of inflation, the funds rate falls to zero frequently.

• Because policy is often constrained, economic performance deteriorates for inflation targets below 2 percent or so.

Average Macroeconomic Performance Under the Taylor Rule

<table>
<thead>
<tr>
<th>core CPI inflation target</th>
<th>0</th>
<th>2</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Percent of time funds rate bounded at zero</td>
<td>28</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>2. Standard deviation of the unemployment rate (percent)</td>
<td>1.8</td>
<td>1.5</td>
<td>1.4</td>
</tr>
<tr>
<td>3. Frequency of deep recessions (number per 100 years)</td>
<td>5.2</td>
<td>4.6</td>
<td>4.4</td>
</tr>
</tbody>
</table>

1. Deep recessions defined as downturns during which the unemployment rate peaks at or above 7-1/2 percent (2-1/4 percentage points above the long-run NAIRU in the simulations).
Exhibit 4
Policy Design in a Low Inflation Environment – More Responsive Rules

More responsive rules:
• Adjust the funds rate by more than the Taylor rule following a change in output.
• May also be more responsive to movements in inflation, if desired.

Advantages:
• Inflation tends to be closer to target when shocks hit, making deflation less likely.
• Policy moves more quickly and thereby limits the severity of recessions, making deflation less likely.

---

Economic Performance Under Rules With Alternative Degrees of Responsiveness ¹

<table>
<thead>
<tr>
<th>Core CPI inflation target</th>
<th>0</th>
<th>2</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard deviation of the unemployment rate (percent)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Taylor rule</td>
<td>1.8</td>
<td><strong>1.5</strong></td>
<td>1.4</td>
</tr>
<tr>
<td>2. More responsive rule</td>
<td>1.3</td>
<td><strong>1.1</strong></td>
<td>1.1</td>
</tr>
<tr>
<td><strong>Frequency of deep recessions (number per 100 years)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Taylor rule</td>
<td>5.2</td>
<td><strong>4.6</strong></td>
<td>4.4</td>
</tr>
<tr>
<td>4. More responsive rule</td>
<td>3.1</td>
<td><strong>2.6</strong></td>
<td>2.3</td>
</tr>
</tbody>
</table>

1. Output gap coefficient equals 1.0 in the more responsive rule, 0.5 in the Taylor rule.

---

Potential Drawbacks of More Responsive Rules

• Heightened funds rate variability and more frequent policy reversals
• Greater risk of policy mistakes because of data errors and supply-side mismeasurement
• Increased risk of confidence crisis if investors become unnerved by Fed “impotence”
Exhibit 5
Another Policy Option – Asymmetric Responsiveness

Asymmetric rules (illustrative example):

- Under most conditions respond according to the Taylor rule.
- But if the Taylor rule wants a funds rate below 1 percent, drop immediately to zero.

Advantages:

- Reduces the stabilization costs associated with the zero bound.
- Minimizes funds rate variability and the frequency of policy reversals.

---

Economic Performance Under the Taylor and Asymmetric Funds Rate Rules

<table>
<thead>
<tr>
<th>Core CPI inflation target</th>
<th>0</th>
<th>2</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard deviation of the unemployment rate (percent)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Taylor rule</td>
<td>1.8</td>
<td><strong>1.5</strong></td>
<td>1.4</td>
</tr>
<tr>
<td>2. Asymmetric rule</td>
<td>1.5</td>
<td><strong>1.4</strong></td>
<td>1.4</td>
</tr>
</tbody>
</table>

**Frequency of deep recessions (number per 100 years)**

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>2</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Taylor rule</td>
<td>5.2</td>
<td><strong>4.6</strong></td>
<td>4.4</td>
</tr>
<tr>
<td>4. Asymmetric rule</td>
<td><strong>4.8</strong></td>
<td><strong>4.5</strong></td>
<td>4.4</td>
</tr>
</tbody>
</table>

1. Asymmetric rule is the same as the Taylor rule, except that when the Taylor rule prescribes a nominal funds rate below 1 percent, the asymmetric rule reduces the funds rate immediately to zero.

---

Potential Drawbacks of Asymmetric Rules

- To be effective, investor expectations must correctly incorporate the implications of asymmetric behavior.
- But asymmetric rules may be difficult to understand in practice.
Exhibit 6
Price-Level Targeting and Other Policies that Promise Above-Average Inflation in the Future

Price-level targeting and similar strategies:

• Pledge to keep the funds rate unusually low following a zero bound episode in order to keep inflation above average for a time.

• Automatic under price-level targeting, because bygones are not bygones – any fall in the price level below target must be made up later.

Advantages:

• By creating the expectation that the future stance of policy will be “easy” for a time, real bond rates today are reduced during zero bound episodes.

• As a result, the severity of recessions and the risk of deflation decreases.

• Research indicates potential effectiveness.

Disadvantages:

• Such strategies imply periodically taking “unusual” actions, such as allowing inflation to drift well above its long-run target.

• For this reason, the public may doubt the likelihood that the central bank will actually deliver on its promises, rendering the strategy ineffective.
Exhibit 7

Main Lessons

- In low inflation environments, the nominal funds rate falls to zero frequently.
- Usually this only delays economic recovery because most disturbances are sufficiently transitory and moderate in magnitude.
- But the economy can become severely destabilized if significant deflation sets in.
- Monetary policy can mitigate the effects of the zero bound in several ways:
  - Aim for a long-run average rate of CPI inflation that is not too low.
  - Respond relatively aggressively to movements in output and inflation.
  - Pursue policies that promise higher inflation following zero bound episodes.
- FRB/US analysis suggests no advantage in “keeping your powder dry.”
Appendix 3: Materials used by Mr. Goodfriend
Monetary Policy at the Zero Bound on Nominal Interest Rates

Marvin Goodfriend
Federal Reserve Bank of Richmond
January 29, 2002

Quantitative Monetary Policy at the Zero Bound

• Usually, open market operations constrained to accommodate demand for monetary base at opportunity cost spread between intended funds rate and zero bound
• Monetary base free to expand further at the zero bound
• Central bank can pursue quantitative monetary policy at the zero bound
Narrow and Broad Liquidity

• To appreciate power of quantitative policy at the zero bound--distinguish between narrow and broad liquidity services
• Narrow liquidity services provided by the medium of exchange allow banks and the public to economize on transactions costs
• At zero interest, narrow liquidity is no longer scarce and that channel of monetary transmission is exhausted

Broad Liquidity Services

• Broad liquidity services are not exhausted, and provide the leverage for quantitative monetary policy
• Broad liquidity is a service yield provided by assets according to how easily they can be turned into cash either by sale or by serving as collateral for external finance
Broad Liquidity Services (2)

- Broad liquidity services are valued because they minimize the exposure of households and firms to the external finance premium.
- The existence of an external finance premium gives rise to a demand for broadly liquid assets variously referred to as—precautionary savings, a liquid buffer stock, or self-insurance.

Expanding Broad Liquidity

- Quantitative policy must expand broad liquidity to be stimulative at the zero bound.
- Open market purchases of short-term bonds would not expand broad liquidity much.
- Open market purchases of long-term bonds, other assets could increase broad liquidity.
- Broad liquidity could be created by monetizing a government budget deficit.
The Transmission Mechanism

- The portfolio rebalancing channel--
- Increase in broad liquidity reduces the marginal implicit broad liquidity services yield on monetary assets
- Portfolio balance requires a similar fall in the explicit yield on non-monetary assets
- Prices of non-monetary assets bid up to restore the required return differential.

The Transmission Mechanism (2)

- Higher asset prices raise desired consumption out of current income
- Higher asset prices relative to their cost of production revive investment
- Reduced saving rate and increased investment demand raise employment
- Higher utilization rates and profits raise asset prices further
The Transmission Mechanism (3)

- The credit channel--
- Higher asset prices raise collateral values, increase net worth, and raise bank capital
- The external finance premium comes down
- Credit spreads narrow, bank lending revives, spending rises as cost of borrowing against future income prospects falls

Implementation Problems

- Injection of monetary base can provide impulse to get recovery going
- Self-sustaining recovery requires confidence that base money will be expanded as much and for as long as needed
- To acquire such credibility, must overcome perception of central bank concern with inflationary risk of high money growth
Implementation Problems (2)

- Relatively small changes in bank reserves suffice to support interest rate policy
- At the zero bound, policy must exert its effect through broad liquidity
- This will require large-scale injections of base money, substantially increasing the size of the central bank balance sheet

Fiscal Support for Quantitative Policy

- Full credibility for quantitative policy at the zero bound requires more support from the fiscal authorities than usual
- There might not be enough long bonds to buy in order to expand the monetary base; central bank could buy other assets, but...
- Either way, capital losses might leave central bank with insufficient assets to reverse excess base money
Fiscal Support for Quantitative Policy (2)

- Fiscal authorities could provide the central bank with additional government debt to sell to drain excess base money
- Alternatively, fiscal authorities could agree to run a budget deficit at the central bank’s request as means of injecting broad liquidity

Fiscal Support for Quantitative Policy (3)

- Central bank could monetize short-term debt issued to finance the deficit, and withdraw excess base money later by selling that debt to the public
- In any case, the government must accept that quantitative policy actions at the zero bound could significantly increase government debt in the hands of the public
Fiscal Support for Quantitative Policy (4)

• An inadequate commitment by the fiscal authorities to support the central bank could block the use of quantitative policy at the zero bound
• A prearranged agreement could enable quantitative policy to act credibly, flexibly, and effectively at the zero bound

Other Policy Options

• Do nothing unusual
• Commit to holding the funds rate at zero
• Buy foreign exchange/depreciate the exchange rate
• Expand credit policy
• Pursue deliberately inflationary policy
Do Nothing Unusual

• Keep funds rate at zero without increasing the monetary base more than necessary
• Contraction likely deeper than usual
• Two risks of more protracted downturn--
  • Distressed banking system, less elastic inside supply of broad liquidity than usual
  • Policy vacuum encourages ill-advised fiscal actions

Commit to Holding the Funds Rate at Zero

• Central bank would write options on future short rates to give itself an incentive to keep rates down
• Advantage, acts directly on long rates
• Disadvantage, at best small effect
• Credibility doubtful given overwhelming pressure to take interest rate policy actions deemed correct at a point in time
Buy Foreign Assets/Depreciate the Exchange Rate

- Different, but both make use of openness
- Could buy foreign government securities to help increase broad liquidity--
- Authorized to do so, but exchange rate risk
- Depreciate exchange rate--
- Conventional policy instrument, but US large, not that open, might export deflation and recession without helping itself much

Expand Credit Policy

- Expand DW lending or buy private debt
- Reduce private credit spreads and help finance credit-constrained firms
- Wide latitude to lend to banks on collateral, need legislation to buy private debt
- Central bank would make a poor financial intermediary--use to stabilize financial markets but not for general policy stimulus
Expand Credit Policy (2)

- Quantitative monetary policy would facilitate intermediation
- Would reduce external finance premium by raising collateral values and net worth
- Central bank could improve the flow of credit without becoming financial intermediary itself

Pursue Deliberately Inflationary Policy

- Quantitative monetary policy could stimulate economy at zero bound without creating inflation or expected inflation
- Unleashing inflation would buy little and could be counterproductive
- Temporary inflation would be desirable to reverse prior deflation that raised real value of nominal debt
Pursue Deliberately Deflationary Policy (2)

- Committing to a path for the price level could help avoid deflation, and build credibility for reflation if deflation occurs
Appendix 4: Materials used by Mr. Wilcox, Mr. Slifman, and Ms. Johnson
Major Forces Shaping the Outlook

- Monetary and fiscal stimulus will be substantial enough to offset restraint from the stock market and the dollar.
- The inventory correction should be coming to an end.
- Excess capacity is likely to weigh on the strength of the recovery in equipment spending.
- Inflationary pressures remain in check.
Chart 2
Perspectives on the Recession

Length of Postwar Recessions

Depth of Postwar Recessions

Change from own peak to own trough in:

<table>
<thead>
<tr>
<th></th>
<th>Average in previous recessions</th>
<th>This recession</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Real GDP (percent)</td>
<td>-2.2</td>
<td>-.4</td>
</tr>
<tr>
<td>2. GDP gap(^a) (percentage points)</td>
<td>-6.4</td>
<td>-4.0</td>
</tr>
<tr>
<td>3. Unemployment rate(^b) (percentage points)</td>
<td>3.1</td>
<td>2.1</td>
</tr>
<tr>
<td>4. Industrial production (percent)</td>
<td>-9.4</td>
<td>-7.1</td>
</tr>
</tbody>
</table>

a. GDP gap is defined as actual GDP less potential GDP, divided by potential GDP.
b. Change from own low point to own high point.

Three-month Diffusion Index for Payroll Employment*
Chart 3
Key Assumptions

Real Federal Funds Rate*
Quarterly

*Nominal federal funds rate less the percent change in the core PCE price index over the previous four quarters.

Cyclical Comparison:
Real Federal Funds Rate

Sources of Projected Fiscal Impetus in 2002

Percent of GDP

- Last year’s tax cuts 0.4
- Enacted spending increases 0.6
- Assumed additional spending initiatives 0.2

Fiscal Impetus
Annual
Chart 4

Key Assumptions, Continued

Broad Real Exchange Value of the Dollar Quarterly

Cyclical Comparison: Real Exchange Rate

Cyclical Comparison: S&P 500 Price Index

S&P 500 Price-Earnings Ratio* Quarterly

*Price over I/B/E/S year-ahead earnings. Quarterly observations are last month of quarter.
Chart 5
Perspectives on the Projected Recovery

Speed of Postwar Recoveries

<table>
<thead>
<tr>
<th>Change over the first four quarters after the NBER trough in:</th>
<th>Average in previous recoveries</th>
<th>Projected recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Real GDP (percent)</td>
<td>7.0</td>
<td>3.2</td>
</tr>
<tr>
<td>2. GDP gap (percentage points)</td>
<td>1.9</td>
<td>.5</td>
</tr>
<tr>
<td>3. Unemployment rate (percentage points)</td>
<td>-1.1</td>
<td>.0</td>
</tr>
<tr>
<td>4. Industrial production (percent)</td>
<td>11.7</td>
<td>3.7</td>
</tr>
</tbody>
</table>

GDP Gap at the NBER Trough

Contributions to the Initial Recovery in Real GDP

PCE Durables and Residential Investment

Business Fixed Investment

Percentage points
Chart 6
Near Term Production Indicators

Private Nonfarm Payroll Employment
Average monthly change, thousands

Initial Claims (FRB Seasonals)
Thousands

Motor Vehicle Assemblies
Millions of units, annual rate

Industrial Production
(Average monthly percent change)
Percent

Index of Weekly Physical Product Data
IP index points

ISM New Orders Index
Diffusion Index
Percent
Chart 7
The Near Term Outlook for Sales, Inventories and Output

<table>
<thead>
<tr>
<th>Final demand indicators</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MV sales (millions of units)</td>
<td>21.6</td>
<td>18.3</td>
</tr>
<tr>
<td>2. Real PCE control (percent change)</td>
<td>1.5</td>
<td>.6</td>
</tr>
<tr>
<td>3. Single family housing starts (millions of units)</td>
<td>1.23</td>
<td>1.25</td>
</tr>
<tr>
<td>4. Shipments of nondefense capital goods, ex. aircraft and IT (percent change)</td>
<td>3.0</td>
<td>-2.9</td>
</tr>
<tr>
<td>5. Orders of nondefense capital goods, ex. aircraft and IT (percent change)</td>
<td>-.3</td>
<td>3.0</td>
</tr>
</tbody>
</table>

* Estimate.

Days’ Supply*

<table>
<thead>
<tr>
<th>Tech Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days</td>
</tr>
<tr>
<td>40</td>
</tr>
</tbody>
</table>

Days’ Supply

<table>
<thead>
<tr>
<th>Other*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days</td>
</tr>
<tr>
<td>57</td>
</tr>
</tbody>
</table>

*IP system.

Output and Final Sales

- GDP ex. motor vehicles
- Final sales ex. motor vehicles

Inventory accumulation

Inventory liquidation

Projection

Billion of 1996 dollars

2000 | 2001 | 2002
Chart 8
Outlook for Business and Household Spending

Real Equipment and Software Investment
(Percent change, annual rate)

<table>
<thead>
<tr>
<th></th>
<th>2001 Q4</th>
<th>2002 H1</th>
<th>2002 H2</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equip. &amp; software</td>
<td>.1</td>
<td>-4.9</td>
<td>6.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Info. technology</td>
<td>1.4</td>
<td>4.8</td>
<td>13.4</td>
<td>23.9</td>
</tr>
<tr>
<td>Computers</td>
<td>30.2</td>
<td>20.2</td>
<td>33.2</td>
<td>49.0</td>
</tr>
<tr>
<td>Software</td>
<td>6.7</td>
<td>10.0</td>
<td>17.7</td>
<td></td>
</tr>
<tr>
<td>Comm. equip.</td>
<td>-28.9</td>
<td>-12.5</td>
<td>4.0</td>
<td>17.3</td>
</tr>
<tr>
<td>Other (ex. trans. equip)</td>
<td>-8.0</td>
<td>-4.2</td>
<td>-.6</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Percent changes are calculated from final quarter of preceding period to final quarter of period indicated.

Real Computer Shipments*
Three-month percent change

Capacity Utilization Rate

Household Net Worth and PCE

Real DPI and PCE Growth

*Includes storage devices and other peripherals. Deflated by PPI for computers.
Chart 9
Outlook for Inflation

Core PCE Price Index

Four-quarter percent change

Year
1999 2000 2001 2002 2003

Energy Input Prices*

Index, 1996=100

Year
2000 2001

GDP Gap

Billions of 1996 dollars

Year
1995 1997 1999 2001 2003

Potential GDP
Actual GDP

Unit Labor Costs

Four-quarter percent change

Year
1999 2000 2001 2002 2003

Profit Share

Nonfinancial Corporations (Economic profits)

Year

NBER peak

Percent

0 2 4 6 8 10 12 14 16

Dec.
Chart 10

Financial Developments
(Weekly data)

Nominal Exchange Rates
Foreign currency/U.S. dollar  Index, Jan. 3, 2000 = 100

Three-Month Eurocurrency Futures Rates
As of January 28, 2002

Three-Month Interest Rates

Ten-Year Interest Rates

Broad Stock Price Indexes
Index, Jan. 3, 2000 = 100

Expected 2002 Earnings*
Index, July 2001 = 100

*Trade-weighted average against major currencies.

*Average of equity analysts' earnings forecasts for 2002 company fiscal years from I/B/E/S mid-month surveys.
**U.S. Trade**

**Exports by Region**
- Chart showing exports by region for the years 1999 to 2001, with regions including Canada, Europe, Latin America, Developing Asia, Japan, and a note indicating that *Includes Korea, Hong Kong, Singapore, Taiwan, and China.*

**Imports by Region**
- Chart showing imports by region for the years 1999 to 2001, with regions including Canada, Europe, Latin America, Developing Asia, Japan, and a note indicating that *Includes Korea, Hong Kong, Singapore, Taiwan, and China.*

**WTI Spot Price**
- Chart showing the WTI spot price from 1999 to 2003, with different curves indicating current and June Greenbook prices, and a dashed line indicating the current price.

**Import Prices**
- Chart showing import prices percent change from 1999 to 2003, with a note indicating that *Excludes computers, semiconductors, and oil.*

**Determinants of Core Exports**
- Chart showing percent change in determinants of core exports from Q4/Q4, with categories including core export growth, contr. of for. GDP growth, Ind. output gap growth, and contr. of rel. prices.

**Determinants of Core Imports**
- Chart showing percent change in determinants of core imports from Q4/Q4, with categories including core import growth, contr. of GDP growth, and contr. of rel. prices.

**Contribution to U.S. GDP Growth**
- Chart showing the contribution of exports and imports to U.S. GDP growth, with percentage points for each year from 2001 to 2003, and a note indicating that *Excludes computers, semiconductors, and oil.*
Chart 12

**Foreign Outlook**

### Real GDP

- **U.S.**
- **Total foreign**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
</tr>
<tr>
<td>H2</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

*Years are Q4/Q4; half years are Q2/Q4 or Q4/Q2.
**U.S. total export weights.

### Foreign Real GDP

- **Industrial countries**
- **Asia**
- **Latin America**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
</tr>
<tr>
<td>H2</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

*U.S. total export weights.

### Industrial Production

- **Index, Jan. 1999 = 100, SA**

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>90</td>
<td>110</td>
<td>115</td>
</tr>
<tr>
<td>Germany</td>
<td>100</td>
<td>105</td>
<td>100</td>
</tr>
<tr>
<td>Japan</td>
<td>95</td>
<td>90</td>
<td>85</td>
</tr>
</tbody>
</table>

*Three-month moving average.

### Exports

- **Index, Jan. 1999 = 100, SA**

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>160</td>
<td>170</td>
<td>165</td>
</tr>
<tr>
<td>Korea</td>
<td>150</td>
<td>130</td>
<td>120</td>
</tr>
<tr>
<td>Singapore</td>
<td>-5</td>
<td>3.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>5</td>
<td>3.5</td>
<td>4.5</td>
</tr>
</tbody>
</table>

*Three-month moving average.

### Real GDP

- **Index, Jan. 1999 = 100, SA**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>-0.2</td>
<td>0.9</td>
<td>2.5</td>
</tr>
<tr>
<td>H2</td>
<td>-0.5</td>
<td>1.4</td>
<td>3.1</td>
</tr>
</tbody>
</table>

*Years are Q4/Q4; half years are Q2/Q4 or Q4/Q2.
**U.S. total export weights.
Chart 13

Japan

Real GDP

GDP
DD contribution
Net Export contribution

Percent change, SAAR*

Years are Q4/Q4; half years are Q2/Q4 or Q4/Q2.

Consumer Prices

12-month percent change

*Change in the structural deficit. Positive entries indicate fiscal expansion; negative entries indicate contraction.

Deposits at Bank of Japan*

Trillions of Yen

*Current account balances at the Bank of Japan.

Fiscal Impulse*

Percent of GDP

Average Bank Financial Strength*

*Source: Moody’s. Average financial strength rating of big four Japanese banks.
### Nominal Exchange Rates

Foreign currency/U.S. dollar Index, Jan. 3, 2000 = 100

- **Argentina**
- **Brazil**
- **Mexico**

*Weekly

*Floating rate.

*Breaks in series reflect reweightings of index on December 4 and December 31, 2001.

### EMBI+ Yield Spreads over U.S. Treasuries

Percentage points

- **Argentina**
- **Brazil**
- **Mexico**

### Real GDP

Percent change, SAAR*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Latin America**</td>
<td>2.7</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Argentina</td>
<td>-15.0</td>
<td>-8.5</td>
<td>-4.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.2</td>
<td>1.5</td>
<td>2.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Mexico</td>
<td>-0.9</td>
<td>1.1</td>
<td>3.1</td>
<td>3.7</td>
</tr>
</tbody>
</table>

*Years are Q4/Q4; half years are Q2/Q4 or Q4/Q2.

**U.S. total export weights.

### Policy Issues

- **Fiscal elements**
  - Tax system
  - Federal / provincial
  - Public employment
- **Banking system**
- **Exchange rate regime and monetary policy**

### Simulation

### Inflation

*Years are Q4/Q4; half years are Q2/Q4 or Q4/Q2.

**U.S. total export weights.
## ECONOMIC PROJECTIONS FOR 2002

<table>
<thead>
<tr>
<th>FOMC</th>
<th>Range</th>
<th>Central Tendency</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentage change, Q4 to Q4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal GDP</td>
<td>3¼ to 5½</td>
<td>4 to 4½</td>
<td>4.3</td>
</tr>
<tr>
<td>(July 2001)</td>
<td>(4¼ to 6)</td>
<td>(5 to 5½)</td>
<td>(5.3)</td>
</tr>
<tr>
<td>Real GDP</td>
<td>2 to 3½</td>
<td>2½ to 3</td>
<td>2.7</td>
</tr>
<tr>
<td>(July 2001)</td>
<td>(3 to 3½)</td>
<td>(3 to 3¼)</td>
<td>(3.5)</td>
</tr>
<tr>
<td>PCE Prices</td>
<td>1 to 2</td>
<td>about 1½</td>
<td>1.3</td>
</tr>
<tr>
<td>(July 2001)</td>
<td>(1½ to 3)</td>
<td>(1¾ to 2½)</td>
<td>(1.7)</td>
</tr>
<tr>
<td></td>
<td>Average level, Q4, percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>5¾ to 6½</td>
<td>6 to 6¼</td>
<td>6</td>
</tr>
<tr>
<td>(July 2001)</td>
<td>(4¾ to 5½)</td>
<td>(4¾ to 5¼)</td>
<td>(5.6)</td>
</tr>
</tbody>
</table>

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