



## Higher Risk Does Bring Higher Returns in Stock Markets Worldwide

Financial market participants routinely use stock market volatility—that is, the size of fluctuations in stock returns—to gauge stock market risk. When risk-averse investors expect more stock market volatility, they reduce their stock holdings by selling stocks and buying safer assets, such as Treasury bills. This increase in demand for Treasury bills (relative to stocks) tends to raise current Treasury prices and reduce stock prices. Ultimately, a rise in expected stock volatility should raise the expected equity premium, which is the difference between the return on the stock market index and a risk-free rate.

The positive relation between expected stock market volatility and returns is a crucial building block of modern asset pricing theories: For a given level of stock market volatility, the more risk-averse investors are, the higher the expected equity premium must be for them to hold stocks in their portfolios.

Although researchers have intensively investigated this relation between expected stock market volatility and returns using both U.S. and international data, they have not firmly established evidence of a positive risk-return trade-off. That is, they have found no proof that higher risk results in higher returns; in fact, researchers usually estimate the risk-return trade-off to be economically very small or even negative.

A failure to control for other risk factors might explain the elusiveness of such evidence. One of these risk factors is the book-to-equity ratio, the ratio of the value of a firm's tangible assets (e.g., machinery, land) to that firm's market value. Stocks with high book-to-equity ratios (i.e., relatively low market values) tend to be risky investments, and investors require high expected returns for holding these stocks. This extra return is called the "value premium." Fama and French (1998) have shown that book-to-

equity ratios are important determinants of stock returns both at home and abroad.<sup>1</sup>

In a recent study, Guo et al. (2007) investigate the risk-return relation using both (i) the sum of squared daily stock market returns in a given period and (ii) conditional volatility estimated from an econometric model.<sup>2</sup> After controlling for the influence of the value premium on stock prices, the equity premium tends to be higher during periods of higher volatility in stock returns.

The table reproduces their estimates of the risk-return trade-off—the increase in the expected equity premium due to a one-unit increase in the expected stock market volatility—for major international stock markets. For example, the coefficient for the U.S. market shows that, holding other things constant, investors require a 4.74-percentage-point increase in the expected equity premium to compensate them for a 1-percentage-point increase in expected stock market volatility. In contrast with previous studies, these results show that the risk-return trade-off is positive and economically important in U.S. data, as well as the world stock market index and stock returns for all other G7 countries.

Controlling for the value premium reveals that there is a positive risk-return trade-off in stock markets worldwide.

—Hui Guo

<sup>1</sup> Fama, E.F. and French, K.R. "Value versus Growth: The International Evidence." *Journal of Finance*, 1998, 53, pp. 1975-99.

<sup>2</sup> Guo, H.; Savickas, R.; Wang, Z. and Yang, J. "Is the Value Premium a Proxy for Time-Varying Investment Opportunities: Some Time Series Evidence." Forthcoming in *Journal of Financial and Quantitative Analysis*, 2007.

### Risk-Return Trade-off Estimated by Guo et al. (2007)

U.S.	Canada	France	Germany	Italy	Japan	U.K.	World
4.74**	1.51	1.84*	1.88**	0.65	1.90*	2.45**	3.16**

NOTE: \*/\*\* indicate significance at the 10/5 percent levels, which means that there is a 90/95 percent likelihood these results did *not* occur by chance.

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## Conventions used in this publication:

1. Charts and tables contain data that were current through July 2007. Unless otherwise indicated, data are quarterly.
2. The *percent change* refers to the percent change from the same period in the previous year. For example, the percent change in  $x$  between quarter  $t-4$  and the current quarter  $t$  is:  $[(x_t/x_{t-4})-1] \times 100$ .
3. All data with significant seasonal patterns are adjusted accordingly.

We welcome your comments addressed to:

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Slovenia joined the euro area effective January 1, 2007.  
The Notes section details the data series that now  
incorporate Slovenia.

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**Real Gross Domestic Product**

Percent change from year ago

	04.2	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1
Canada	3.12	3.87	3.52	3.26	2.91	2.89	3.20	3.63	3.12	2.40	1.91	1.96
Euro Area	2.10	1.86	1.62	1.32	1.44	1.79	1.91	2.42	2.88	2.81	3.35	3.13
France	2.57	1.81	2.06	2.03	1.52	2.01	1.76	1.96	2.70	2.07	2.09	1.90
Germany	1.23	0.71	0.15	0.42	0.80	1.45	1.71	1.91	2.89	3.21	3.93	3.60
Italy	1.32	1.31	0.66	-0.33	0.00	0.00	0.65	1.96	1.62	1.62	2.91	2.24
Japan	3.03	2.83	1.08	0.63	1.79	2.25	2.81	2.66	2.15	1.47	2.42	2.68
United Kingdom	3.84	3.10	2.60	2.10	1.64	1.78	1.84	2.44	2.81	2.98	3.14	3.02
United States	4.49	3.41	3.40	3.29	3.10	3.36	3.15	3.69	3.51	2.95	3.13	1.91

**Nominal Gross Domestic Product**

Percent change from year ago

	04.2	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1
Canada	7.40	7.20	7.31	6.49	5.47	6.60	7.52	7.26	6.33	4.43	2.86	4.44
Euro Area	4.27	3.51	3.42	3.29	3.10	3.65	4.01	4.13	4.80	4.80	5.05	5.64
France	4.45	3.79	3.93	3.90	3.12	3.58	3.35	4.11	5.02	4.48	4.53	4.08
Germany	2.27	1.36	0.90	1.28	1.24	2.02	2.38	2.07	3.14	3.58	4.19	5.94
Italy	5.14	2.96	2.95	1.74	2.01	2.59	3.44	3.43	3.66	3.64	4.16	5.25
Japan	1.54	1.51	0.74	-0.19	0.69	0.84	1.05	1.38	1.02	0.73	1.86	2.09
United Kingdom	6.48	5.65	5.66	5.22	4.15	3.55	3.90	4.21	4.60	6.44	5.99	6.27
United States	7.55	6.43	6.69	6.49	5.98	6.56	6.35	6.86	6.89	5.96	5.72	4.70

**Consumer Price Index**

Percent change from year ago

	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1	07.2
Canada	2.02	2.29	2.12	1.91	2.62	2.20	2.36	2.57	1.74	1.36	1.81	.
Euro Area	2.28	2.31	2.09	2.02	2.31	2.32	2.38	2.47	2.14	1.76	1.89	1.88
France	2.42	2.29	1.91	1.81	2.04	1.83	2.03	2.19	1.93	1.51	1.29	1.26
Germany	2.02	2.14	1.77	1.63	2.09	2.20	2.11	2.13	1.62	1.31	1.90	1.96
Italy	2.29	2.16	2.08	2.19	2.16	2.40	2.26	2.32	2.32	1.98	2.02	1.85
Japan	-0.11	0.50	0.01	-0.07	-0.31	-0.73	-0.14	0.18	0.60	0.33	-0.10	.
United Kingdom	1.26	1.44	1.74	1.95	2.37	2.13	1.95	2.24	2.42	2.72	2.84	.
United States	2.73	3.35	3.00	2.92	3.78	3.75	3.70	3.99	3.36	1.95	2.43	2.66

**Employment**

Percent change from year ago

	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1	07.2
Canada	1.97	1.55	1.38	1.12	1.39	1.62	1.84	2.22	1.86	1.88	2.42	2.02
Euro Area	0.94	0.98	1.03	0.85	0.67	0.65	1.07	1.49	1.55	1.52	1.39	.
France	0.19	0.20	0.45	0.35	0.51	0.57	0.52	0.94	1.05	1.00	1.53	.
Germany	0.51	0.58	0.05	-0.32	-0.23	-0.04	0.10	0.72	0.96	1.00	1.50	.
Italy	0.38	0.03	0.46	0.10	-0.74	-0.54	1.10	2.04	1.88	1.50	0.20	.
Japan	0.23	0.12	0.19	0.44	0.59	0.50	0.55	0.24	0.13	0.71	0.42	.
United Kingdom	0.96	1.21	1.56	1.48	1.58	1.23	0.77	1.08	0.91	0.95	0.71	.
United States	1.46	1.28	1.38	1.88	1.99	1.85	2.12	1.81	1.62	2.08	1.87	1.31

**Unemployment Rate**

Percent

	04.2	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1
Canada	7.25	7.04	7.12	6.96	6.86	6.72	6.49	6.41	6.20	6.43	6.15	6.12
Euro Area	8.87	8.80	8.73	8.77	8.67	8.43	8.40	8.23	7.93	7.77	7.60	7.23
France	9.60	9.60	9.60	9.60	9.67	9.70	9.70	9.70	9.57	9.37	9.20	8.90
Germany	9.57	9.60	9.60	9.70	9.77	9.10	9.20	8.80	8.33	8.40	7.90	7.23
Italy	8.20	7.90	7.90	7.90	7.70	7.70	7.50	7.30	6.80	6.60	6.50	6.20
Japan	4.65	4.78	4.54	4.56	4.35	4.33	4.48	4.25	4.09	4.14	4.07	4.01
United Kingdom	4.70	4.60	4.67	4.63	4.67	4.70	5.03	5.13	5.37	5.43	5.37	5.47
United States	5.57	5.44	5.40	5.26	5.10	4.99	4.96	4.70	4.65	4.67	4.46	4.49

**Reserve Money**

Percent change from year ago

	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1	07.2
Canada	3.24	5.20	5.45	2.56	4.07	3.29	3.88	4.20	5.87	5.95	5.58	.
Japan	4.48	4.49	2.09	1.78	1.64	1.16	-1.05	-16.25	-21.21	-19.91	-19.18	-4.19
United Kingdom	5.66	5.63	5.58	4.28	4.43	3.48	4.57	5.50	5.14	5.24	4.16	4.37
United States	5.19	4.96	4.85	4.06	3.32	3.18	4.03	4.21	3.15	2.71	1.90	1.62

**Narrow Money**

Percent change from year ago

	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1	07.2
Canada	8.09	8.27	7.95	6.97	6.33	7.70	7.21	7.73	9.78	10.53	10.05	.
Euro Area	9.34	8.69	8.93	16.48	16.76	17.72	16.14	9.33	7.35	7.37	7.05	.
Japan	3.84	3.88	4.73	4.94	4.78	5.47	4.79	4.01	1.49	-0.73	-0.22	.
United Kingdom	9.98	9.15	9.22	9.19	9.29	9.12	9.45	9.04	8.00	7.96	7.54	.
United States	2.88	4.02	3.47	1.30	1.80	2.41	3.48	4.02	4.00	4.82	5.88	8.06

**Broad Money**

Percent change from year ago

	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1	07.2
Canada	6.00	5.89	5.86	5.51	4.93	5.57	5.46	6.10	7.90	8.73	8.35	.
Euro Area	5.96	6.39	6.44	7.75	8.51	8.19	8.79	8.36	8.67	9.20	10.65	.
Japan	1.87	2.01	2.04	1.61	1.93	1.92	1.48	1.21	0.59	0.69	1.06	.
United Kingdom	9.27	8.77	10.30	10.29	10.98	12.69	12.18	13.32	14.30	12.74	12.83	.
United States	3.78	5.31	5.33	3.85	4.14	4.09	4.71	4.79	4.55	4.93	5.35	6.20

**Short-Term Interest Rates**

Percent

	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1	07.2
Canada	2.40	2.58	2.64	2.58	2.90	3.48	3.93	4.43	4.32	4.32	4.35	4.52
Euro Area	2.12	2.16	2.14	2.13	2.13	2.34	2.61	2.89	3.22	3.59	3.82	4.07
Japan	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.13	0.38	0.42	0.54	.
United Kingdom	4.85	4.82	4.85	4.83	4.55	4.56	4.53	4.64	4.85	5.17	5.49	5.72
United States	1.70	2.25	2.78	3.23	3.74	4.30	4.72	5.18	5.39	5.32	5.31	5.32

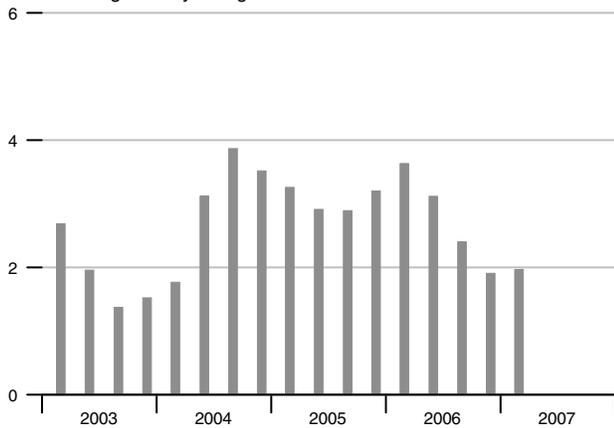
**Long-Term Interest Rates**

Percent

	04.3	04.4	05.1	05.2	05.3	05.4	06.1	06.2	06.3	06.4	07.1	07.2
Canada	4.68	4.46	4.28	4.03	3.90	4.06	4.13	4.43	4.27	4.02	4.08	4.36
Euro Area	4.19	3.83	3.65	3.38	3.24	3.40	3.55	4.03	3.96	3.84	4.08	.
France	4.16	3.83	3.64	3.37	3.23	3.39	3.51	3.99	3.90	3.79	4.06	.
Germany	4.11	3.75	3.60	3.30	3.17	3.34	3.48	3.94	3.88	3.76	4.00	4.33
Italy	4.32	3.97	3.74	3.54	3.39	3.55	3.72	4.26	4.17	4.03	4.24	.
Japan	1.64	1.45	1.40	1.28	1.36	1.53	1.58	1.90	1.80	1.71	1.68	1.75
United Kingdom	4.99	4.65	4.63	4.44	4.28	4.30	4.09	4.55	4.59	4.57	4.85	.
United States	4.91	4.72	4.65	4.46	4.45	4.73	4.74	5.26	5.06	4.80	4.86	5.03

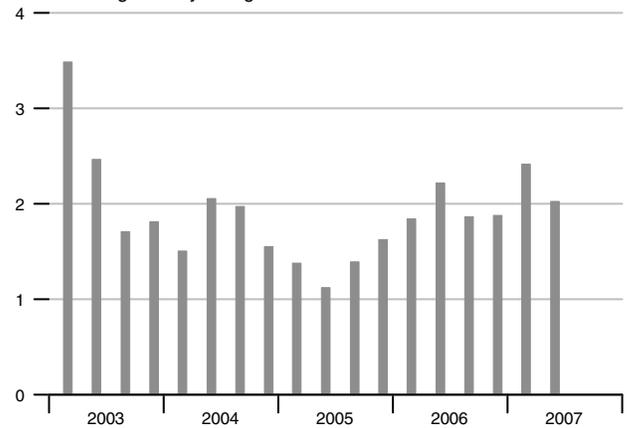
**Real GDP**

Percent change from year ago



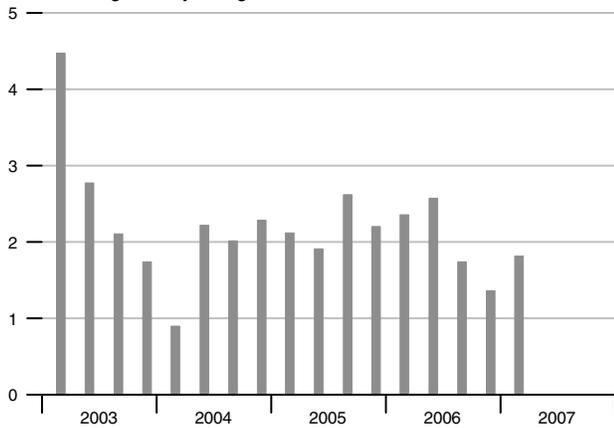
**Employment**

Percent change from year ago



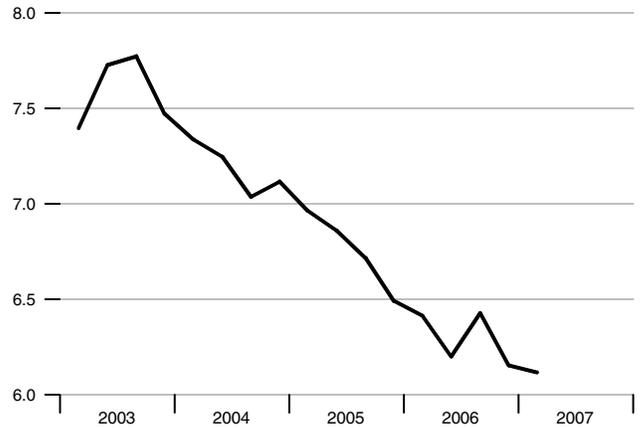
**Consumer Price Index**

Percent change from year ago



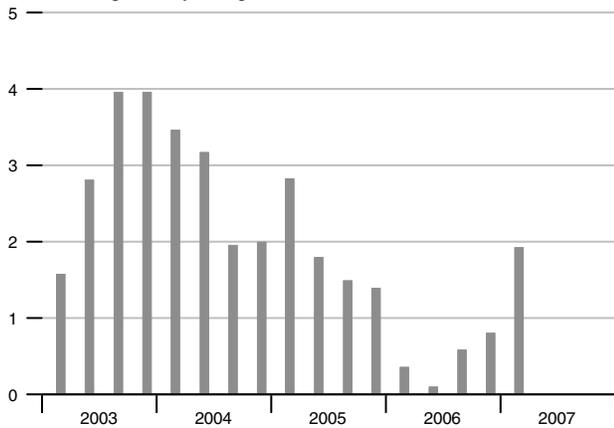
**Unemployment Rate**

Percent



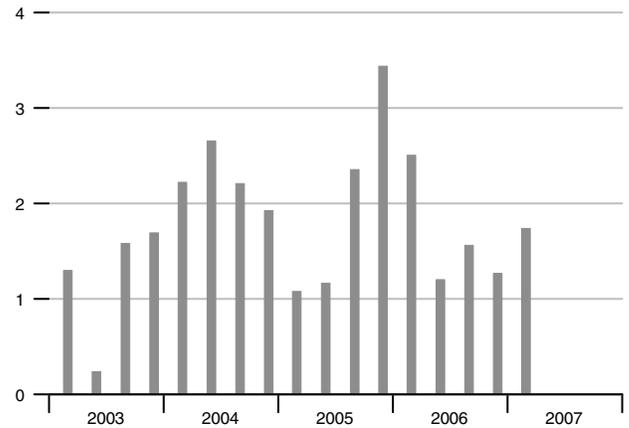
**Real Hourly Earnings**

Percent change from year ago



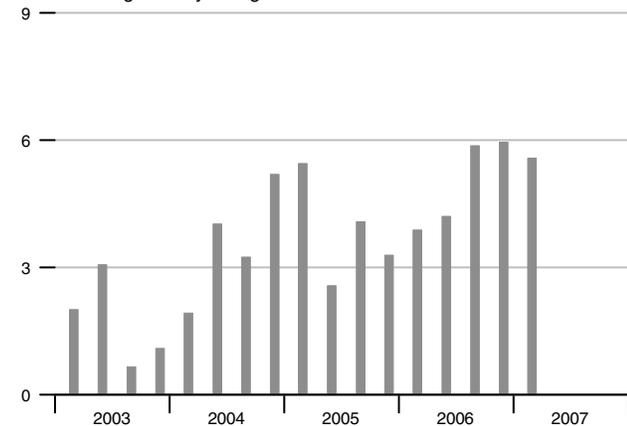
**Current Account Balance**

Percent of GDP



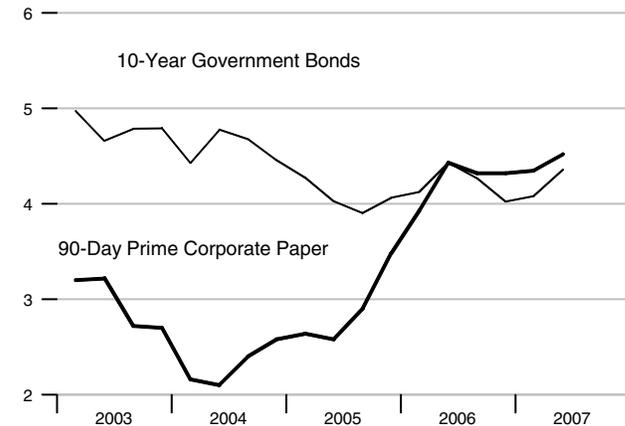
### Reserve Money

Percent change from year ago



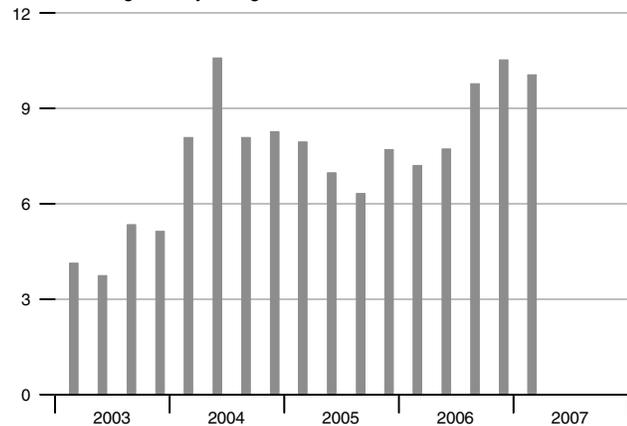
### Interest Rates

Percent



### M1B

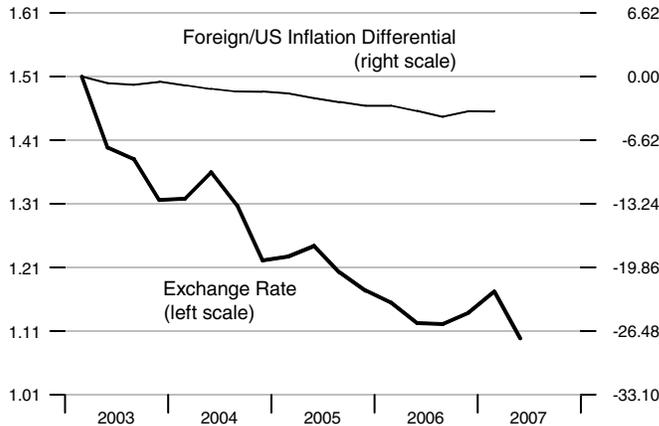
Percent change from year ago



### Exchange Rate and Inflation Differential

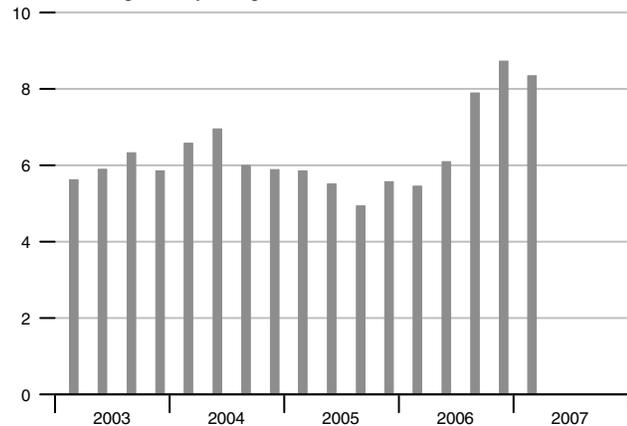
C\$/US\$

Percent



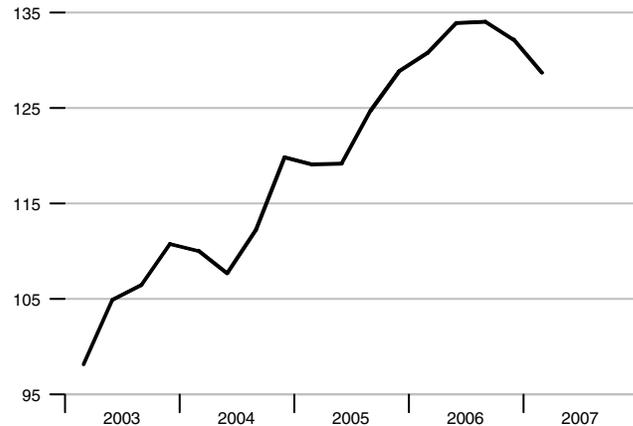
### M2

Percent change from year ago



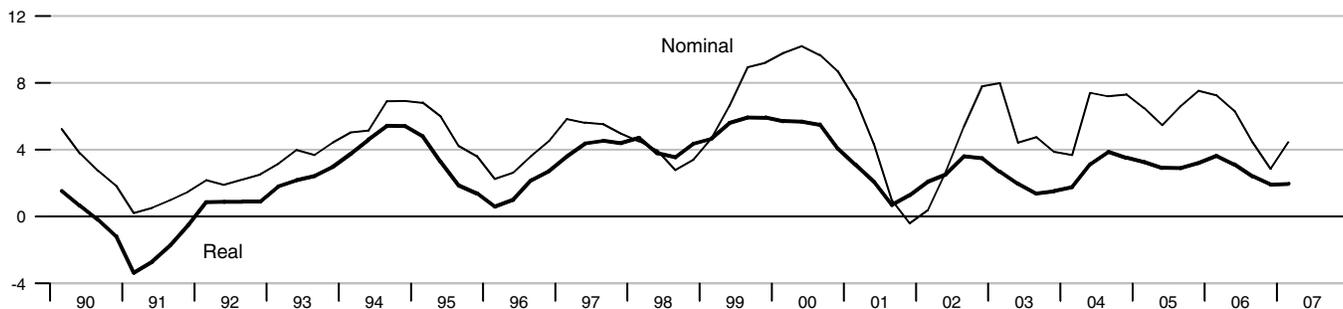
### Real Effective Exchange Rate

Index 2000 = 100



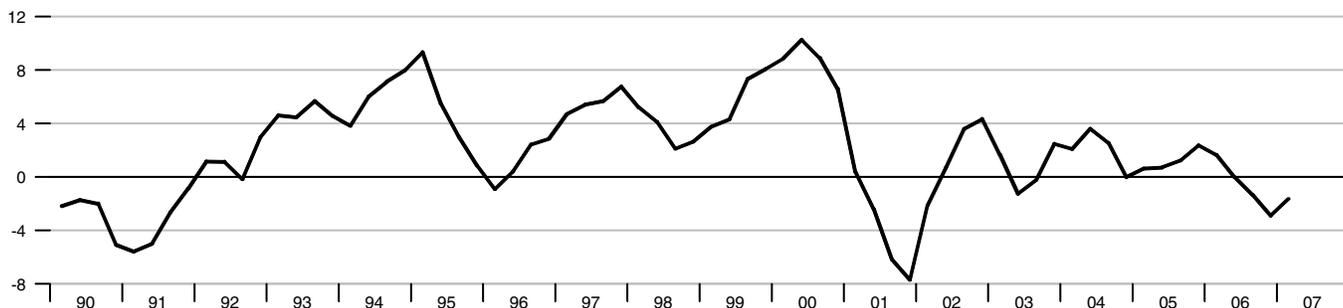
**GDP**

Percent change from year ago



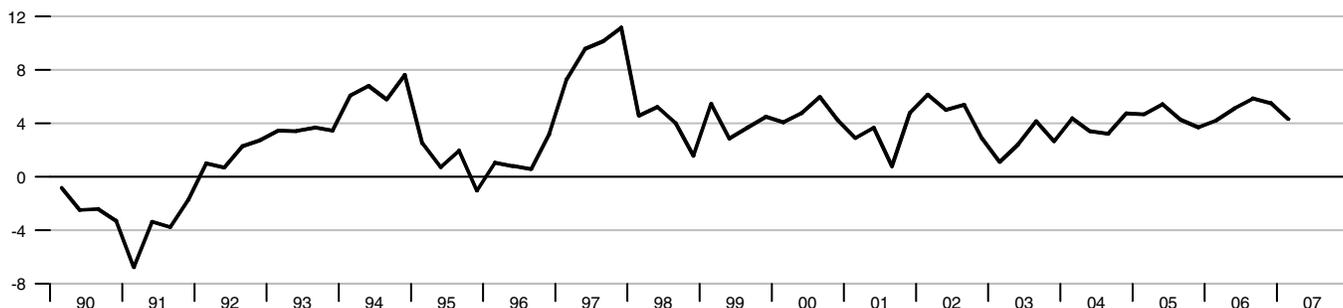
**Industrial Production**

Percent change from year ago



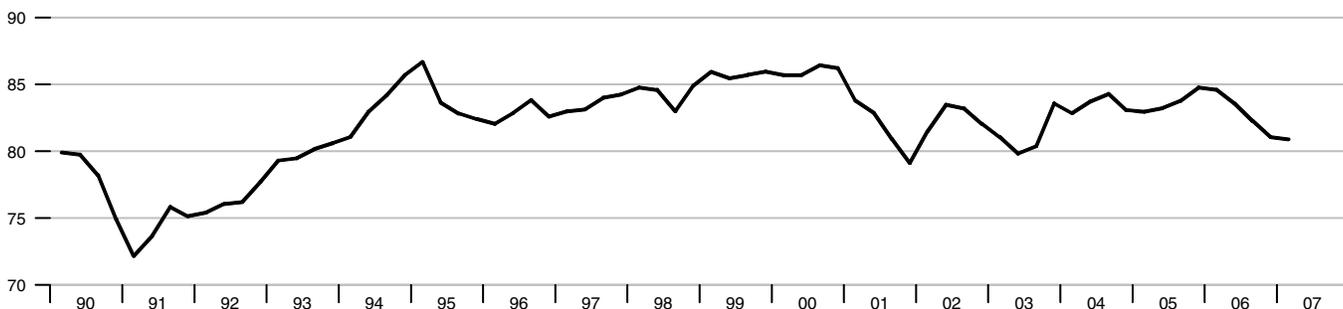
**Retail Sales**

Percent change from year ago

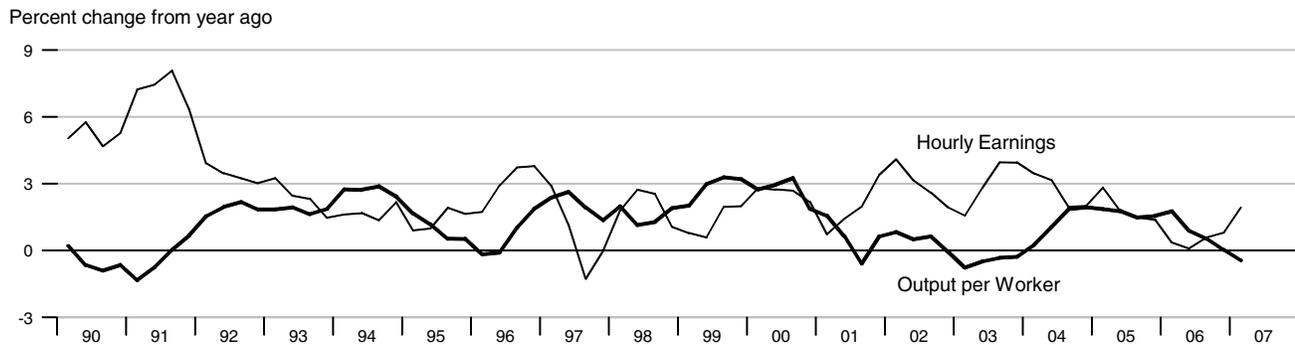


**Capacity Utilization**

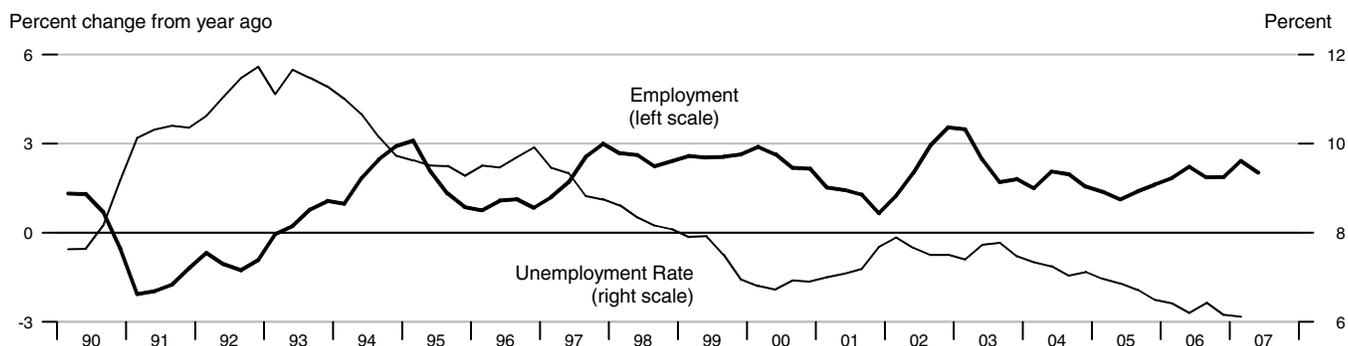
Percent



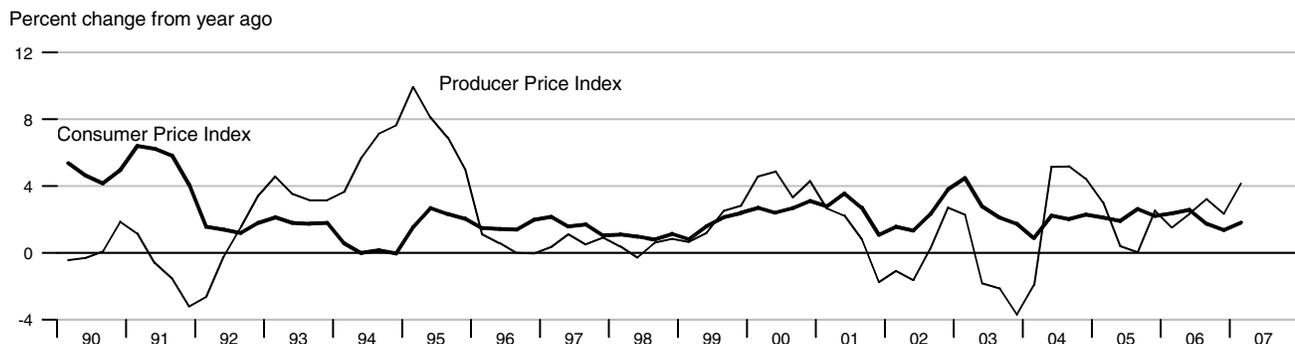
### Real Hourly Earnings and Output per Worker



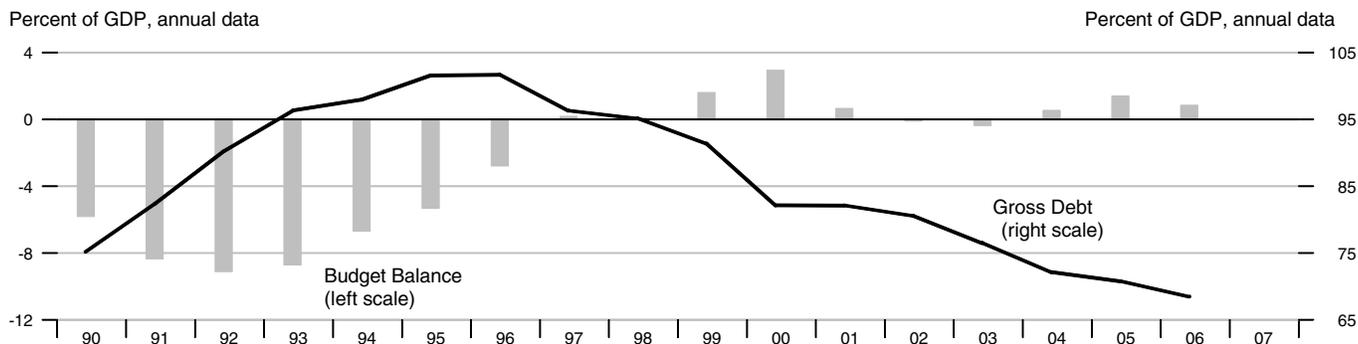
### Labor Force Indicators



### Inflation

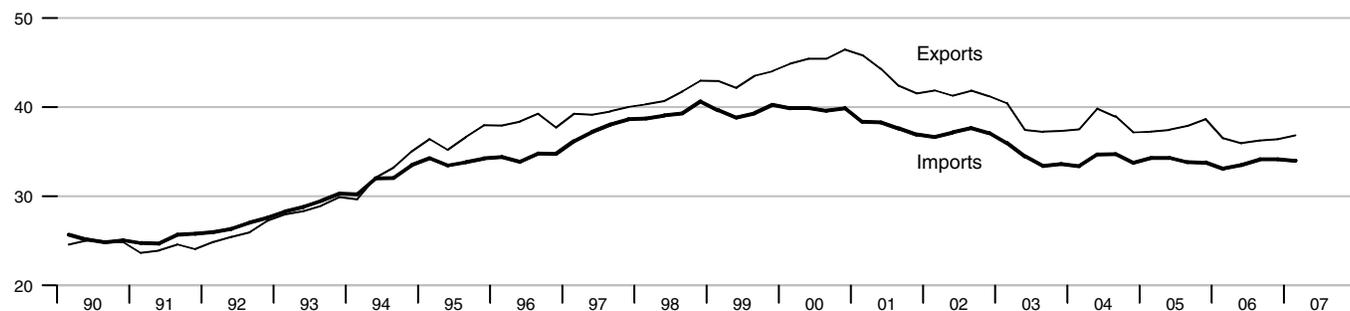


### Gross Government Debt and Budget Balance



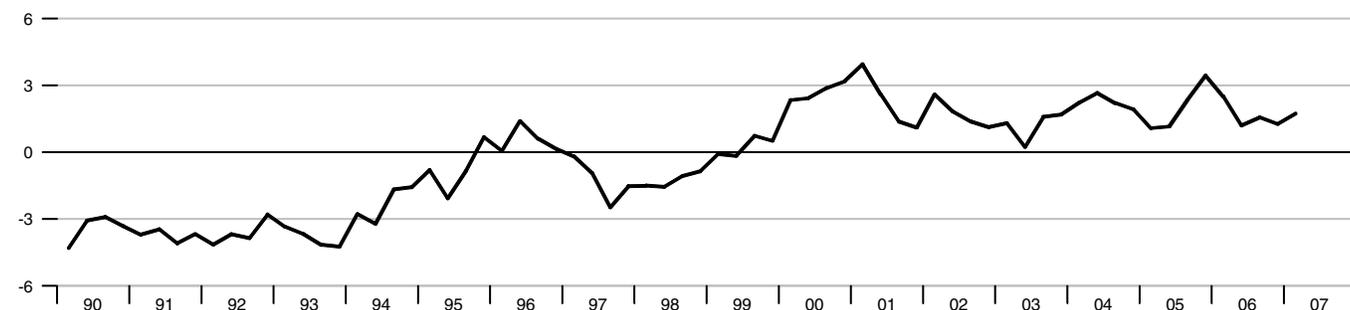
**International Trade - Goods and Services**

Percent of GDP



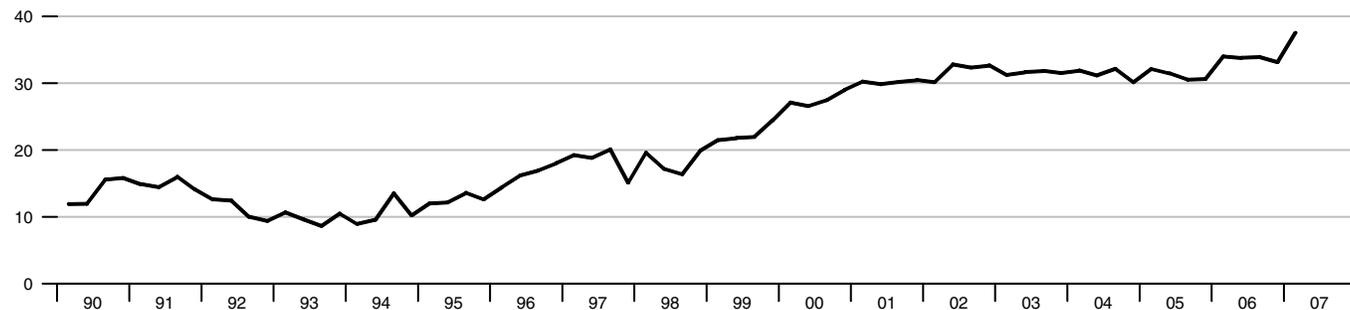
**Current Account Balance**

Percent of GDP



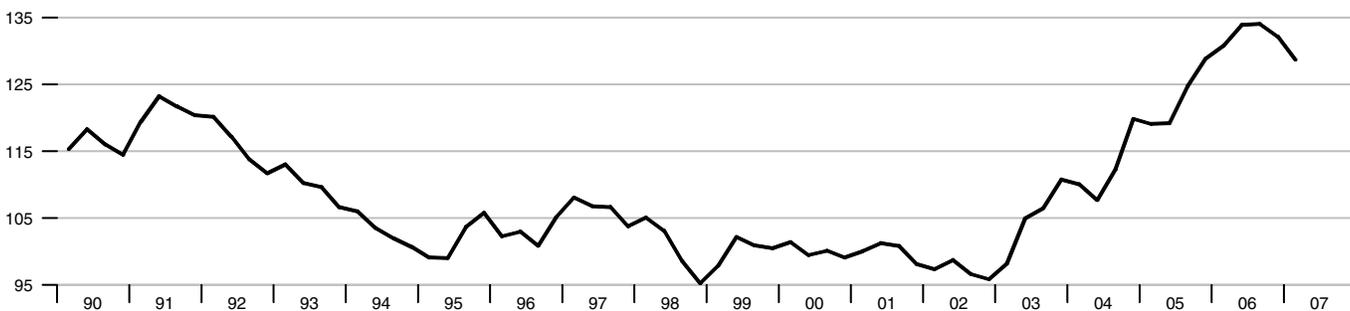
**Foreign Exchange Reserves**

Billions of US\$



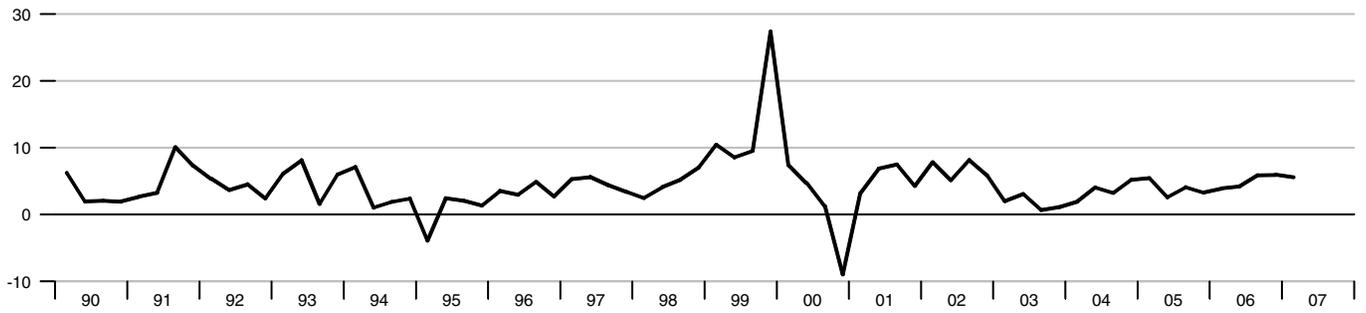
**Real Effective Exchange Rate**

Index 2000 = 100



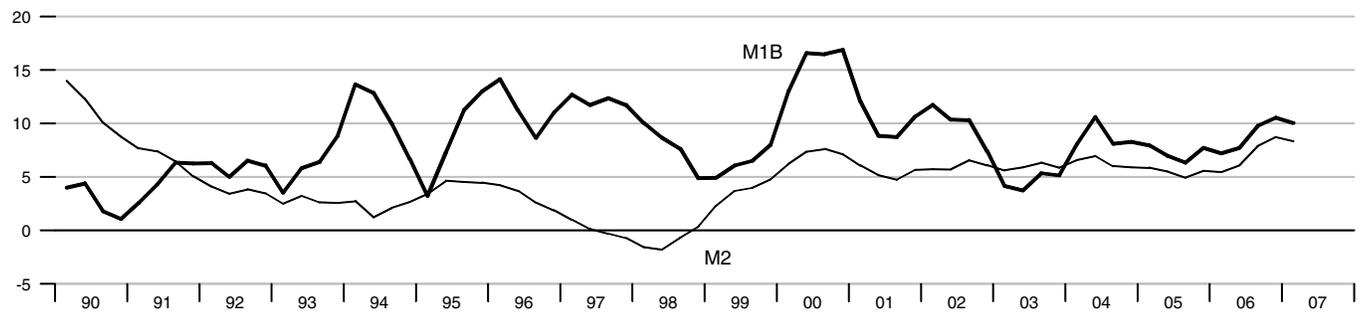
**Reserve Money**

Percent change from year ago



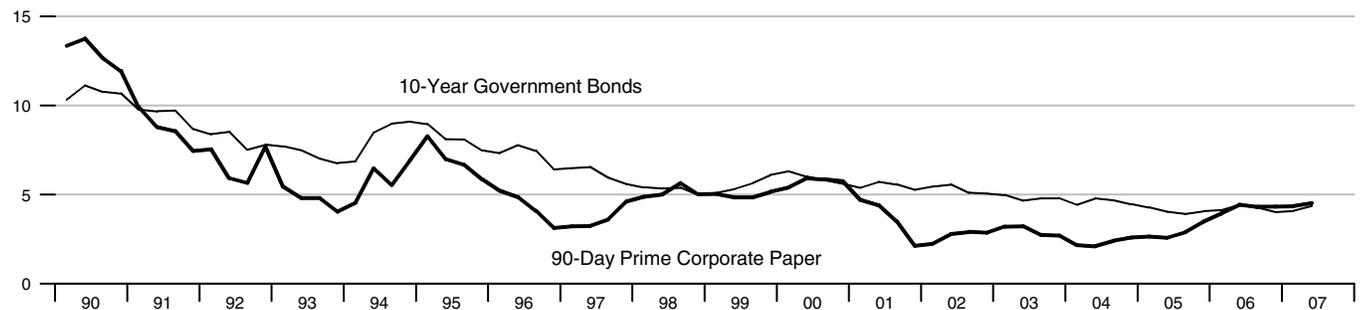
**Monetary Aggregates**

Percent change from year ago



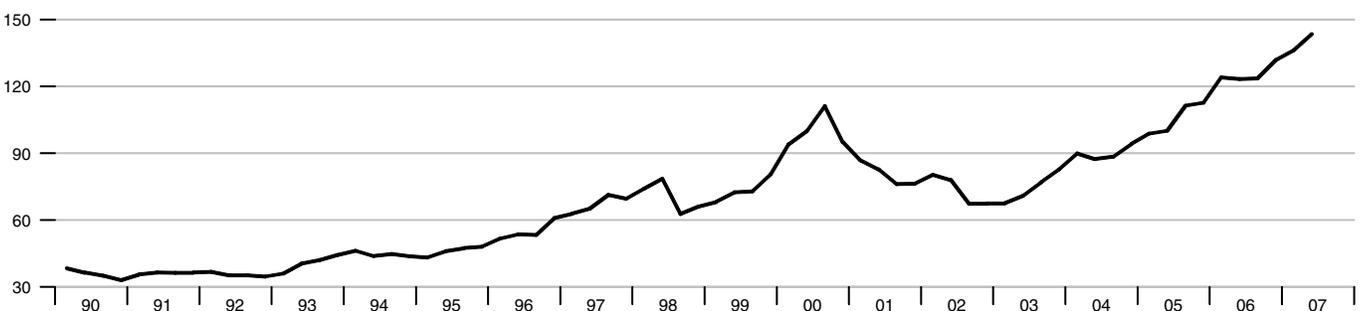
**Interest Rates**

Percent



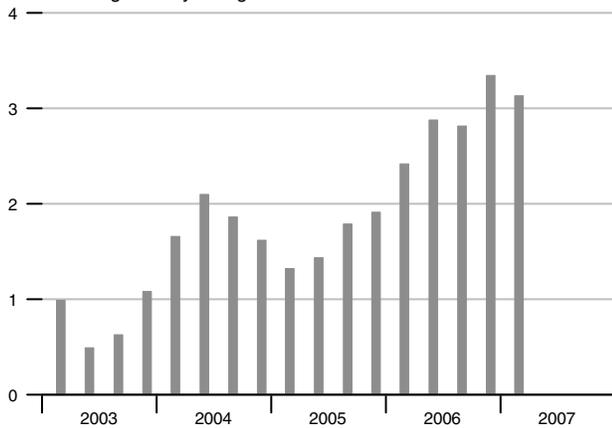
**Stock Exchange Index - Toronto Stock Exchange**

2000 = 100



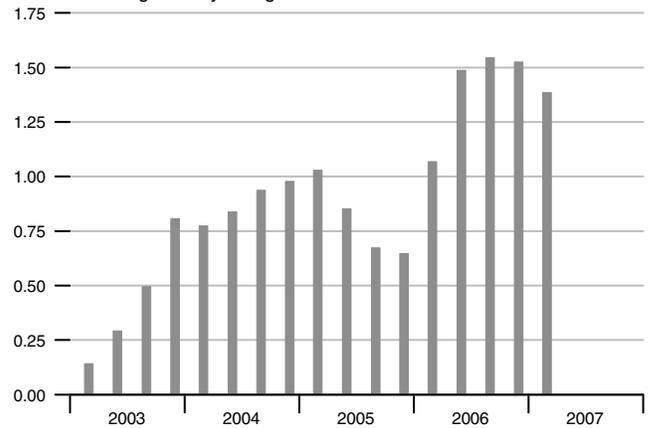
**Real GDP**

Percent change from year ago



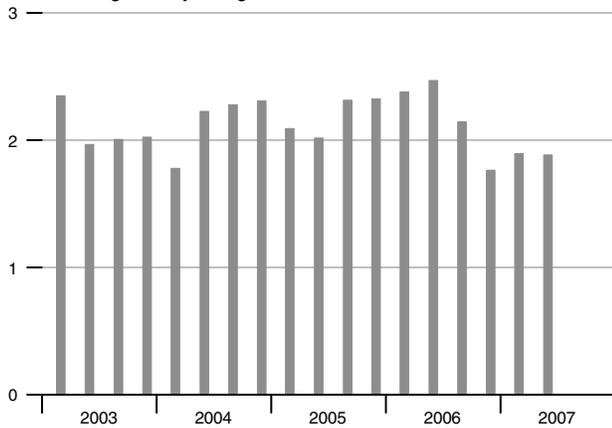
**Employment**

Percent change from year ago



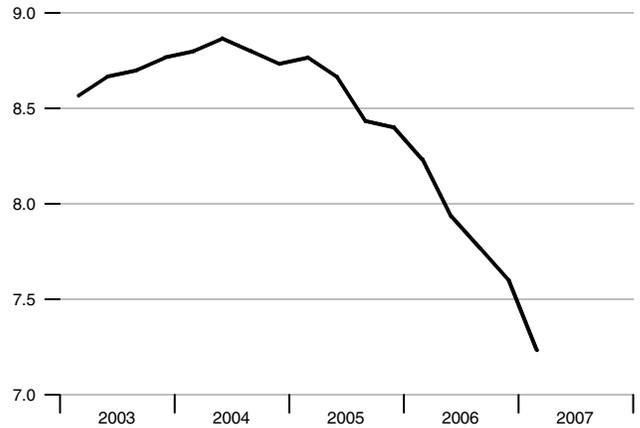
**Consumer Price Index**

Percent change from year ago



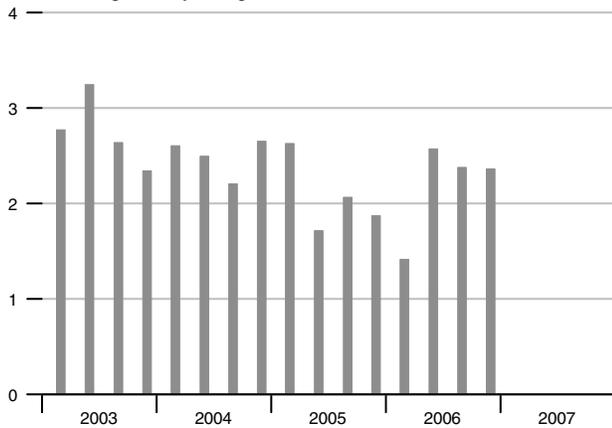
**Unemployment Rate**

Percent



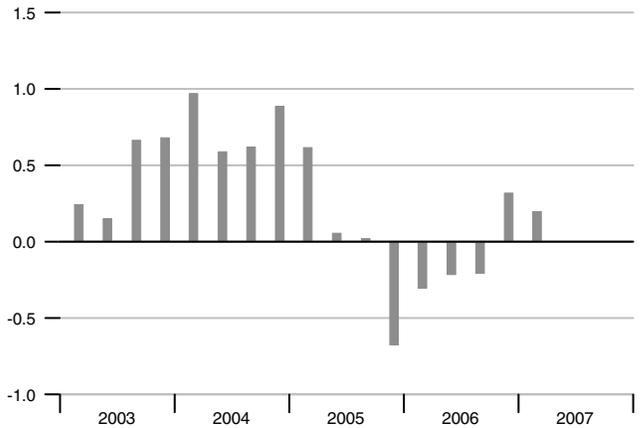
**Real Hourly Earnings**

Percent change from year ago



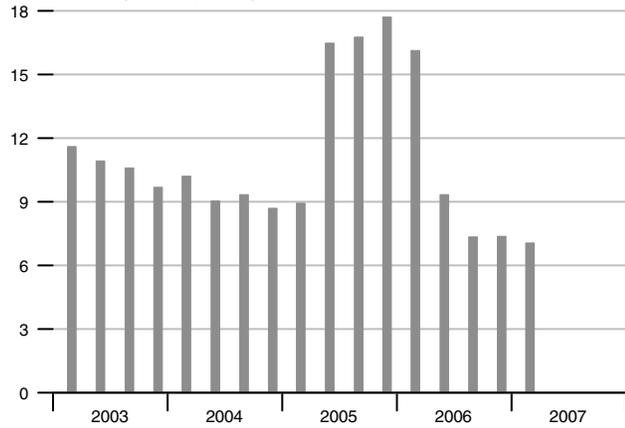
**Current Account Balance**

Percent of GDP



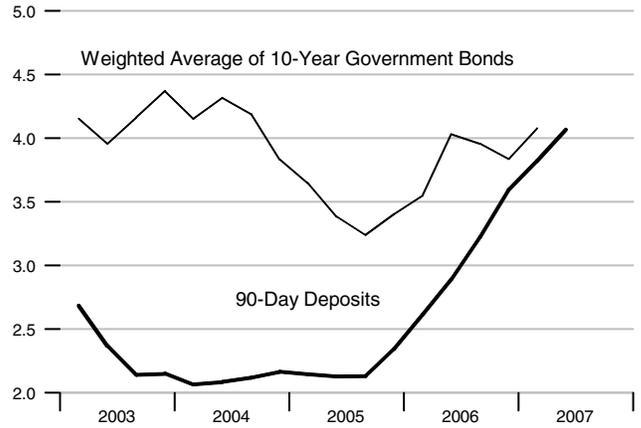
**M1**

Percent change from year ago



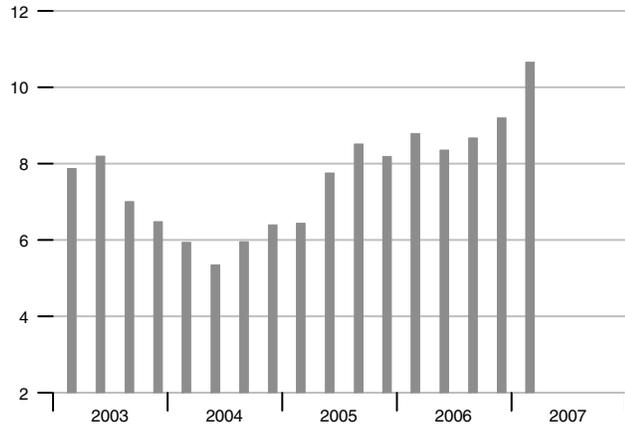
**Interest Rates**

Percent



**M3**

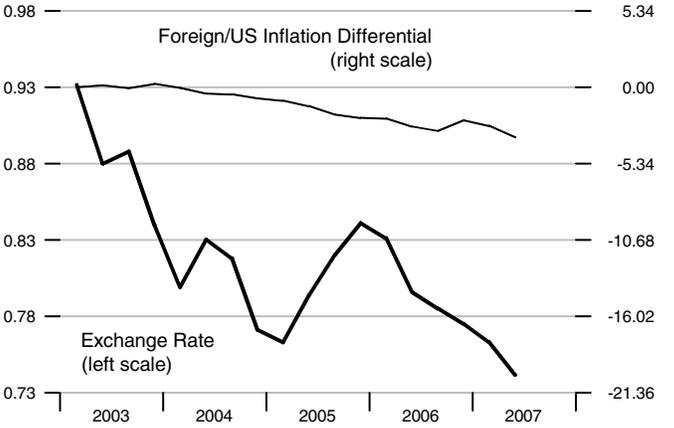
Percent change from year ago



**Exchange Rate and Inflation Differential**

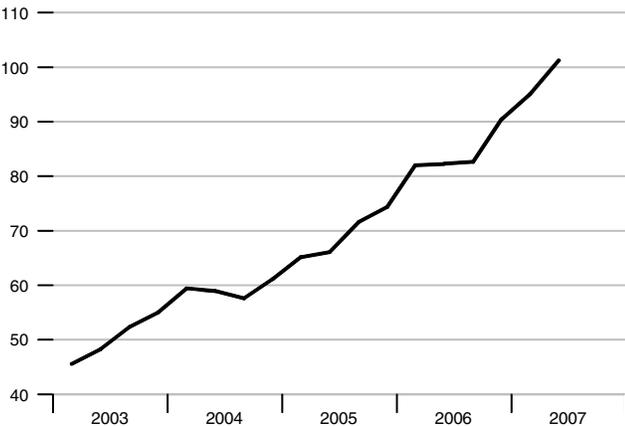
Euro/US\$

Percent



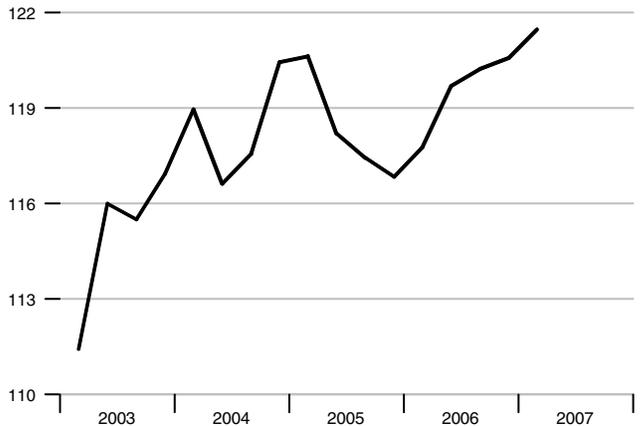
**Stock Exchange Index - Dow Jones EURO STOXX<sup>SM</sup>**

2000 = 100



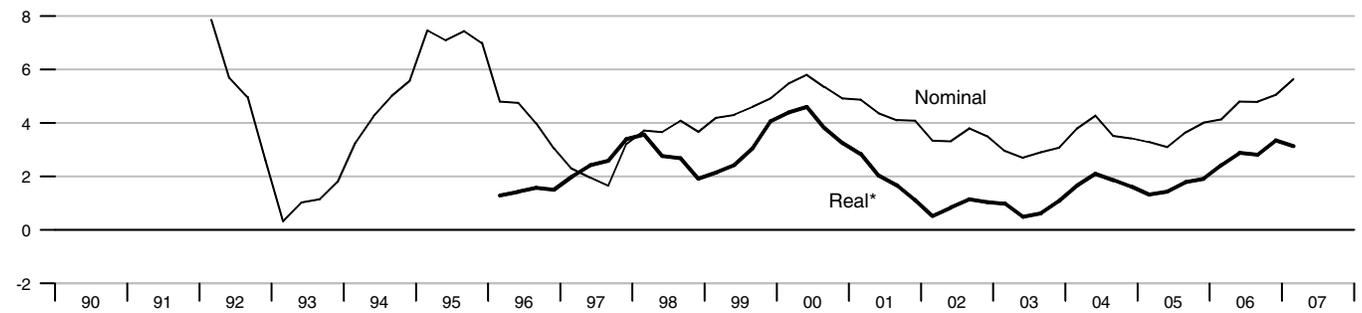
**Real Effective Exchange Rate**

Index 2000 = 100



**GDP**

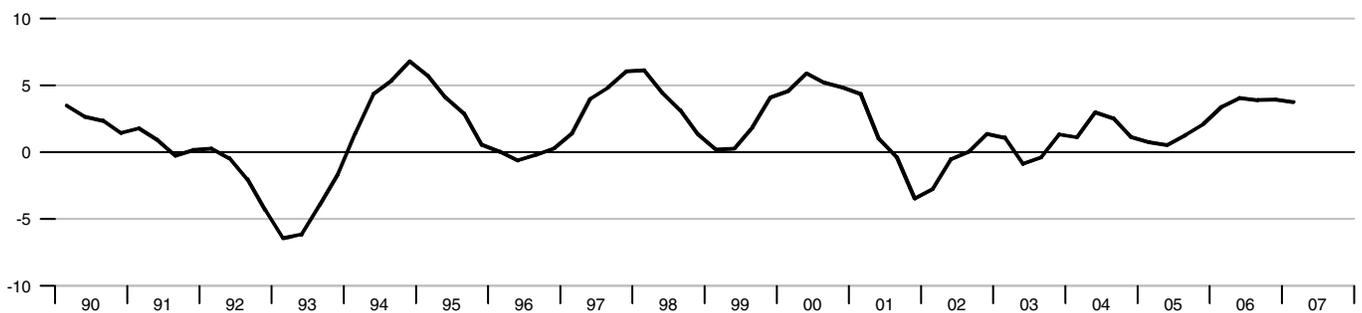
Percent change from year ago



\* EUROSTAT has recently changed how it calculates GDP. Data are currently available back to 1995 but will soon be revised back to 1991.

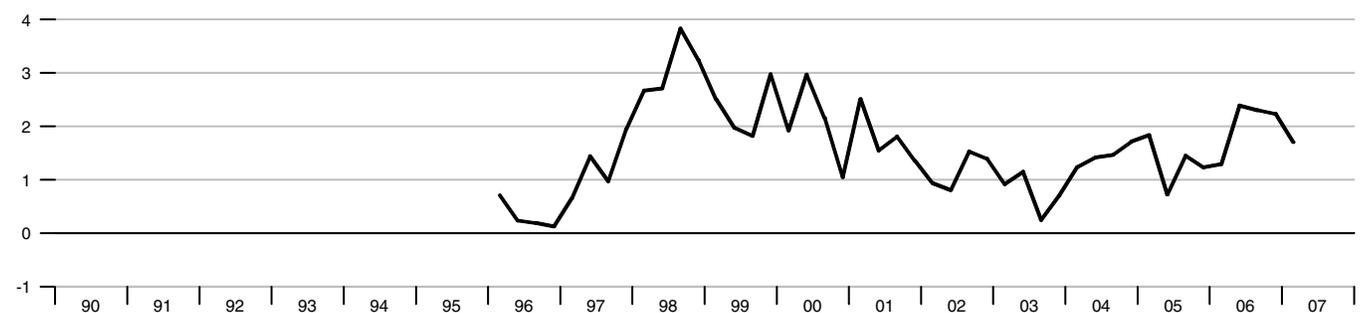
**Industrial Production**

Percent change from year ago



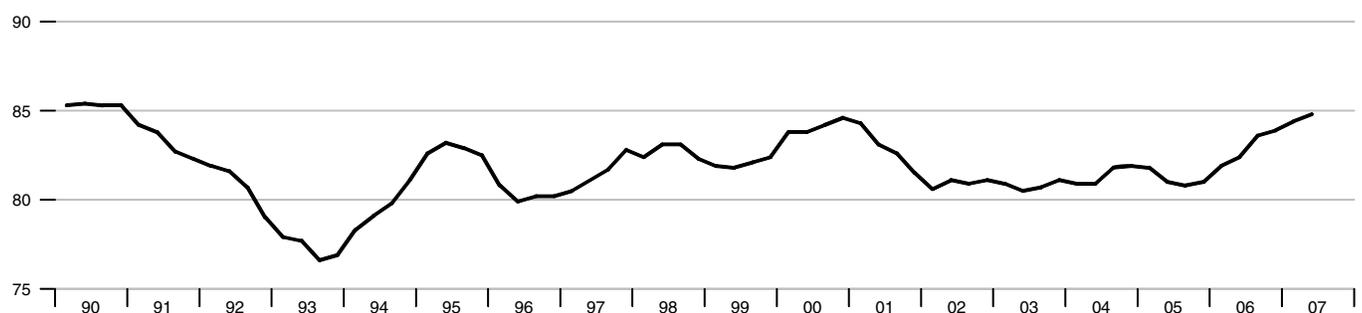
**Retail Sales**

Percent change from year ago

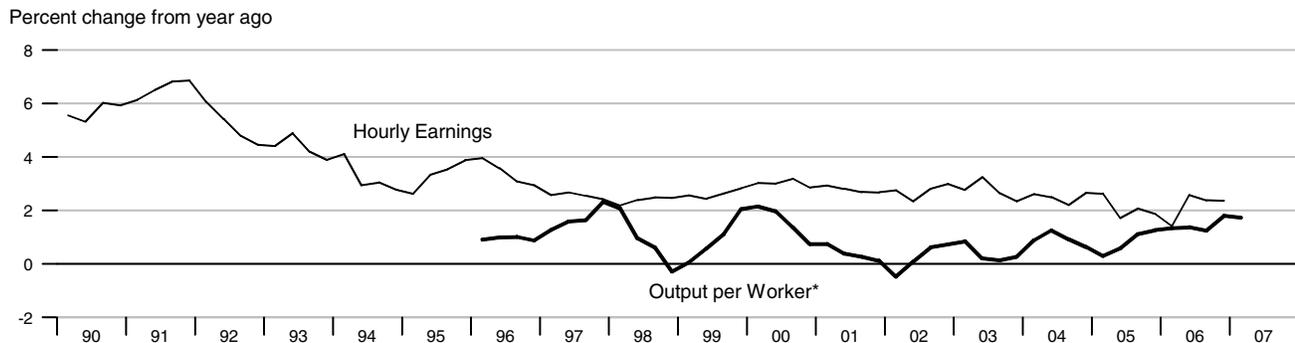


**Capacity Utilization**

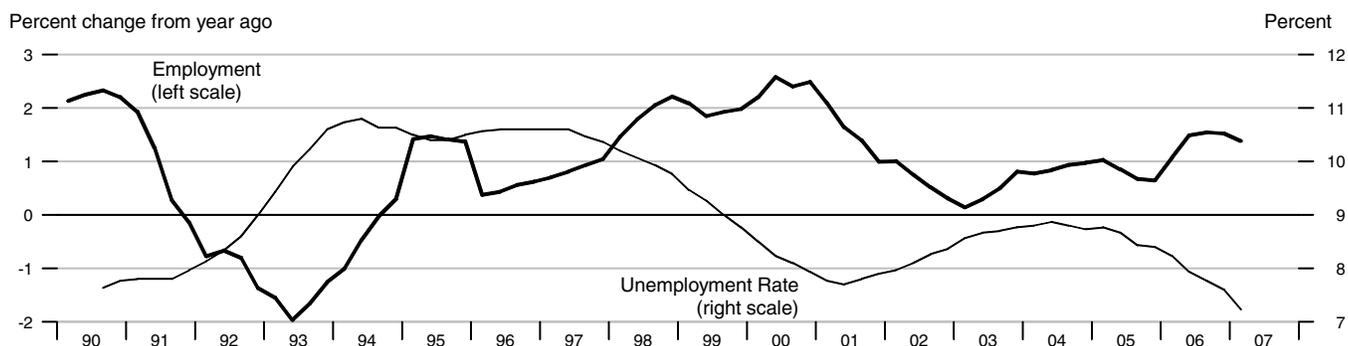
Percent



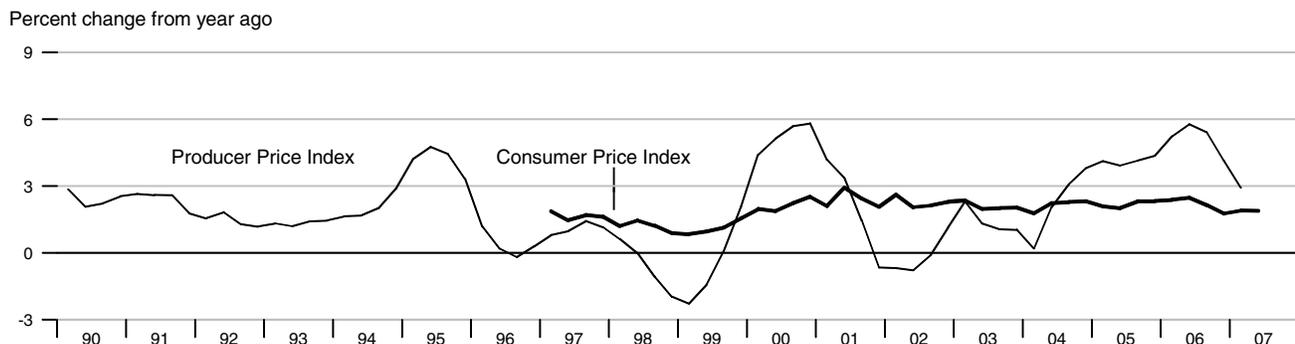
### Real Hourly Earnings and Output per Worker



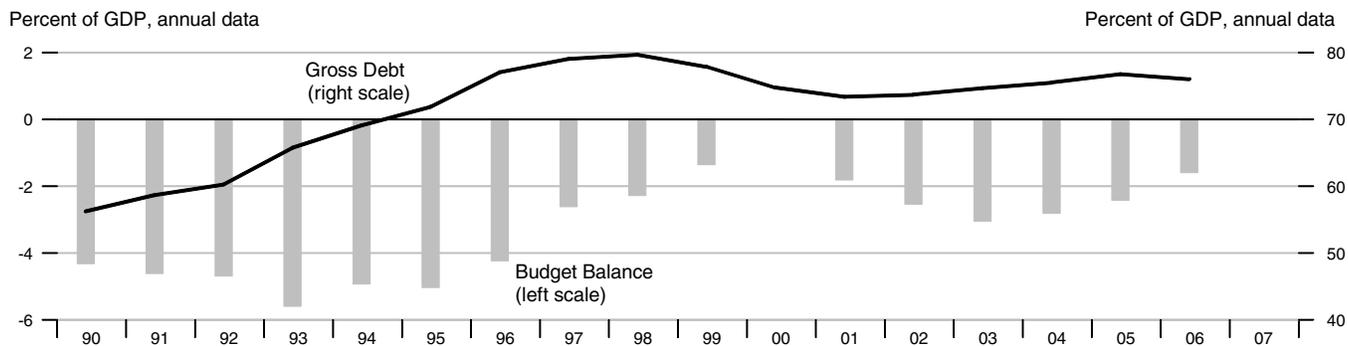
### Labor Force Indicators



### Inflation

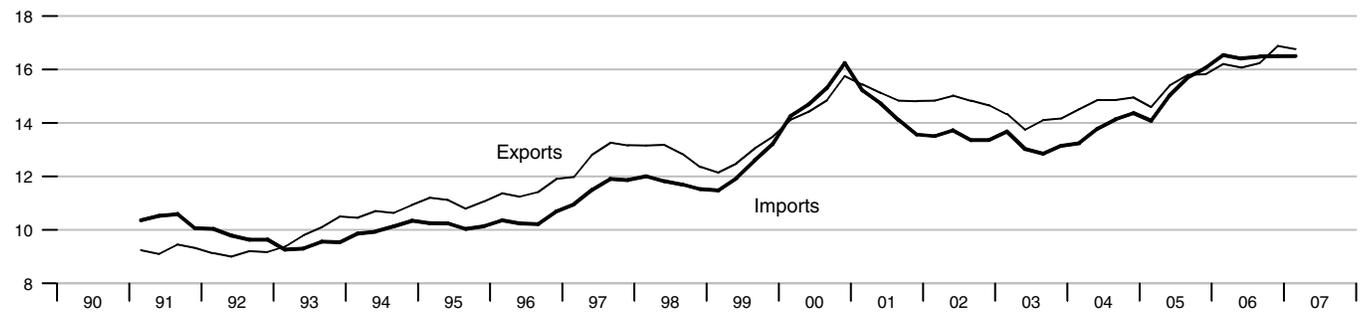


### Gross Government Debt and Budget Balance



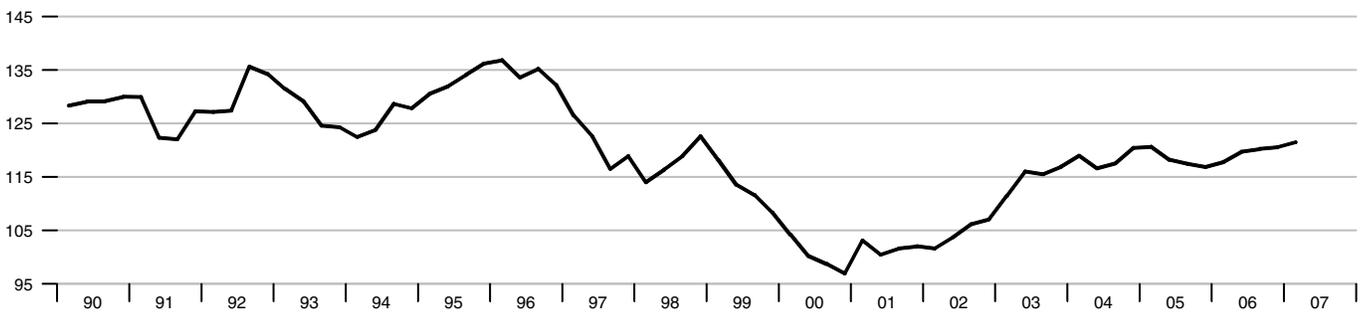
**International Trade - Goods**

Percent of GDP



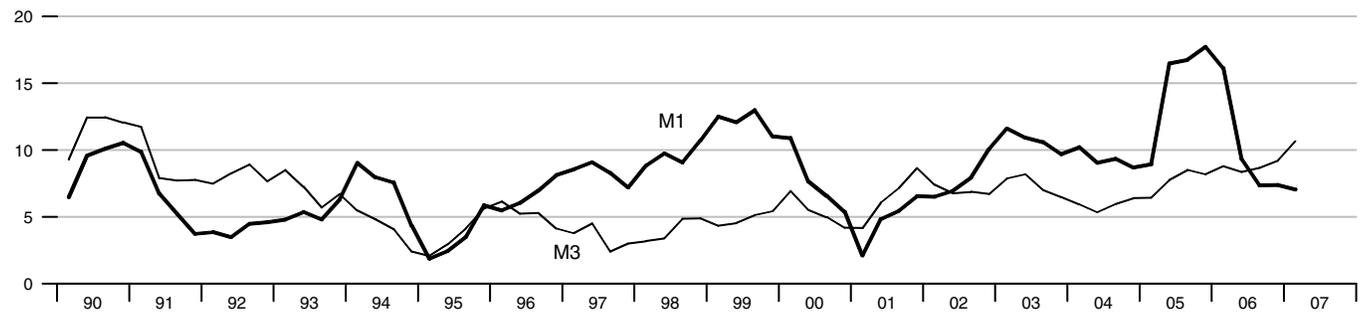
**Real Effective Exchange Rate**

Index 2000 = 100



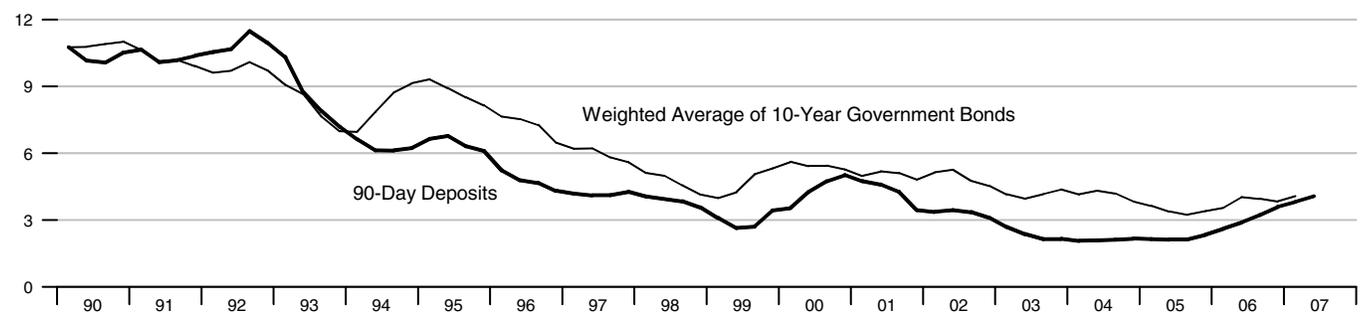
**Monetary Aggregates**

Percent change from year ago



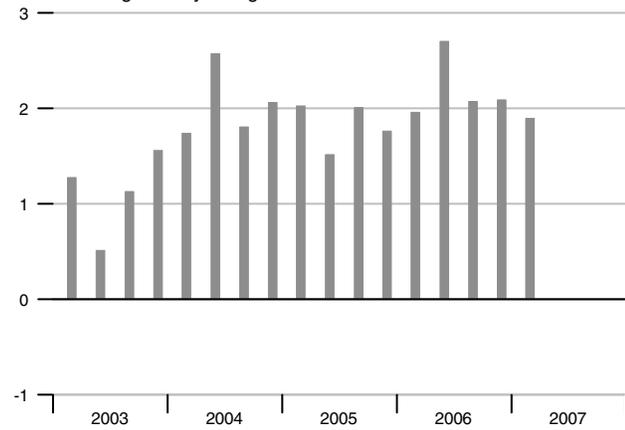
**Interest Rates**

Percent



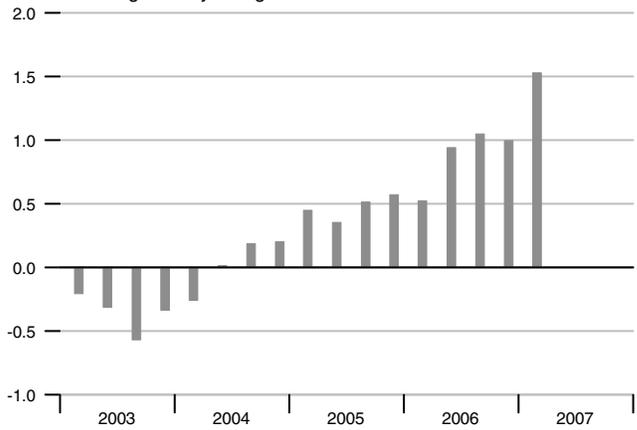
**Real GDP**

Percent change from year ago



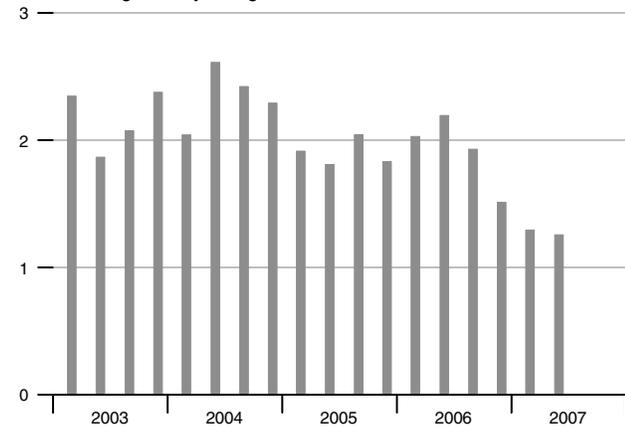
**Employment**

Percent change from year ago



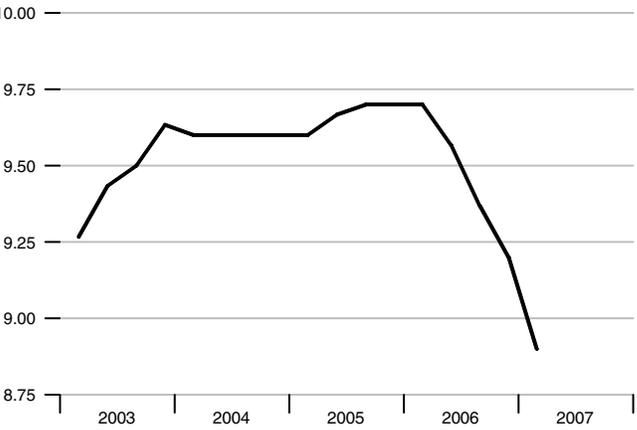
**Consumer Price Index**

Percent change from year ago



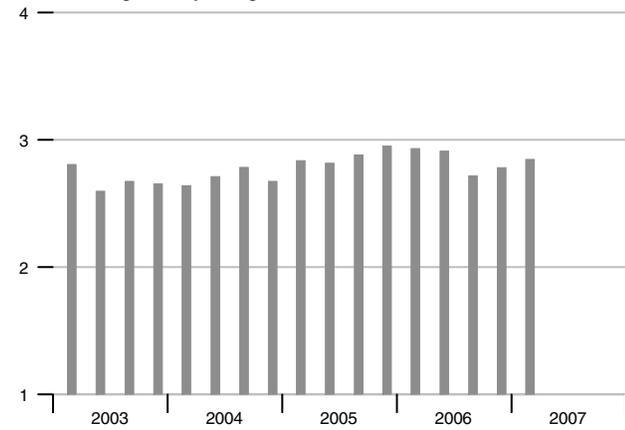
**Unemployment Rate**

Percent



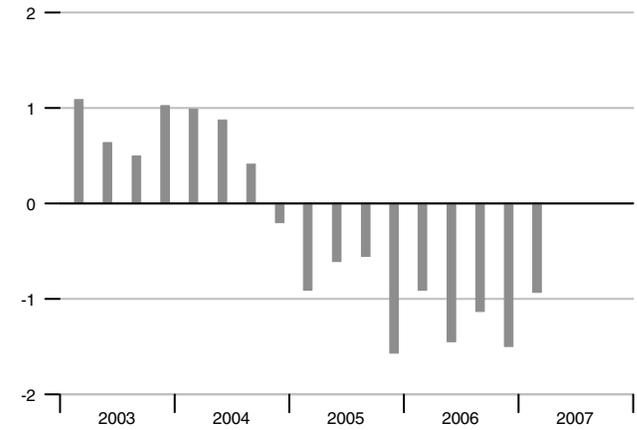
**Real Hourly Earnings**

Percent change from year ago



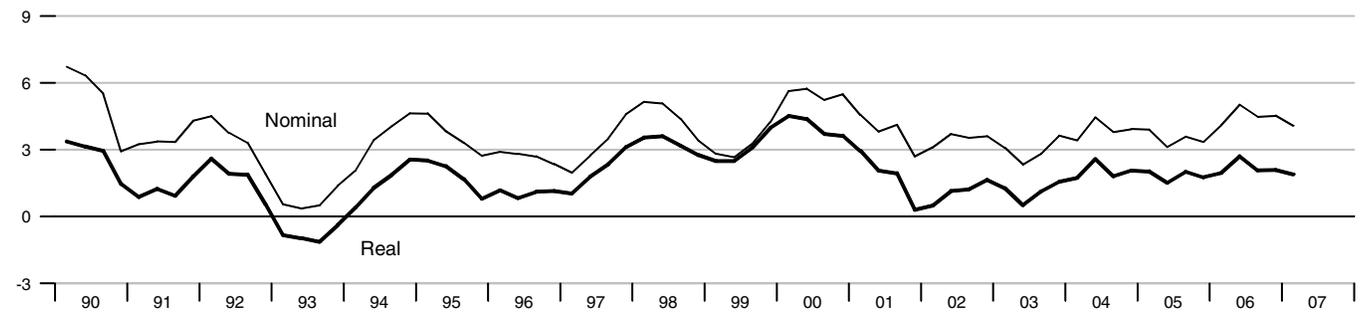
**Current Account Balance**

Percent of GDP



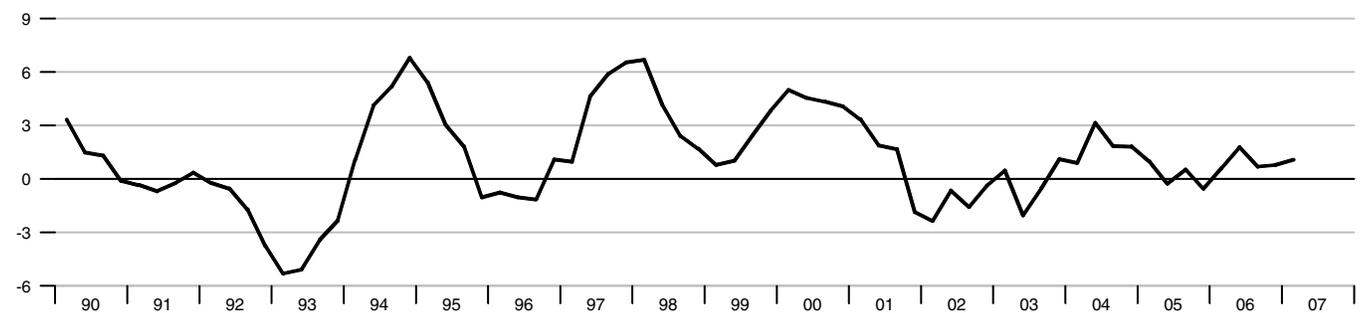
**GDP**

Percent change from year ago



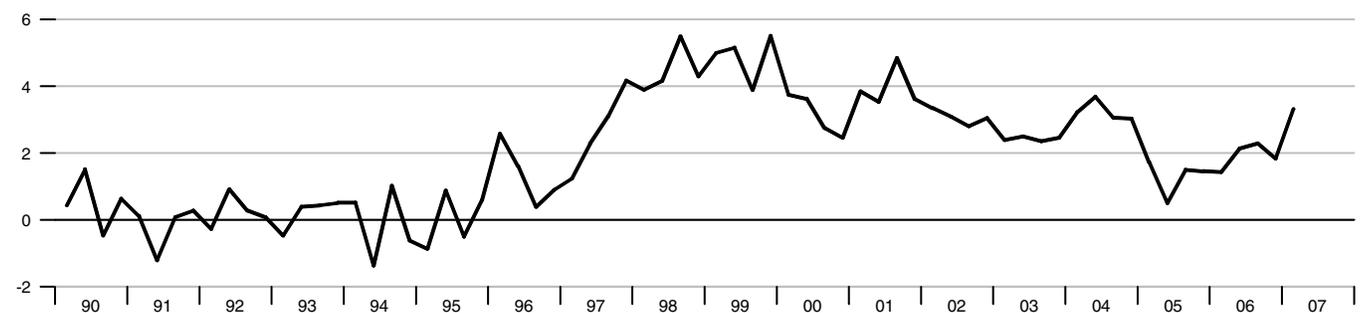
**Industrial Production**

Percent change from year ago



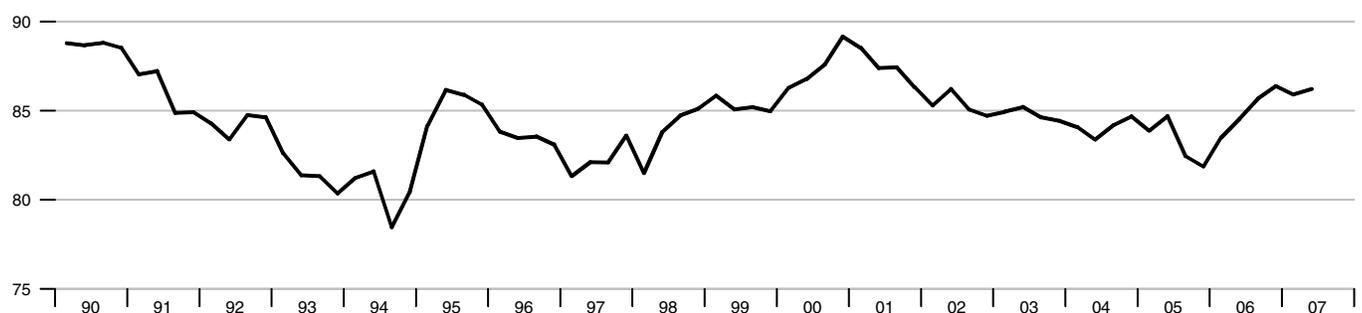
**Retail Sales**

Percent change from year ago

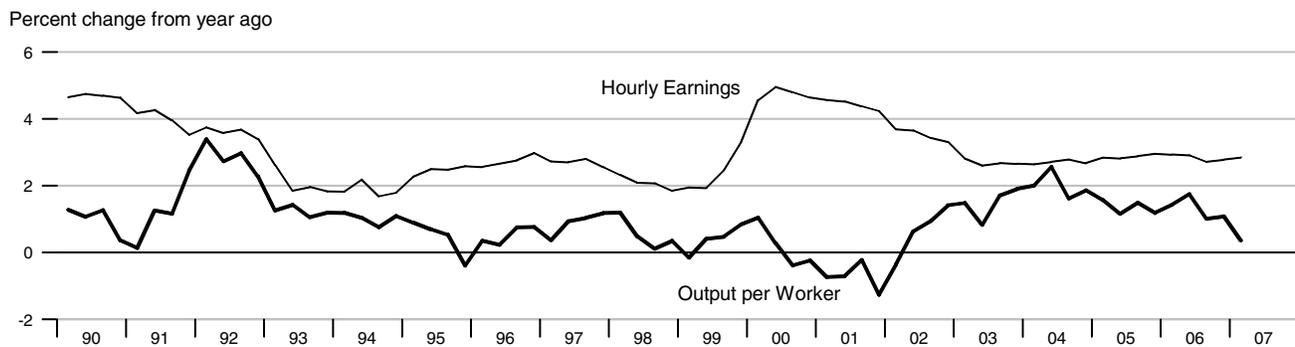


**Capacity Utilization**

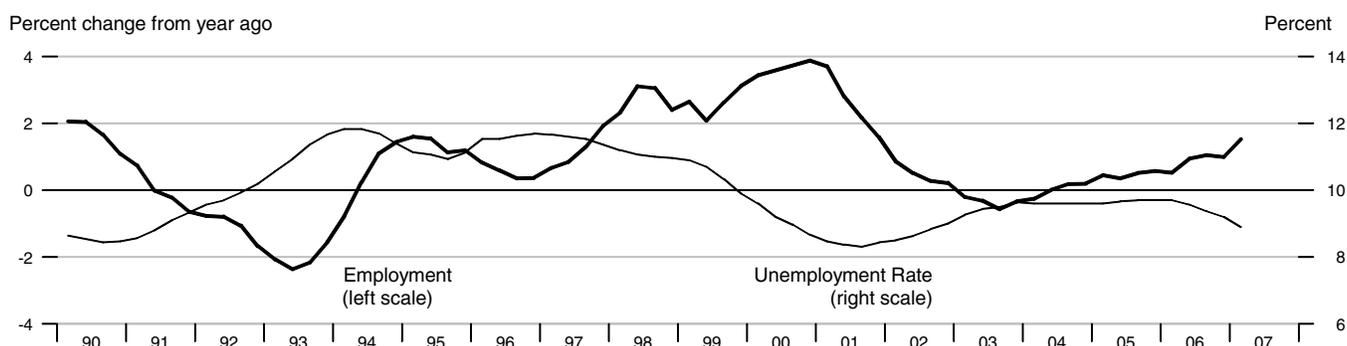
Percent



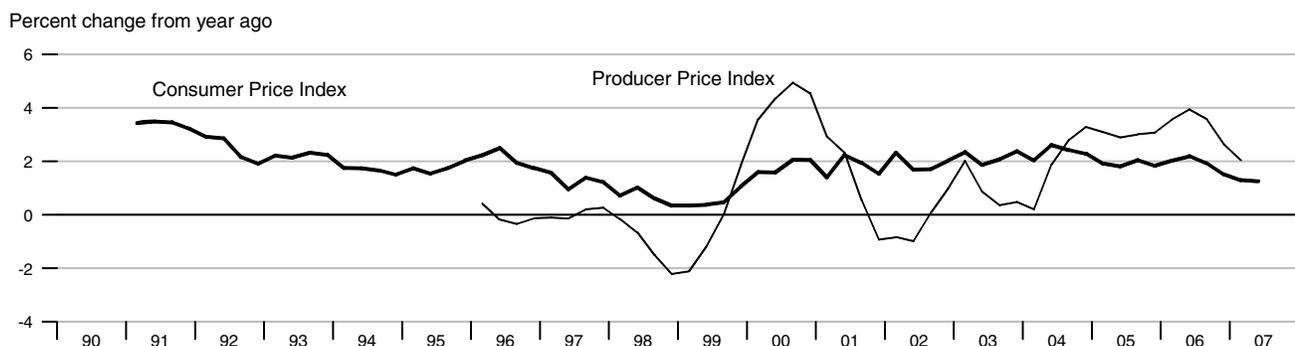
### Real Hourly Earnings and Output per Worker



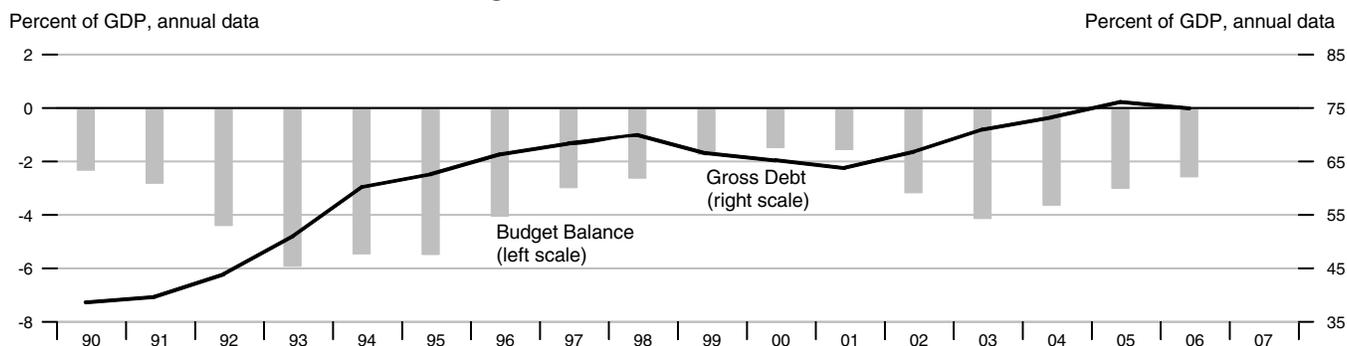
### Labor Force Indicators



### Inflation

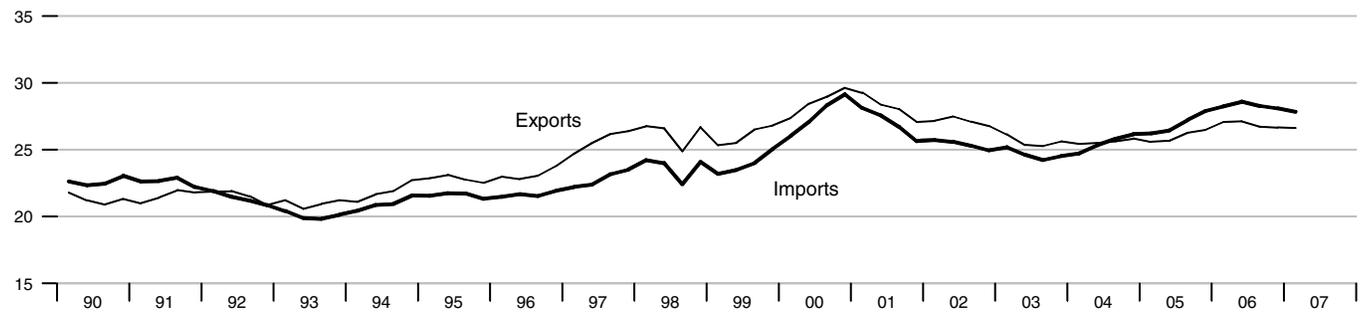


### Gross Government Debt and Budget Balance



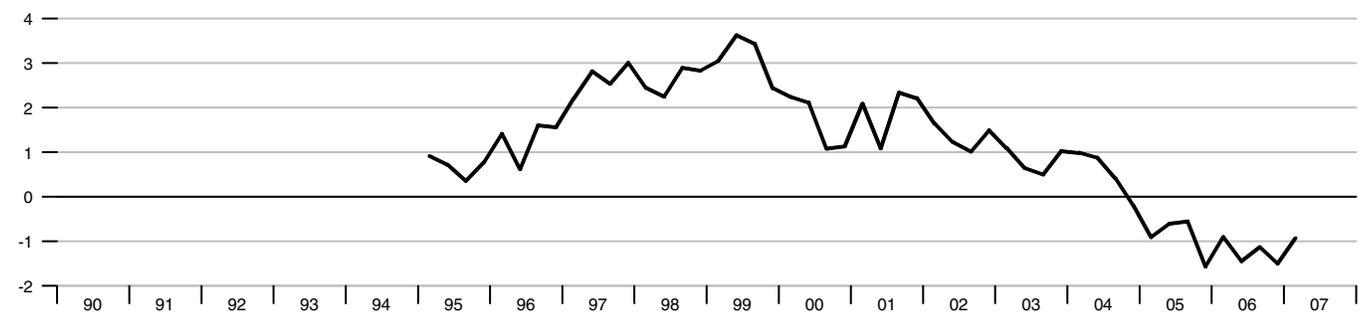
**International Trade - Goods and Services**

Percent of GDP



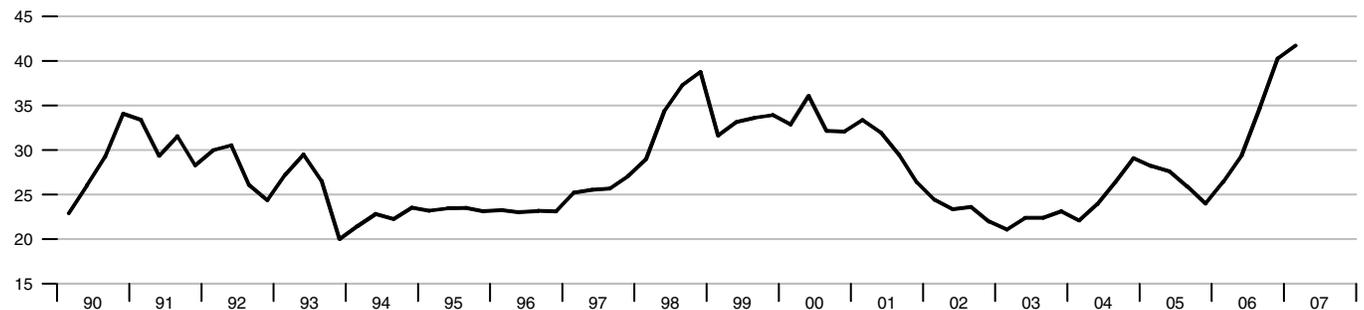
**Current Account Balance**

Percent of GDP



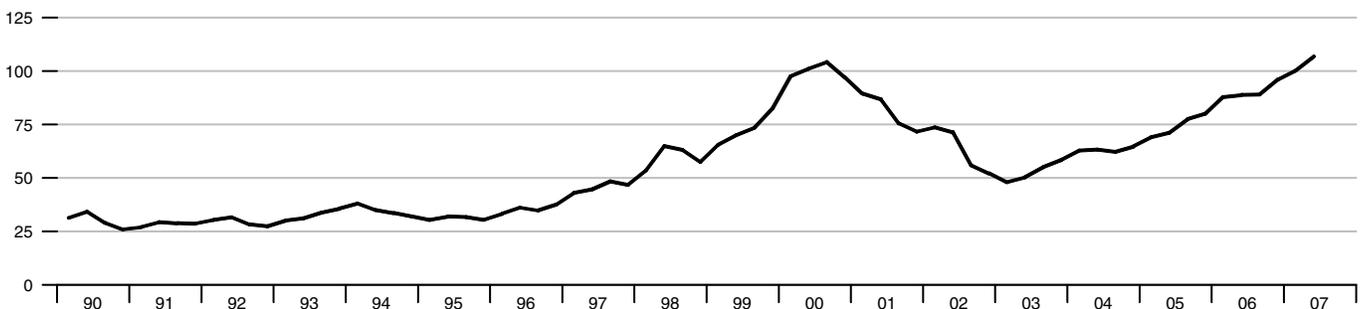
**Foreign Exchange Reserves**

Billions of US\$



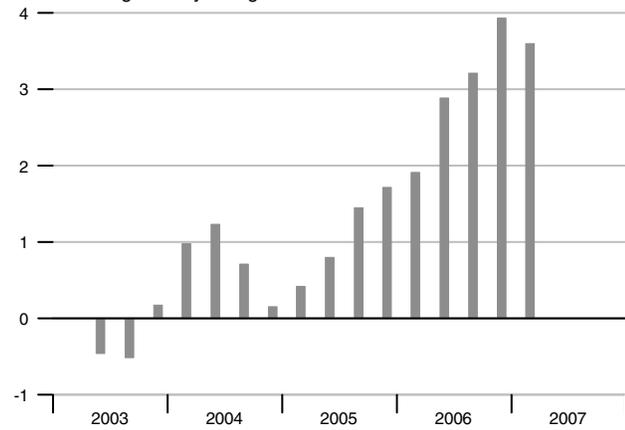
**Stock Exchange Index - SBF 250**

2000 = 100



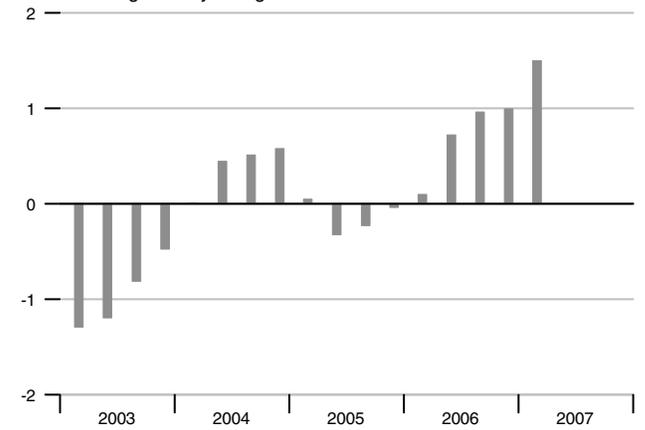
**Real GDP**

Percent change from year ago



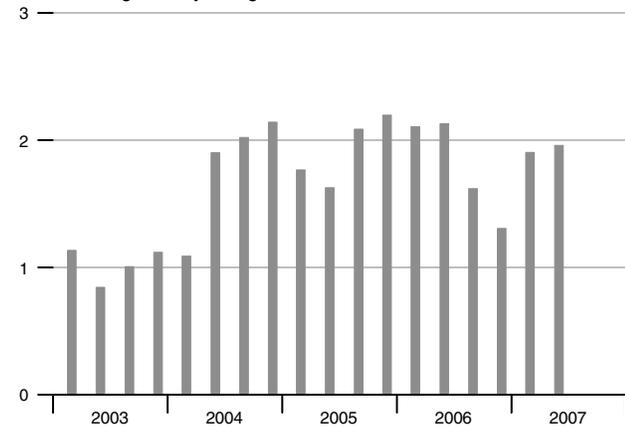
**Employment**

Percent change from year ago



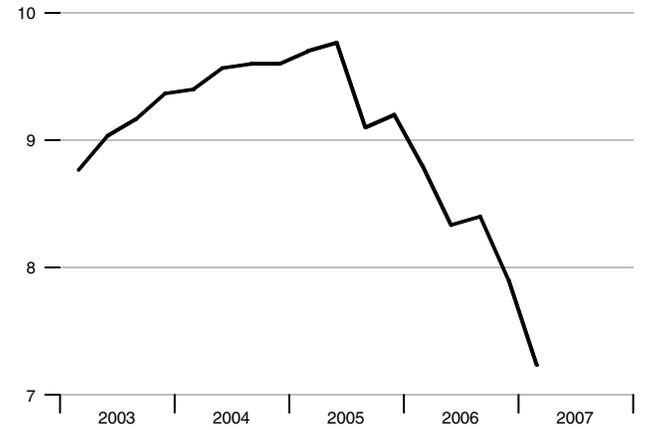
**Consumer Price Index**

Percent change from year ago



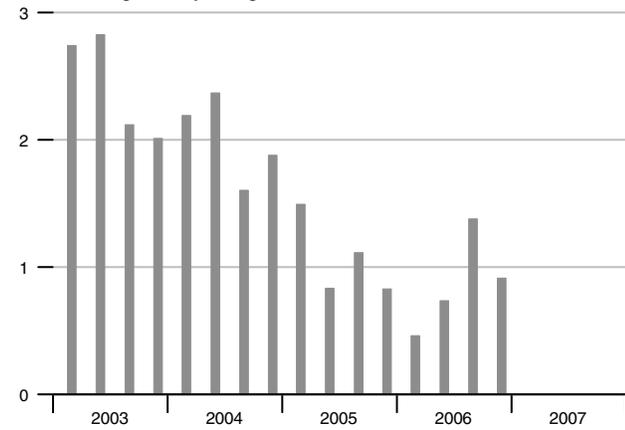
**Unemployment Rate**

Percent



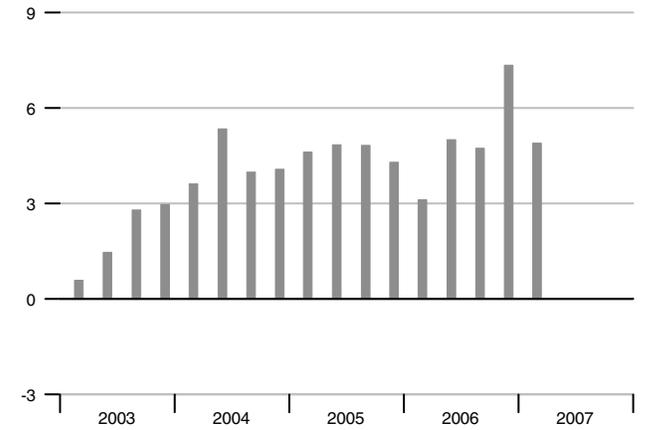
**Real Hourly Earnings**

Percent change from year ago



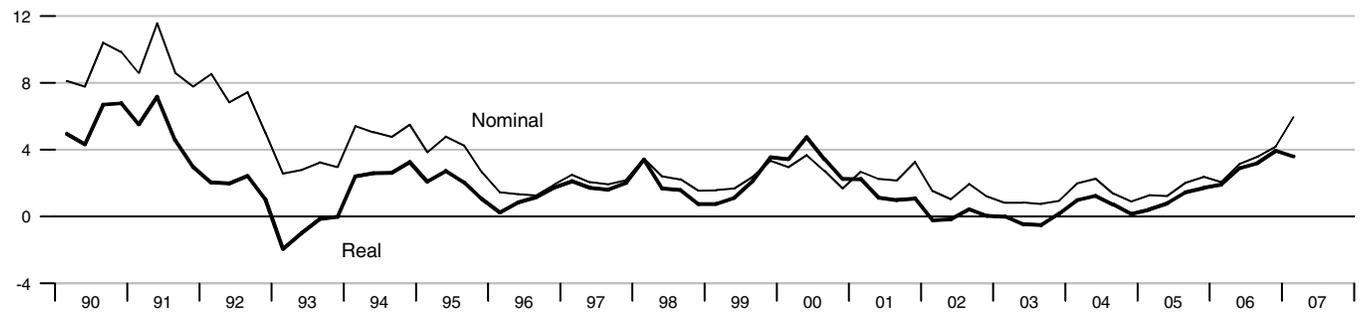
**Current Account Balance**

Percent of GDP



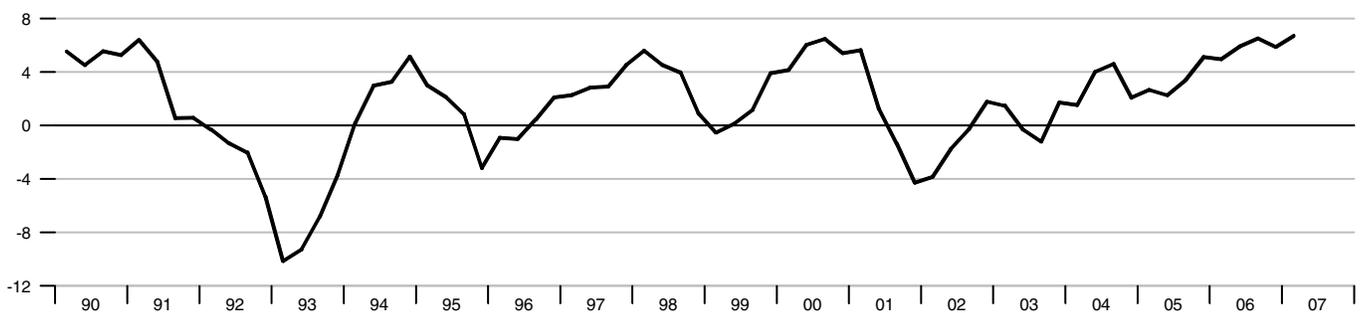
**GDP**

Percent change from year ago



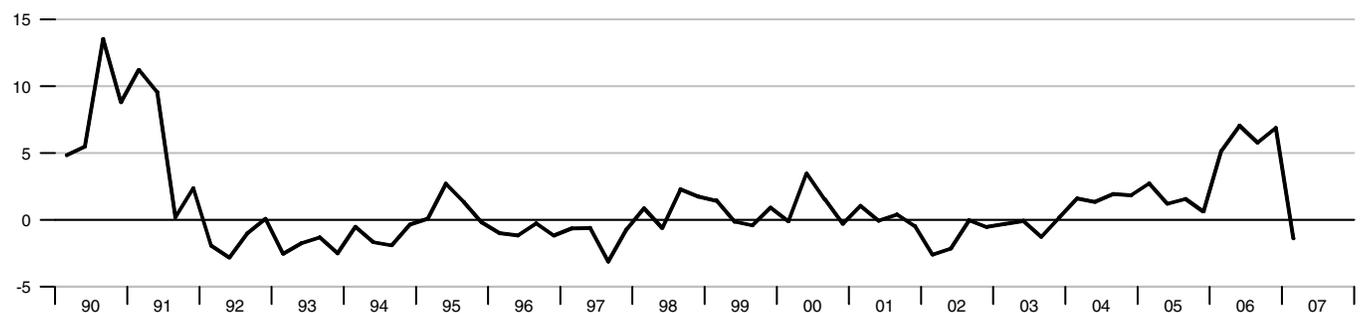
**Industrial Production**

Percent change from year ago



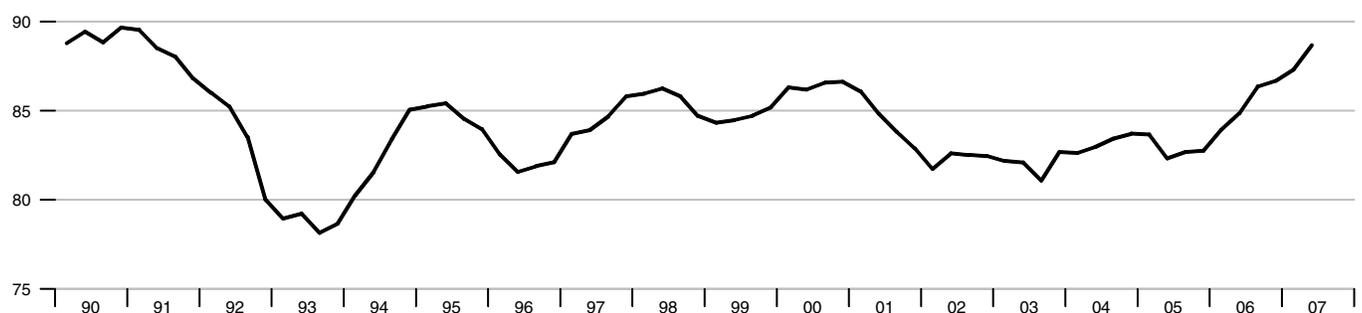
**Retail Sales**

Percent change from year ago



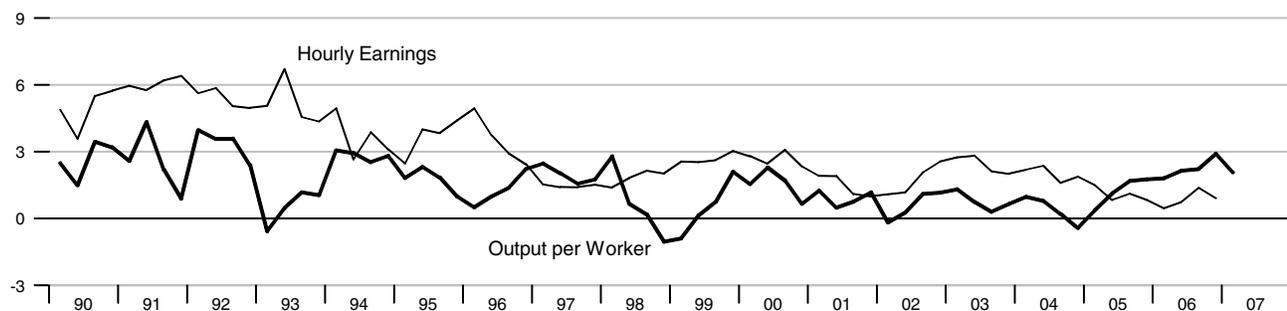
**Capacity Utilization**

Percent



### Real Hourly Earnings and Output per Worker

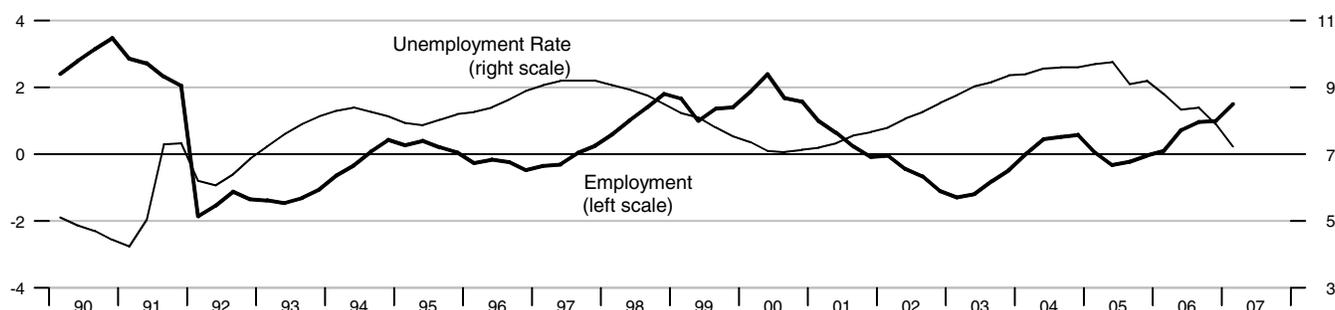
Percent change from year ago



### Labor Force Indicators

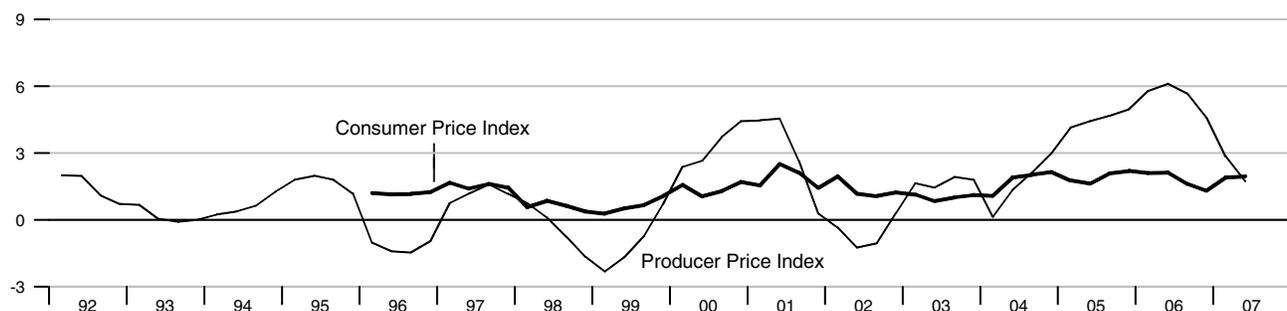
Percent change from year ago

Percent



### Inflation

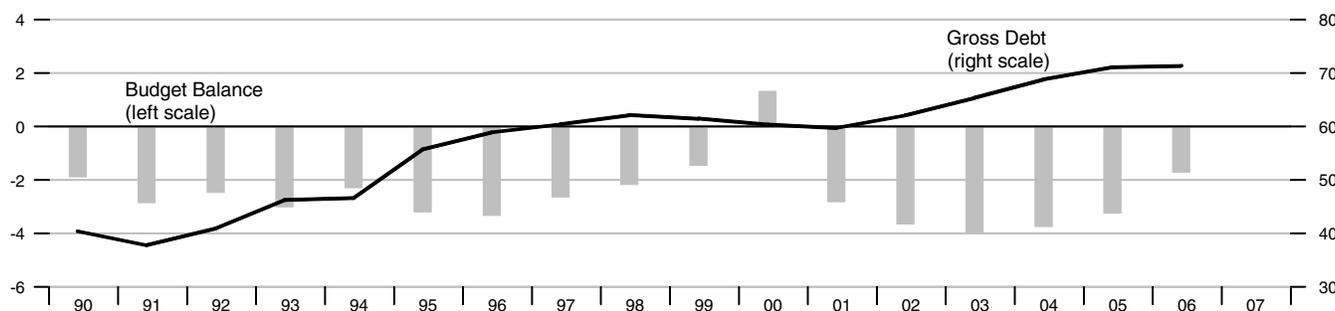
Percent change from year ago



### Gross Government Debt and Budget Balance

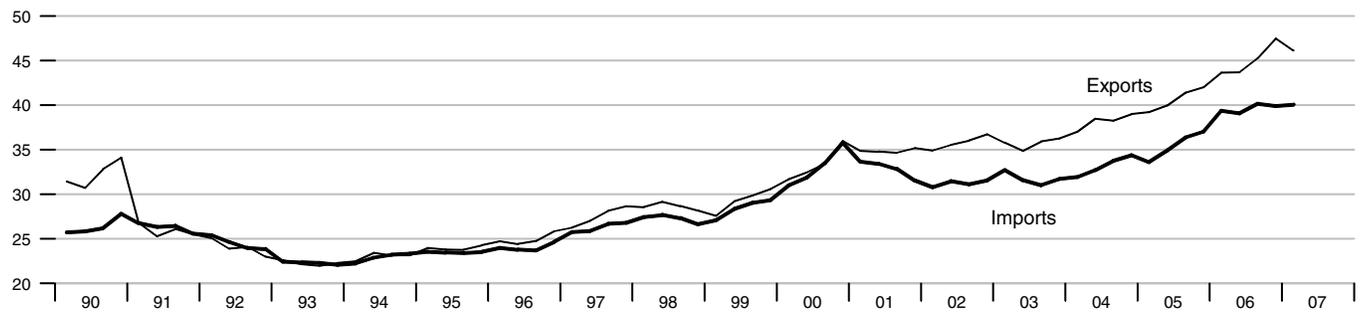
Percent of GDP, annual data

Percent of GDP, annual data



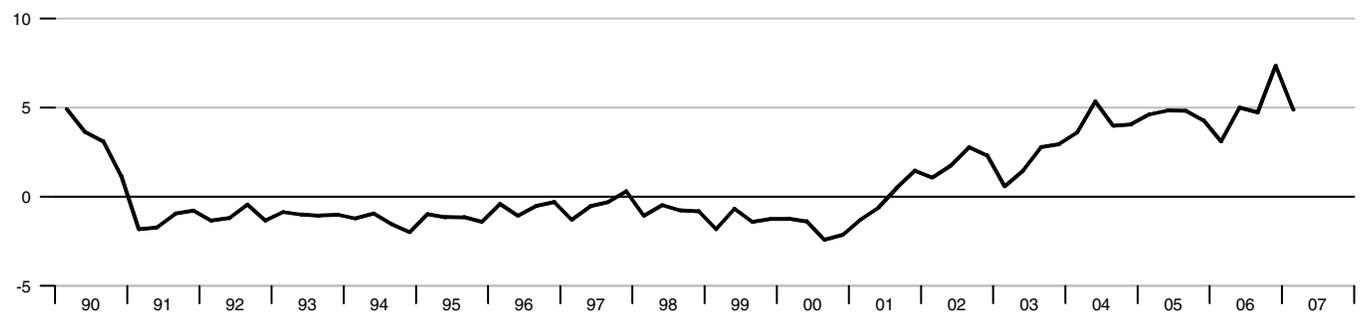
**International Trade - Goods and Services**

Percent of GDP



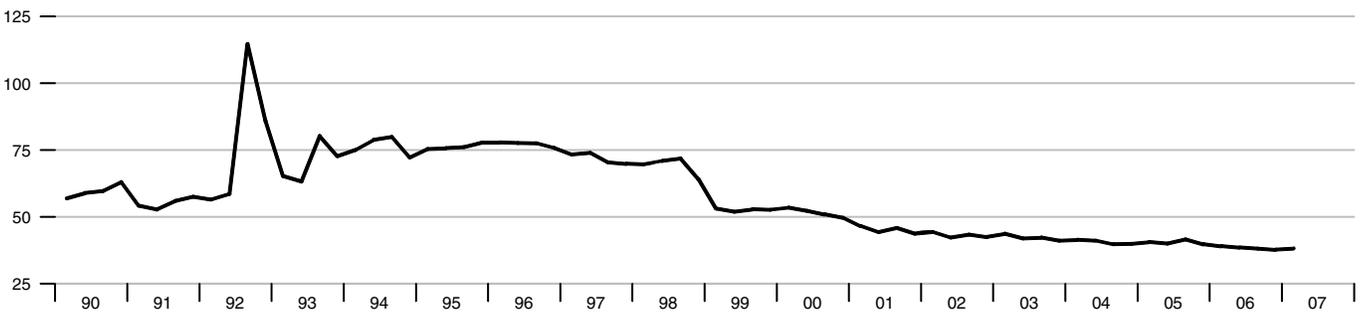
**Current Account Balance**

Percent of GDP



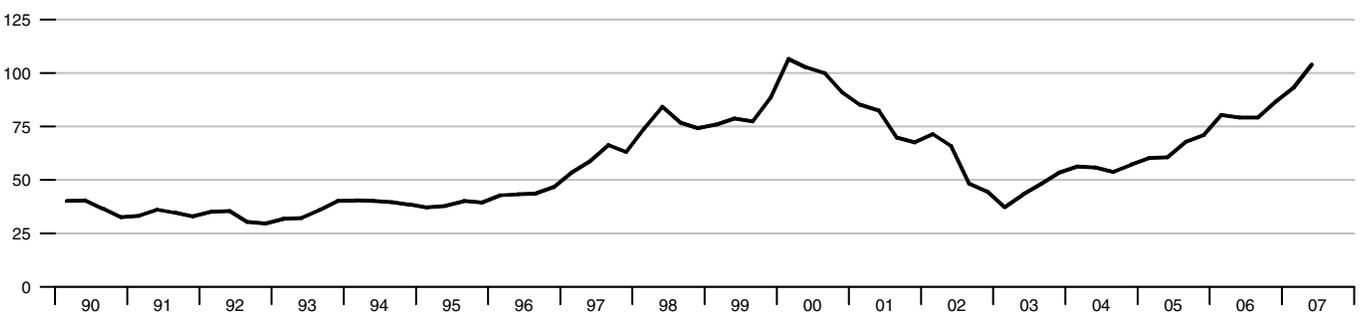
**Foreign Exchange Reserves**

Billions of US\$



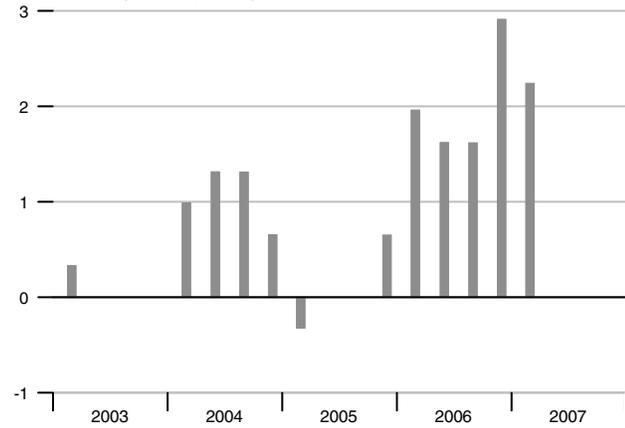
**Stock Exchange Index - CDAX**

2000 = 100



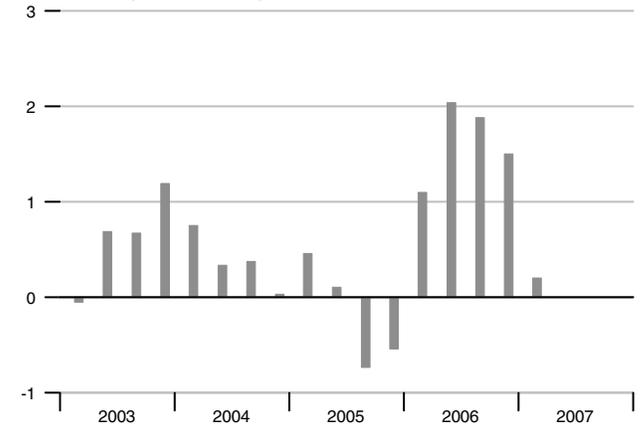
**Real GDP**

Percent change from year ago



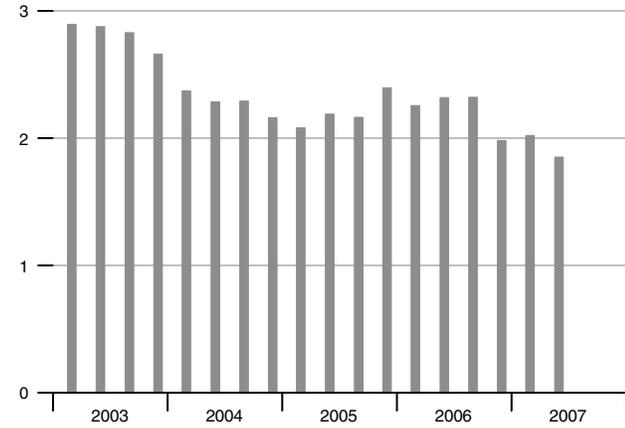
**Employment**

Percent change from year ago



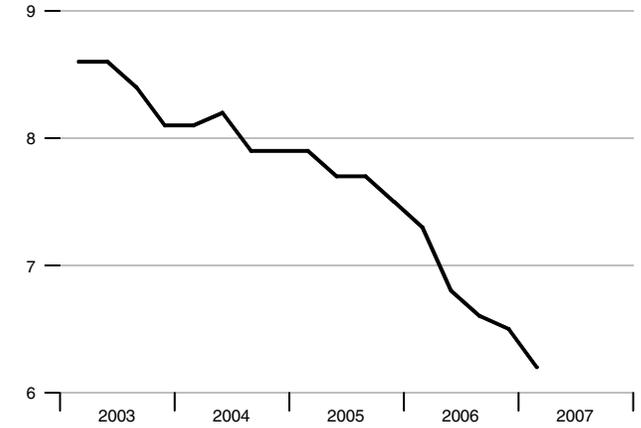
**Consumer Price Index**

Percent change from year ago



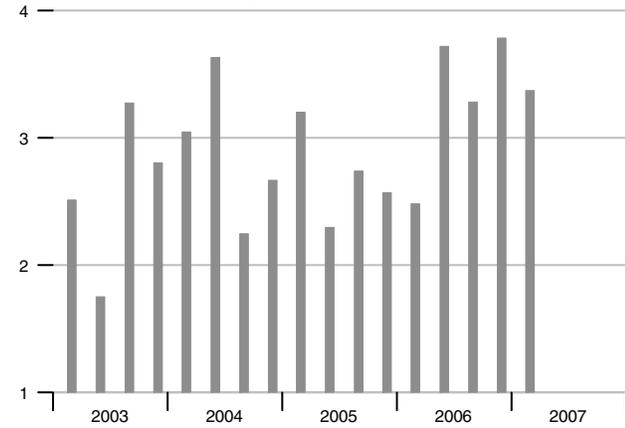
**Unemployment Rate**

Percent



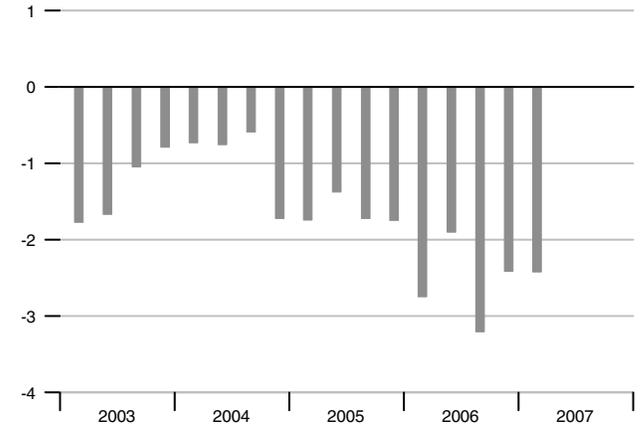
**Real Hourly Earnings**

Percent change from year ago



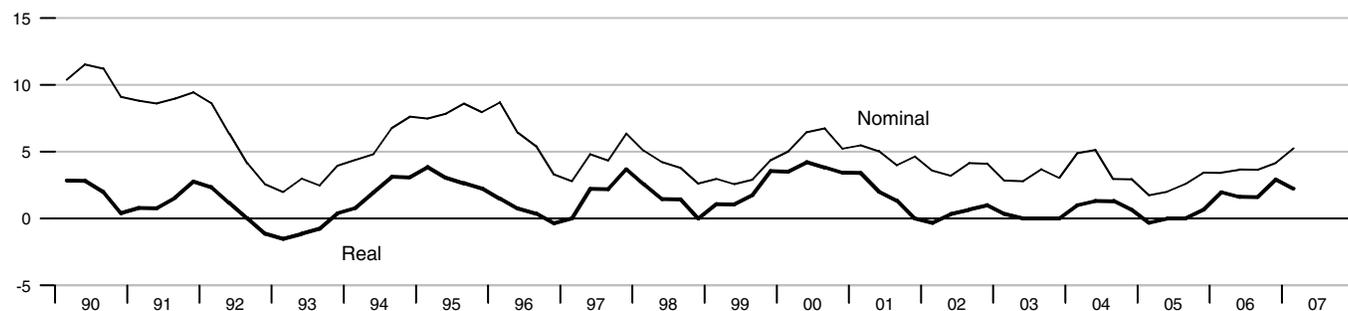
**Current Account Balance**

Percent of GDP



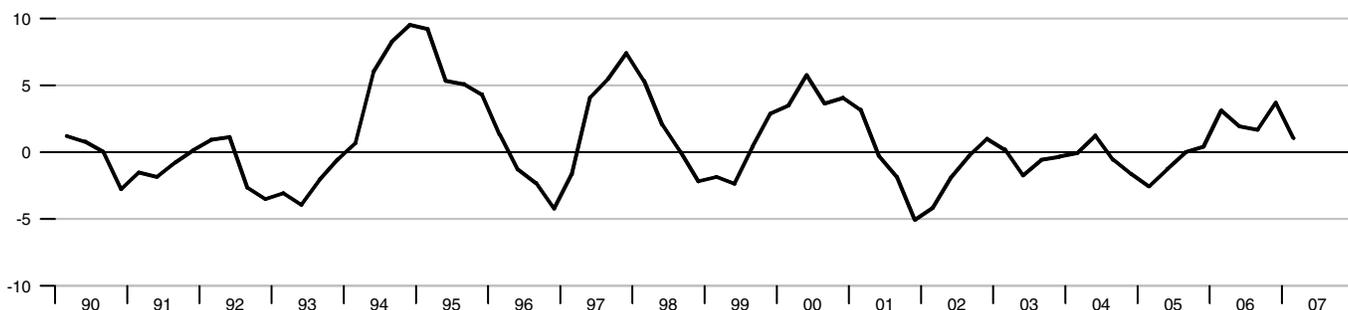
**GDP**

Percent change from year ago



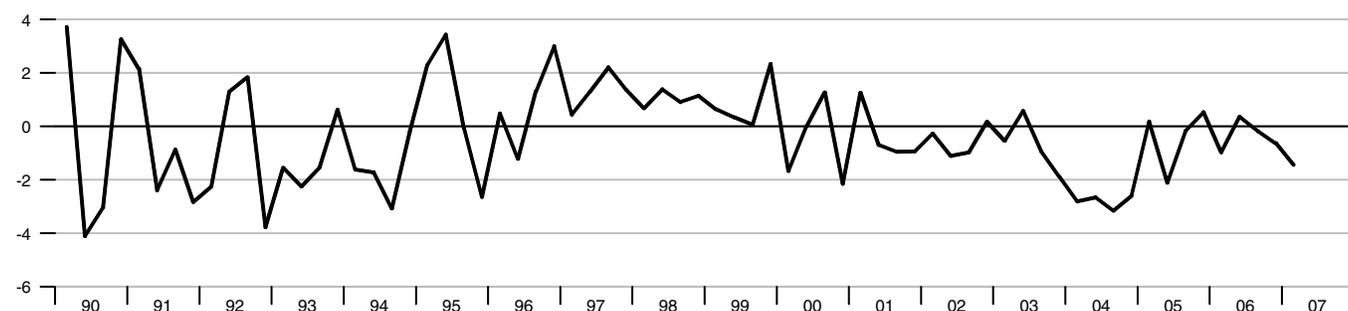
**Industrial Production**

Percent change from year ago



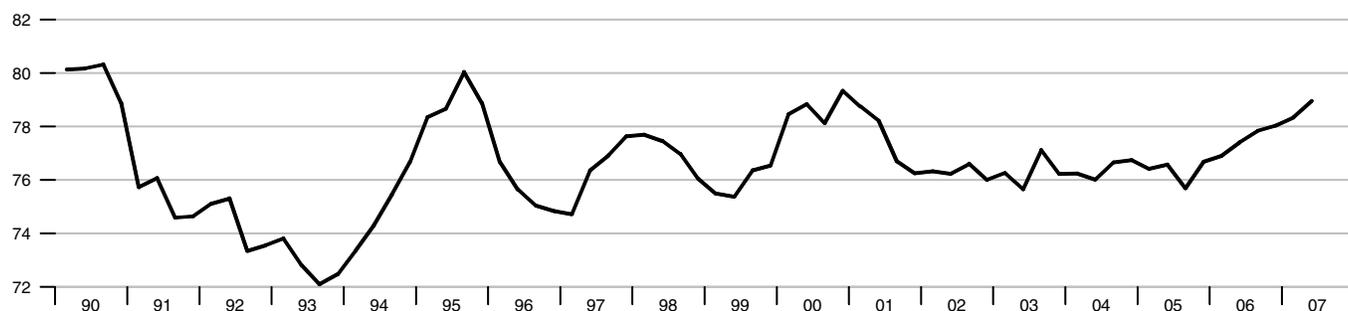
**Retail Sales**

Percent change from year ago



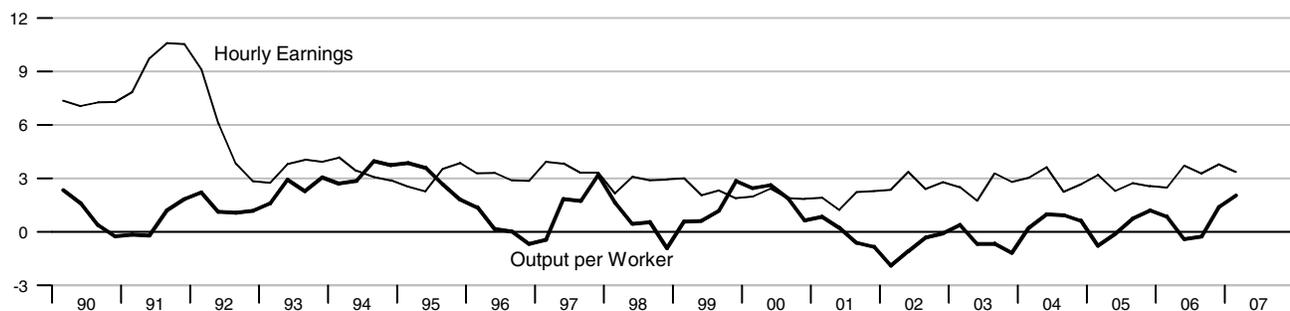
**Capacity Utilization**

Percent



### Real Hourly Earnings and Output per Worker

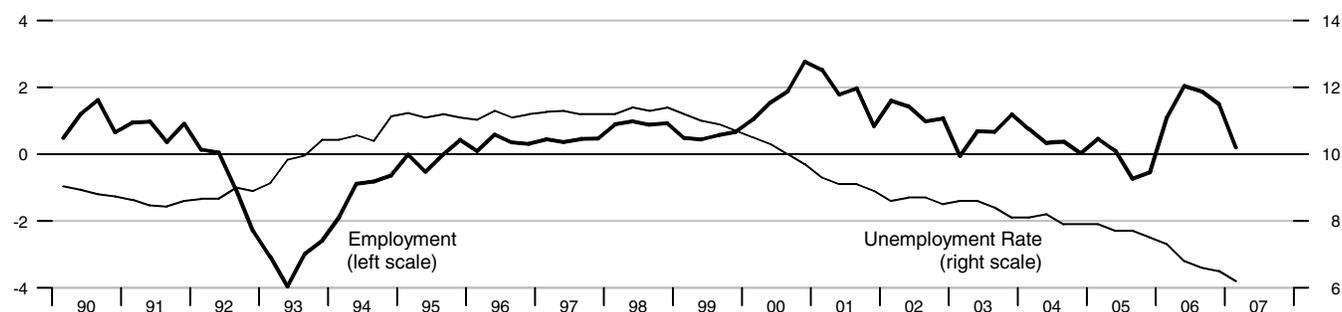
Percent change from year ago



### Labor Force Indicators

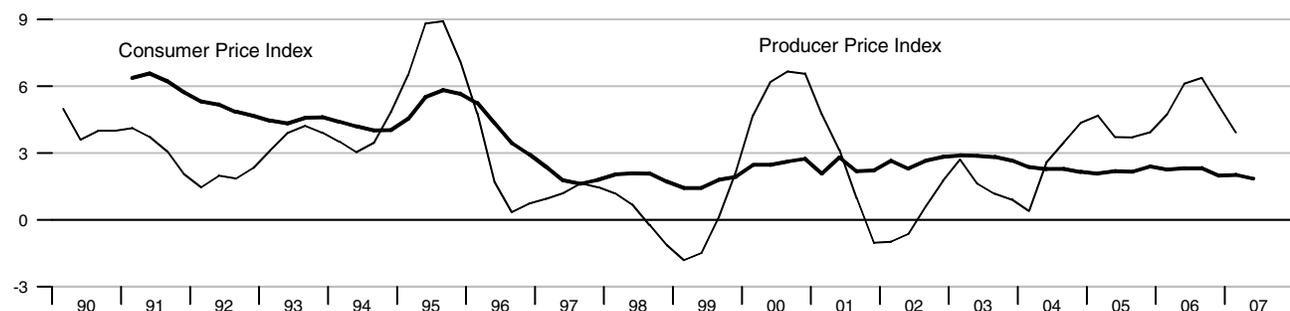
Percent change from year ago

Percent



### Inflation

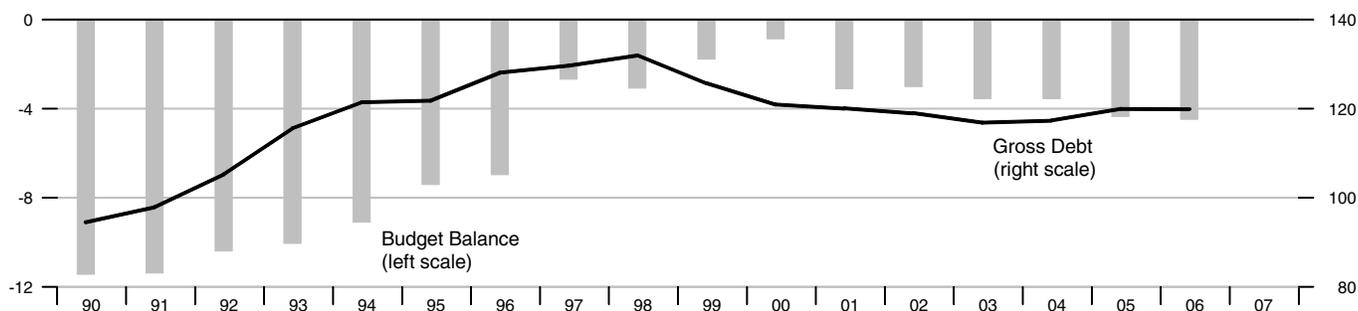
Percent change from year ago



### Gross Government Debt and Budget Balance

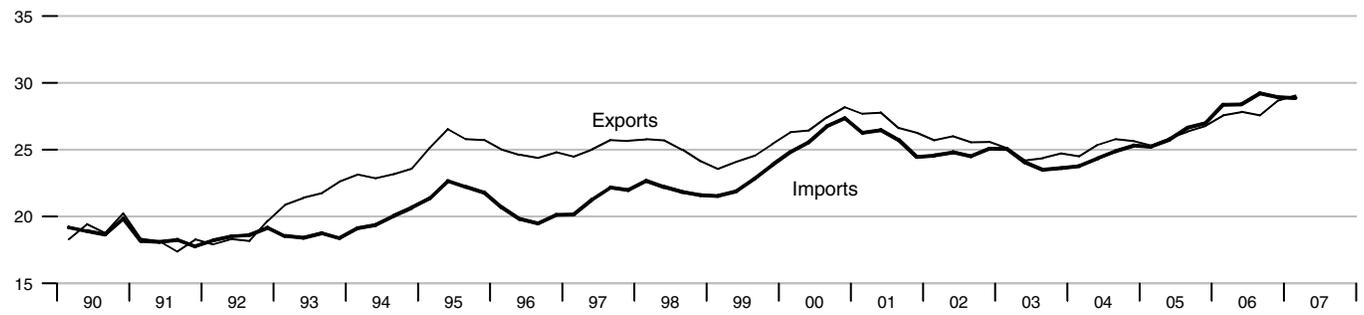
Percent of GDP, annual data

Percent of GDP, annual data



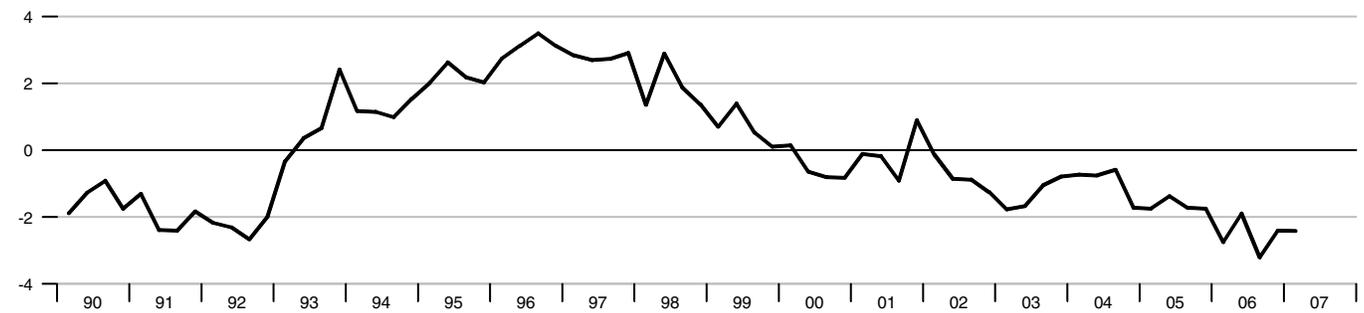
**International Trade - Goods and Services**

Percent of GDP



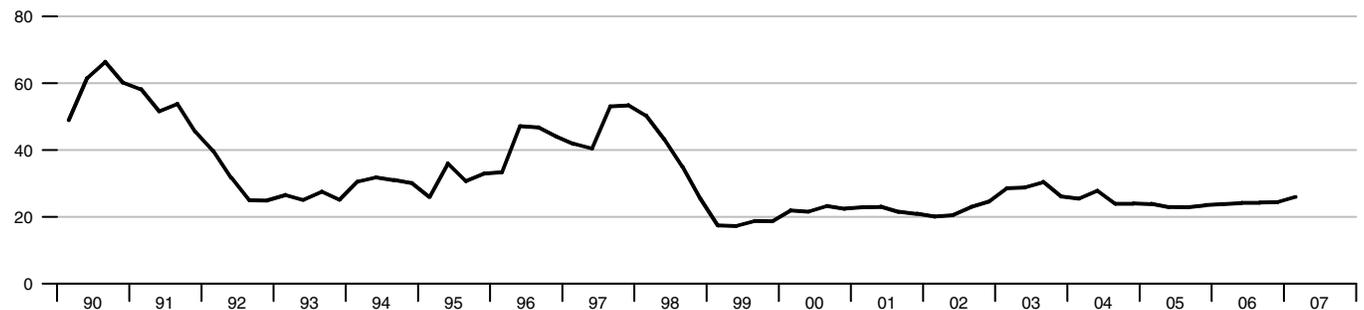
**Current Account Balance**

Percent of GDP



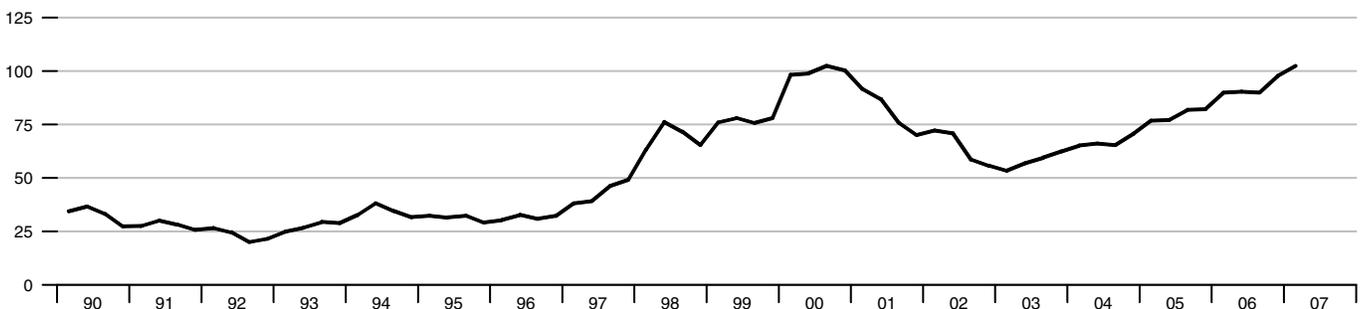
**Foreign Exchange Reserves**

Billions of US\$



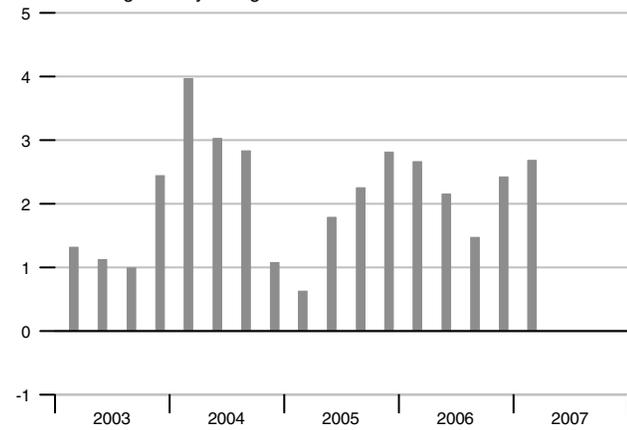
**Stock Exchange Index - Milan Stock Exchange**

2000 = 100



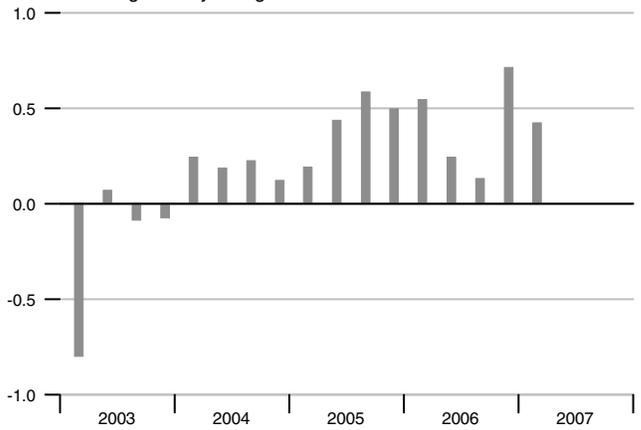
**Real GDP**

Percent change from year ago



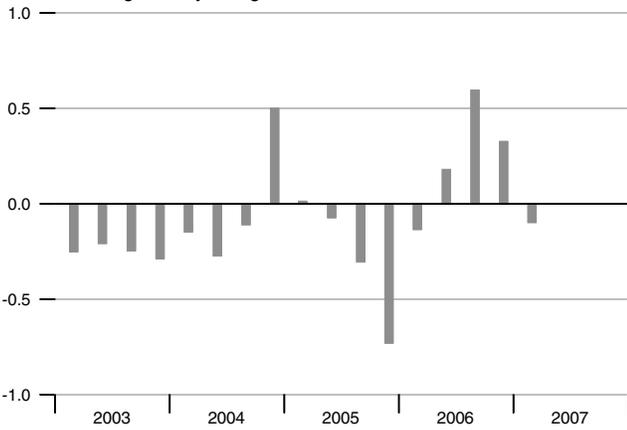
**Employment**

Percent change from year ago



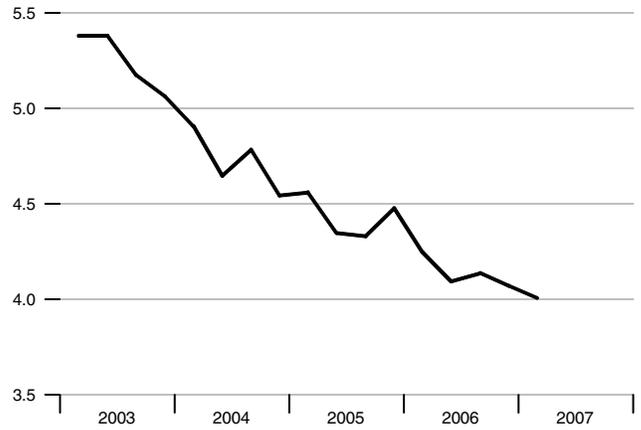
**Consumer Price Index**

Percent change from year ago



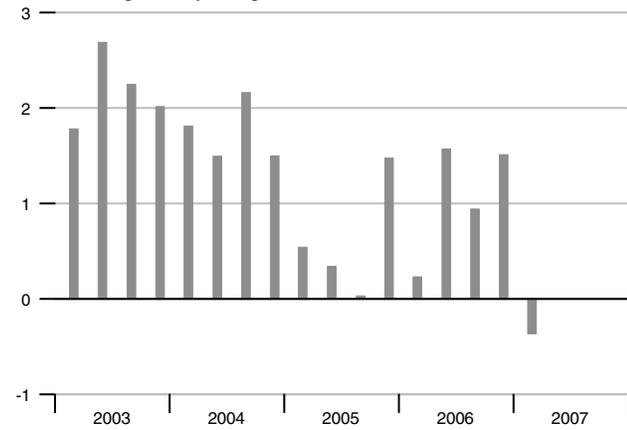
**Unemployment Rate**

Percent



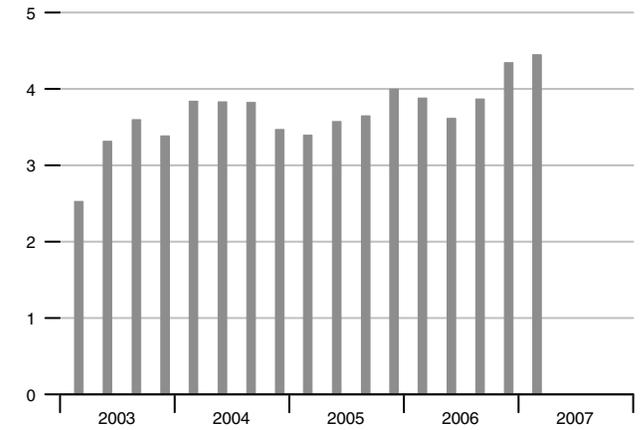
**Real Monthly Earnings**

Percent change from year ago

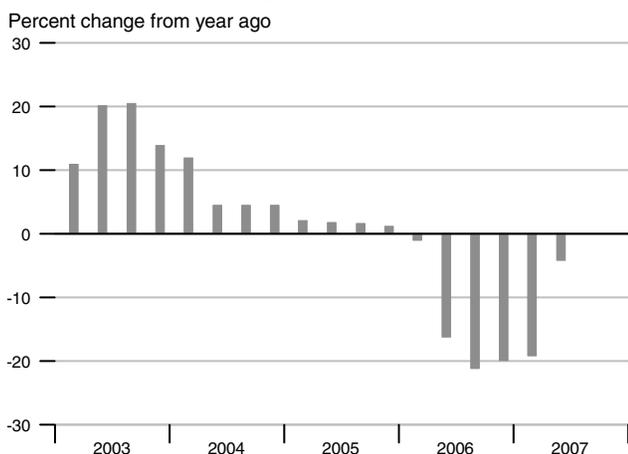


**Current Account Balance**

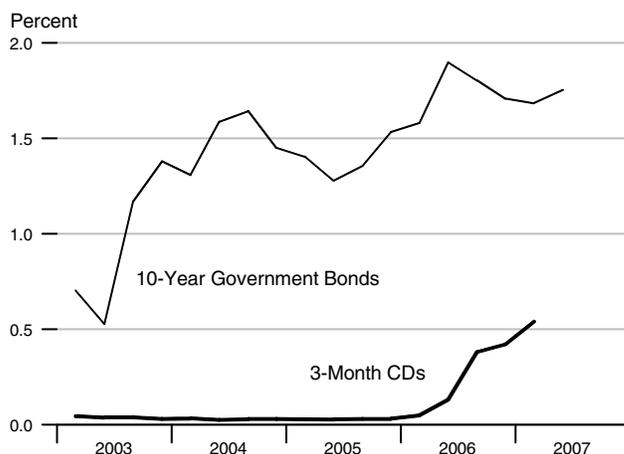
Percent of GDP



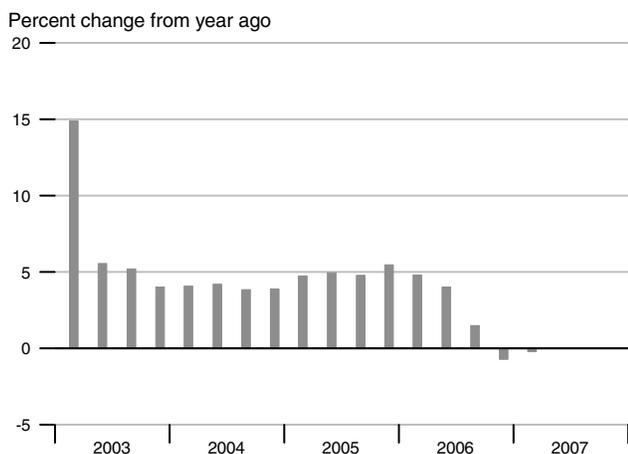
### Adjusted Monetary Base



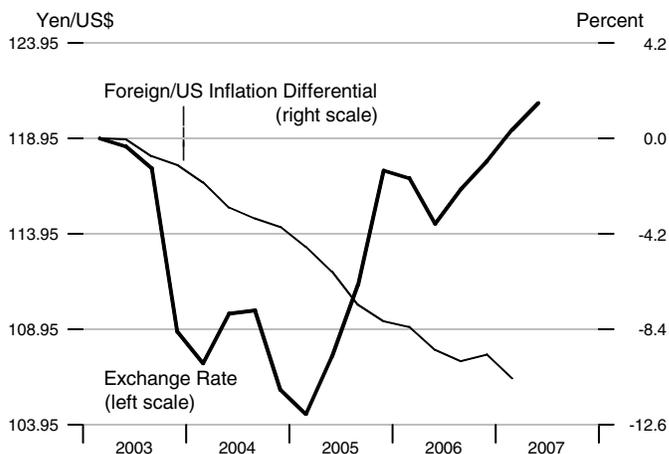
### Interest Rates



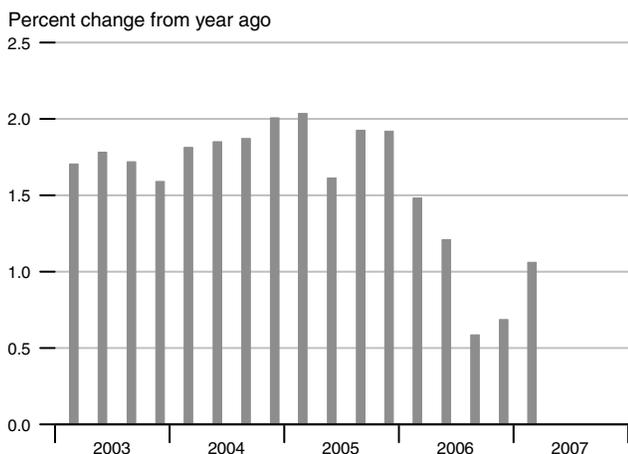
### M1



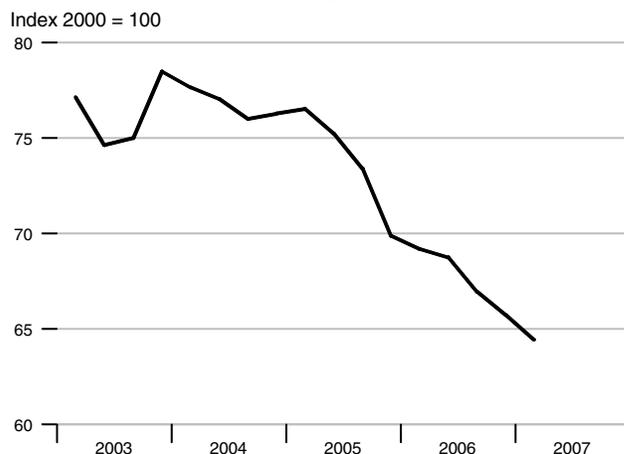
### Exchange Rate and Inflation Differential



### M2

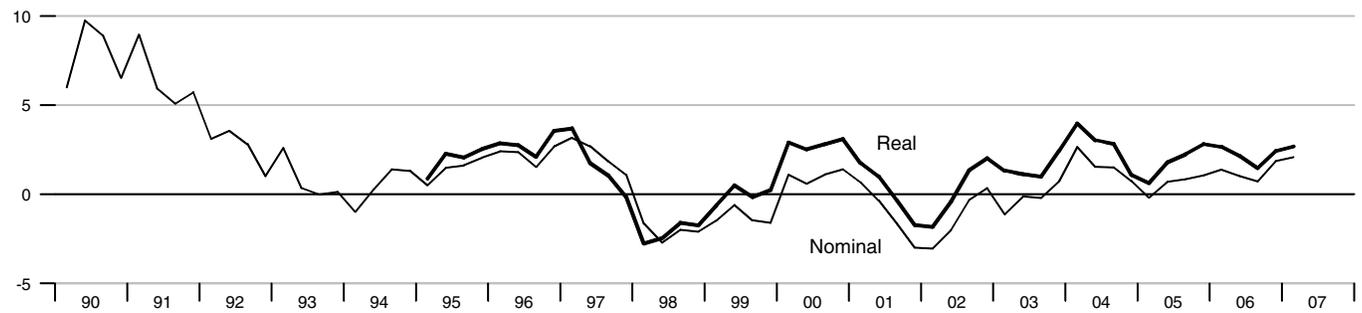


### Real Effective Exchange Rate



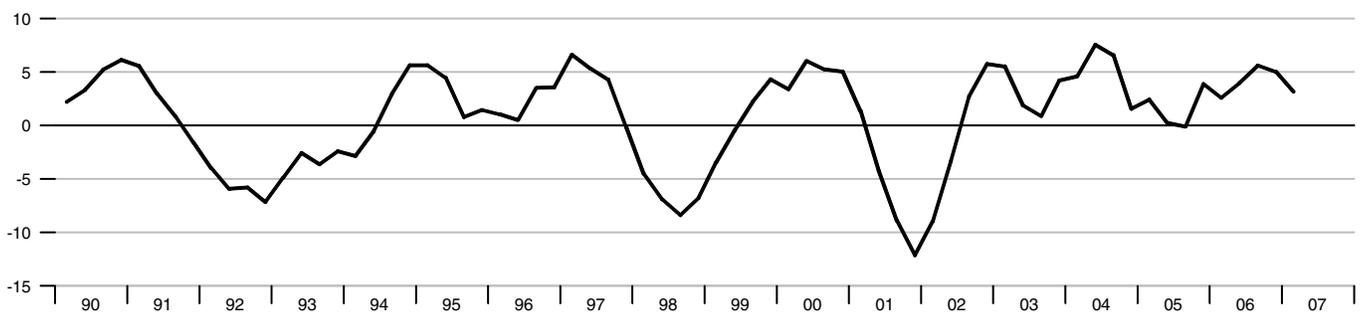
**GDP**

Percent change from year ago



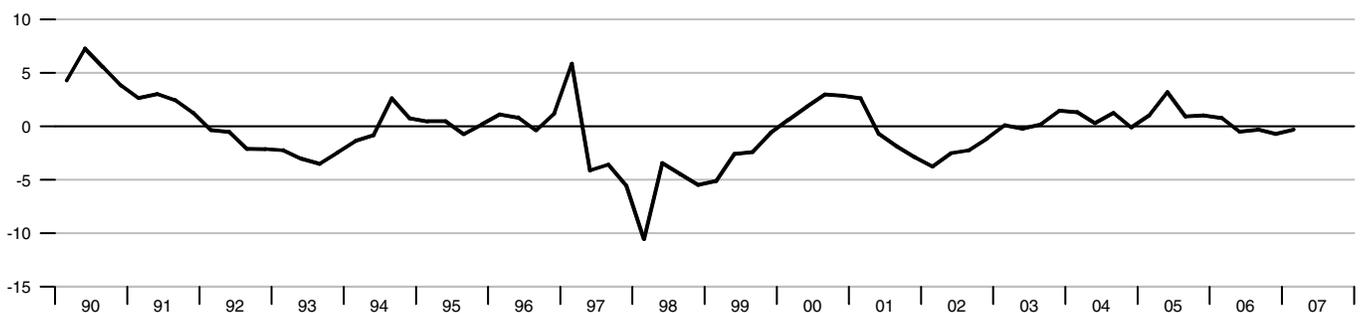
**Industrial Production**

Percent change from year ago



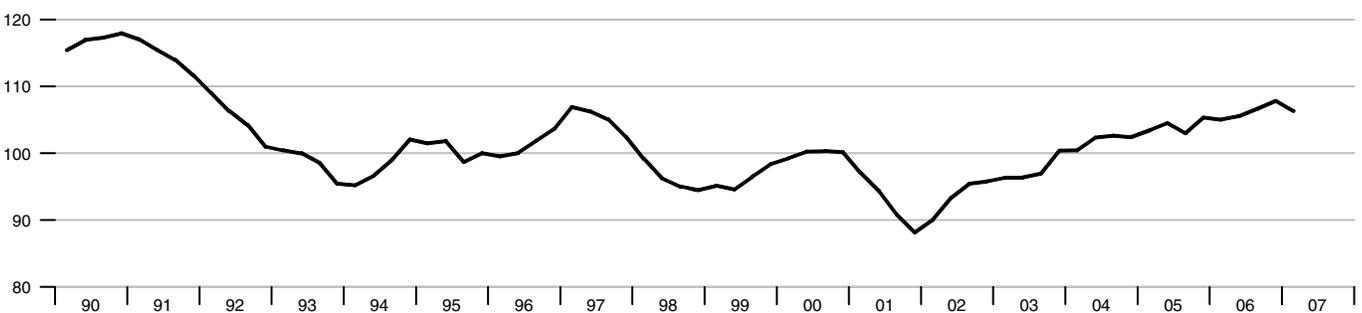
**Retail Sales**

Percent change from year ago



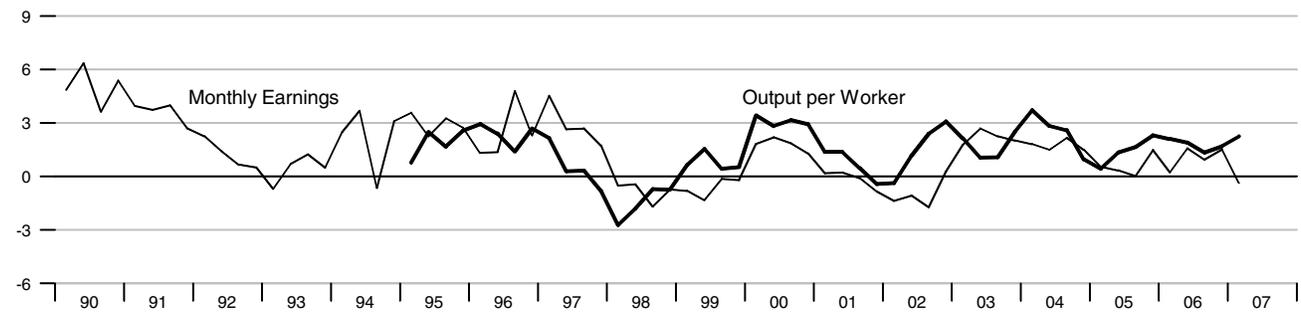
**Capacity Utilization**

2000 = 100



### Real Monthly Earnings and Output per Worker

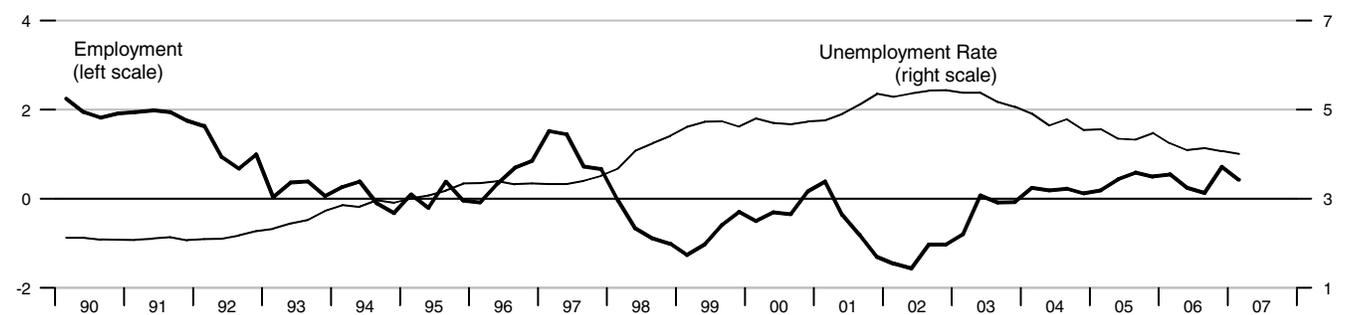
Percent change from year ago



### Labor Force Indicators

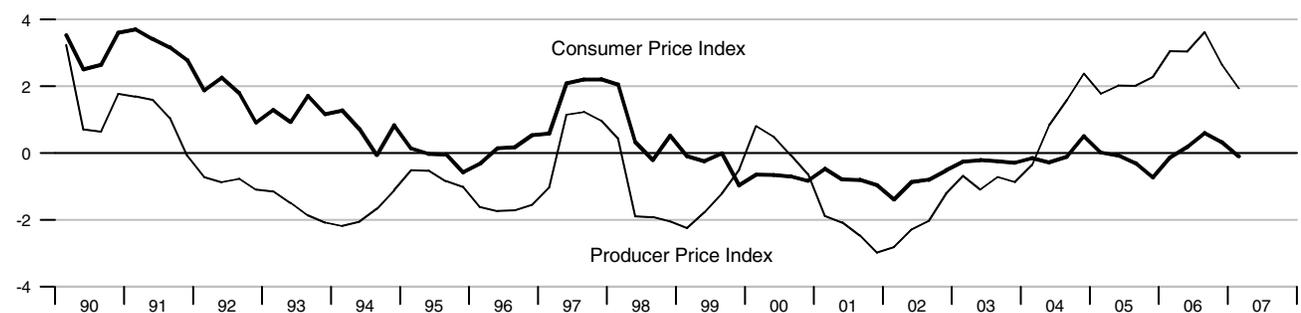
Percent change from year ago

Percent



### Inflation

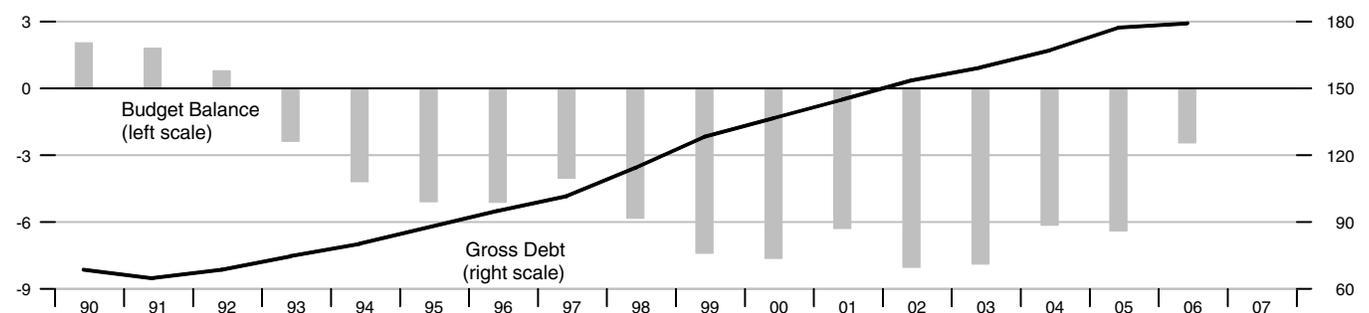
Percent change from year ago



### Gross Government Debt and Budget Balance

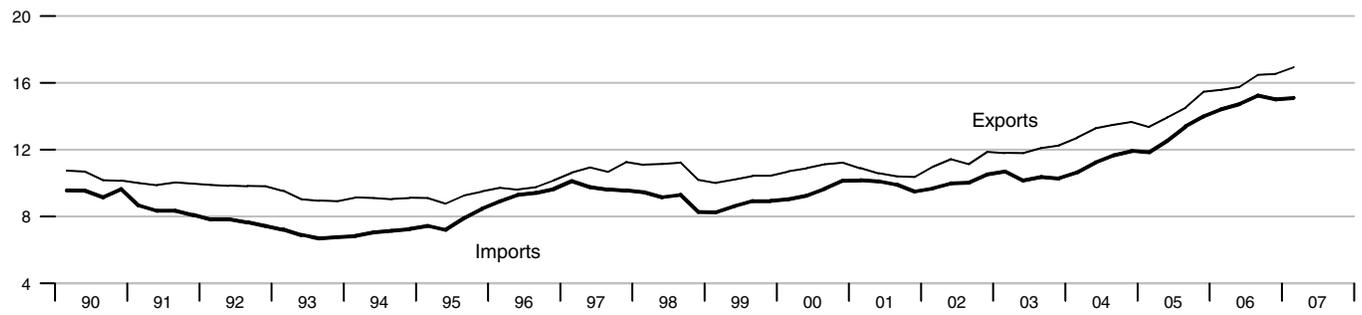
Percent of GDP, annual data

Percent of GDP, annual data



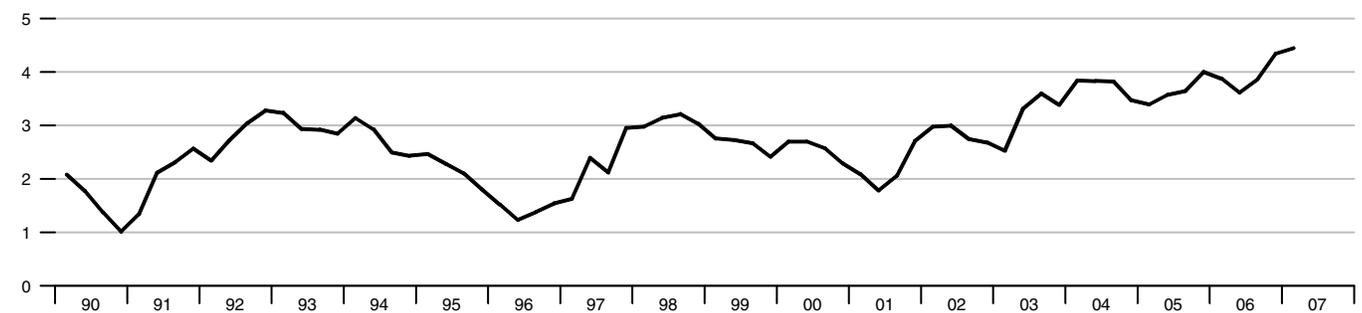
**International Trade - Goods and Services**

Percent of GDP



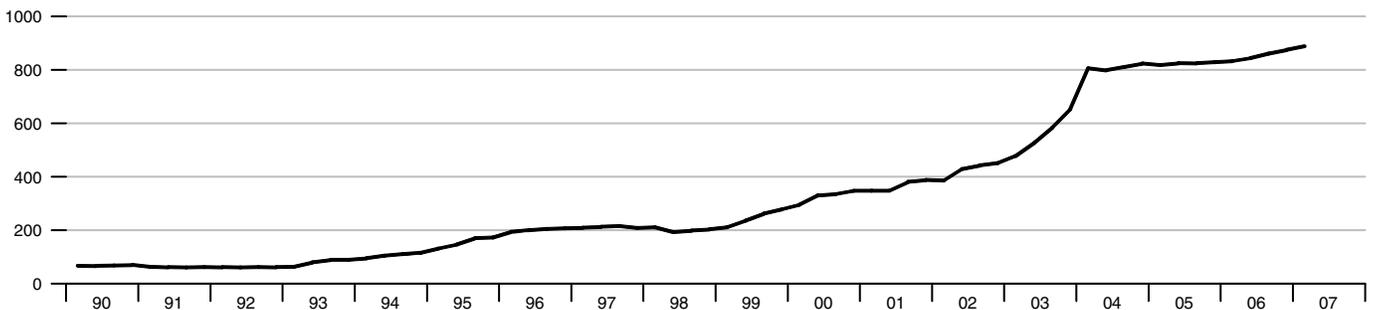
**Current Account Balance**

Percent of GDP



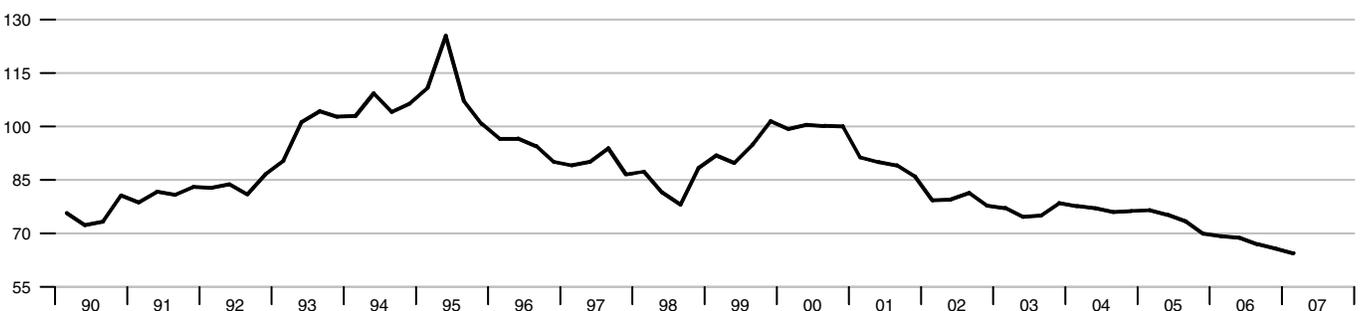
**Foreign Exchange Reserves**

Billions of US\$



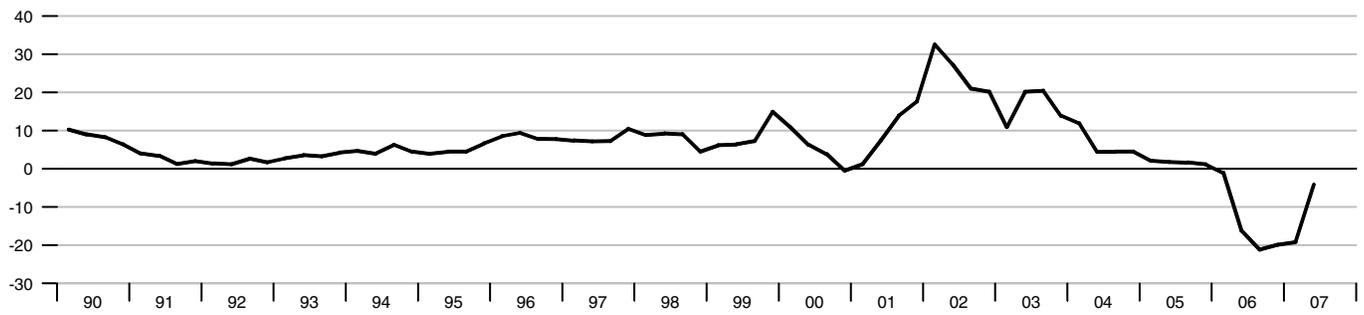
**Real Effective Exchange Rate**

Index 2000 = 100



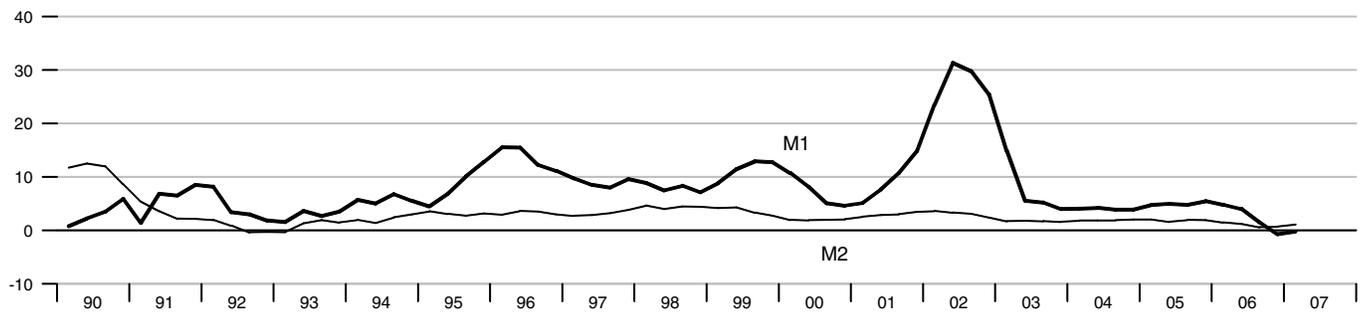
**Adjusted Monetary Base**

Percent change from year ago



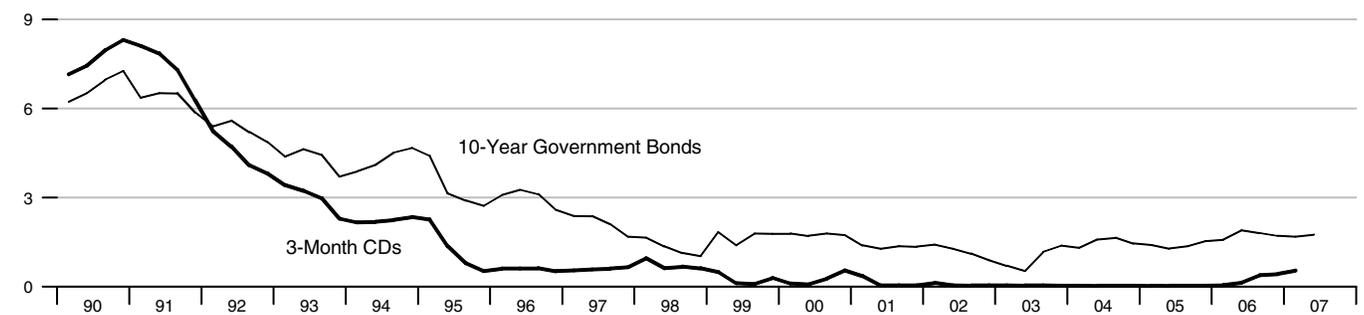
**Monetary Aggregates**

Percent change from year ago



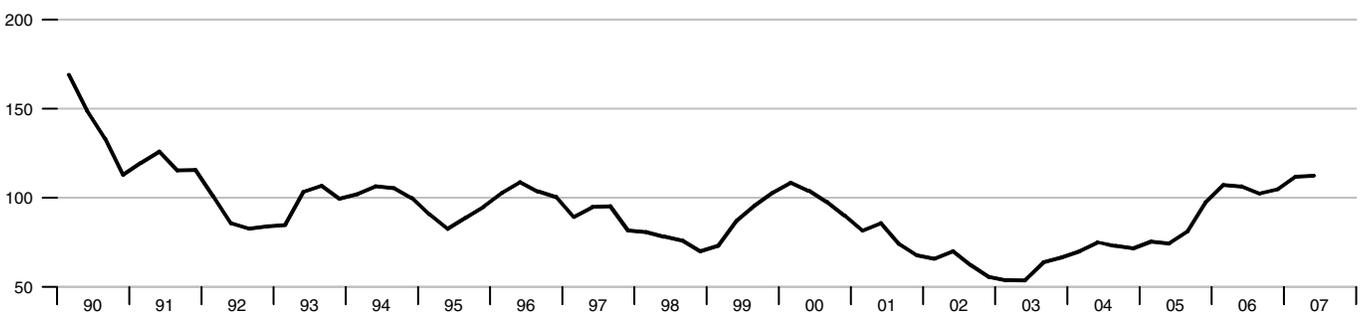
**Interest Rates**

Percent



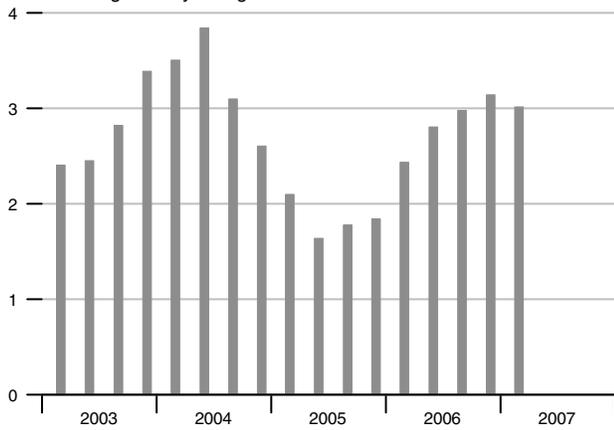
**Stock Exchange Index - Tokyo Stock Exchange**

2000 = 100



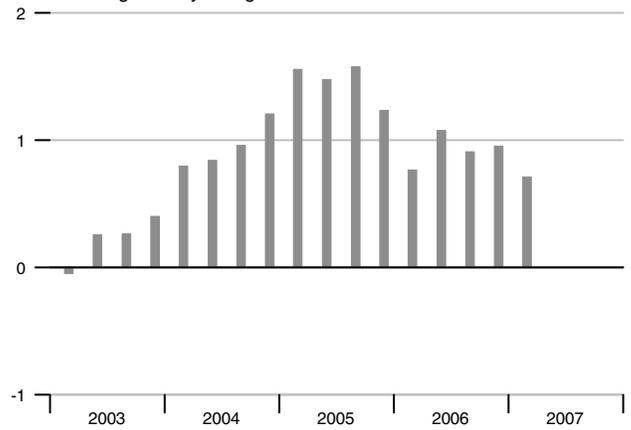
**Real GDP**

Percent change from year ago



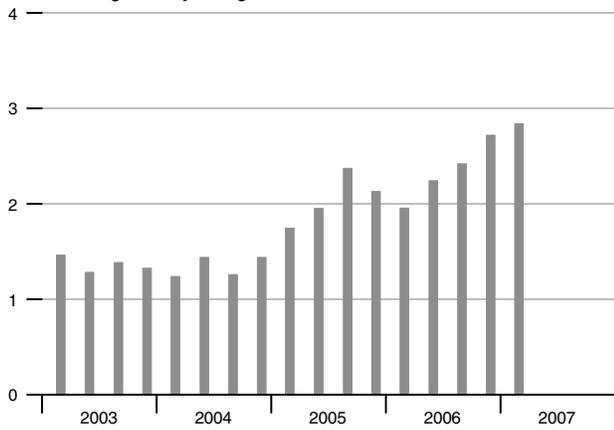
**Employment**

Percent change from year ago



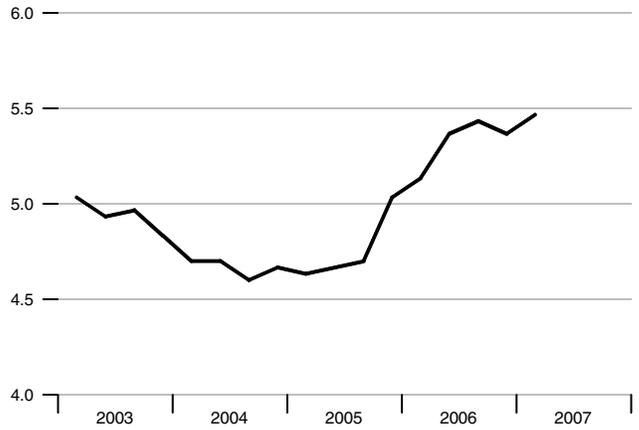
**Consumer Price Index**

Percent change from year ago



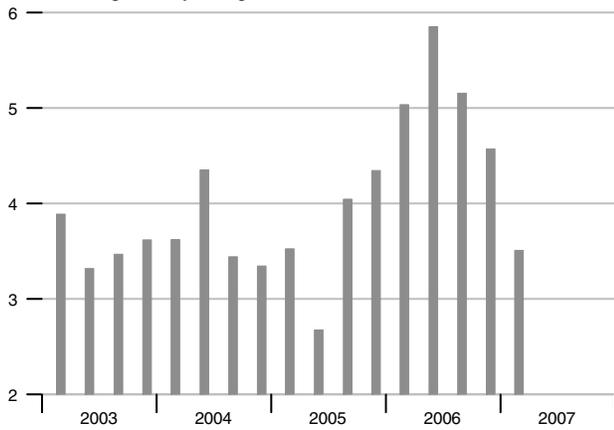
**Unemployment Rate**

Percent



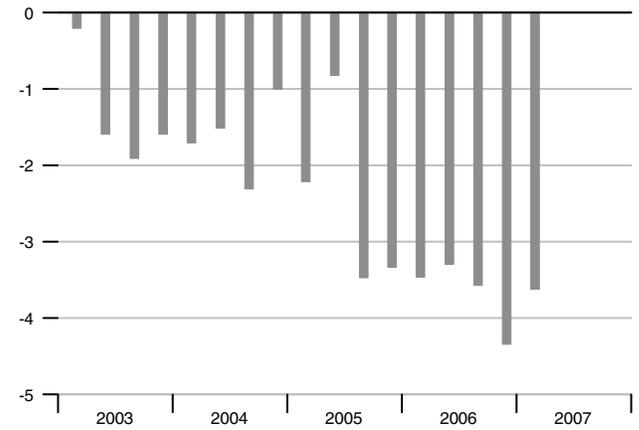
**Real Weekly Earnings**

Percent change from year ago

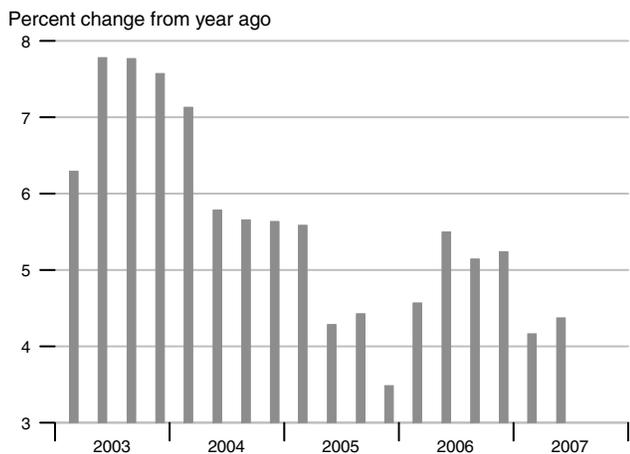


**Current Account Balance**

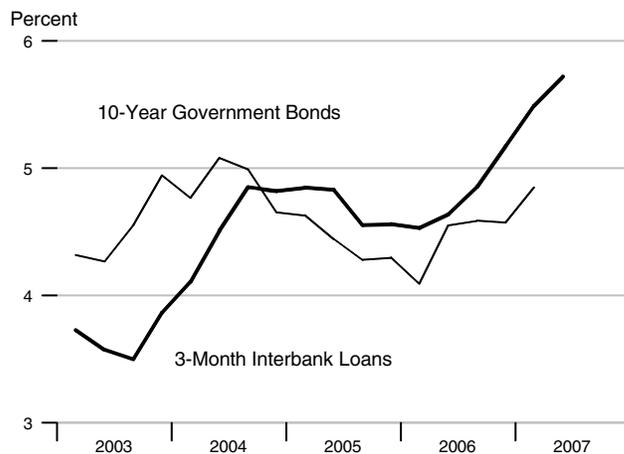
Percent of GDP



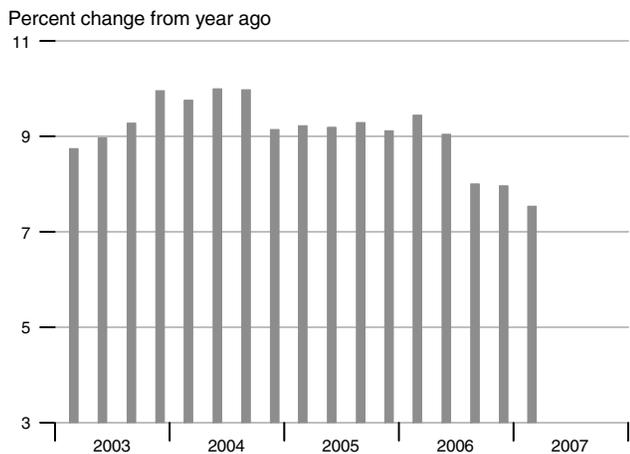
Notes and Coins in Circulation



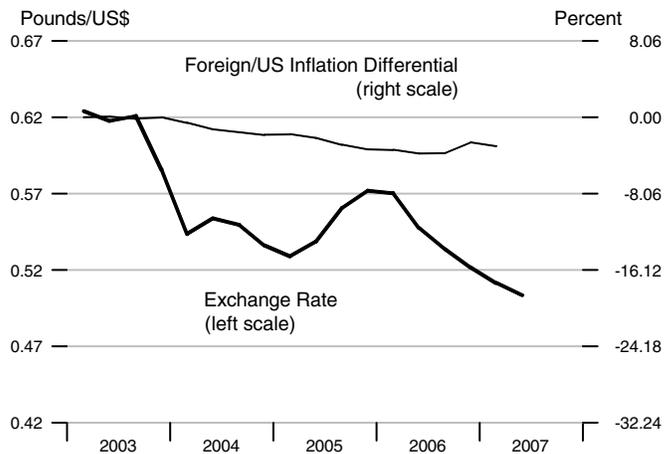
Interest Rates



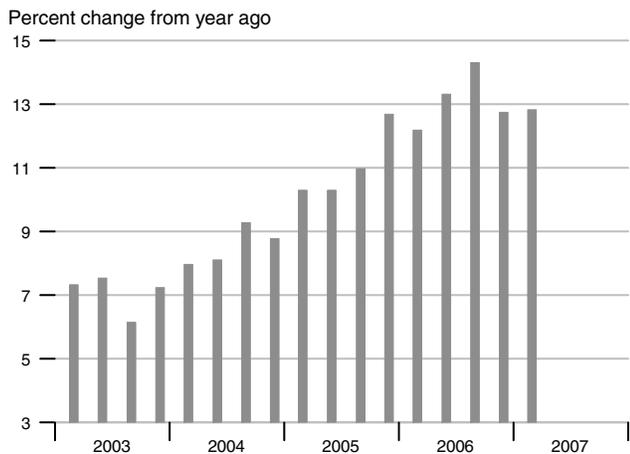
M2



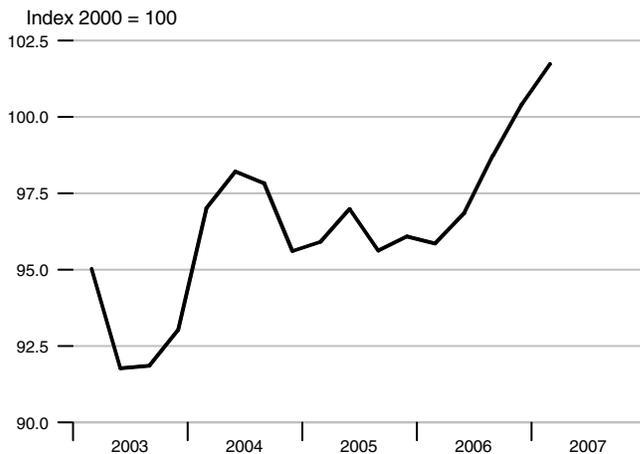
Exchange Rate and Inflation Differential



M4

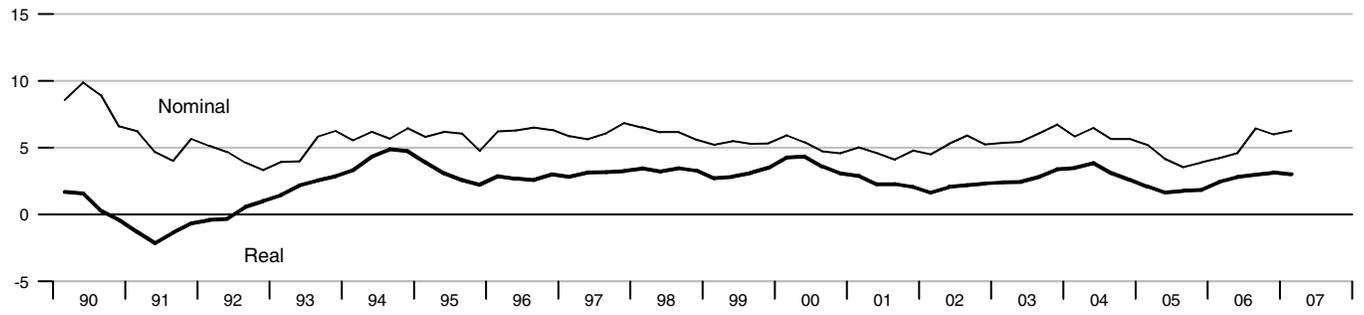


Real Effective Exchange Rate



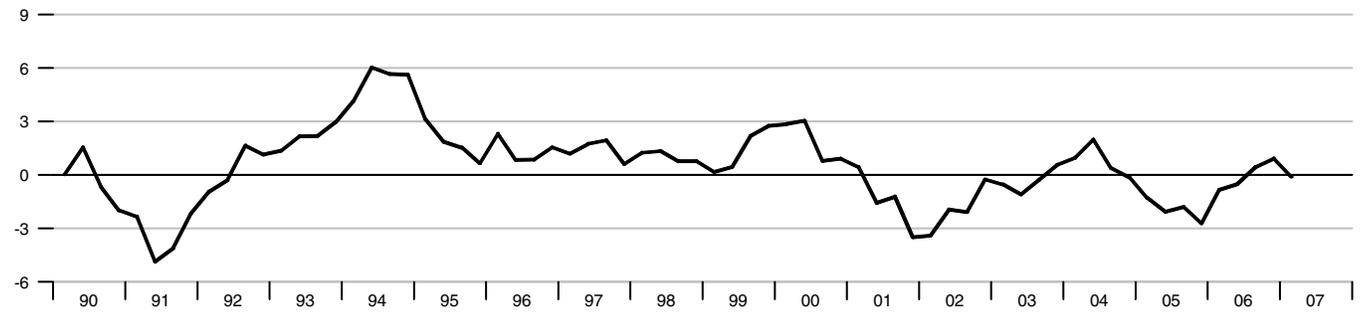
**GDP**

Percent change from year ago



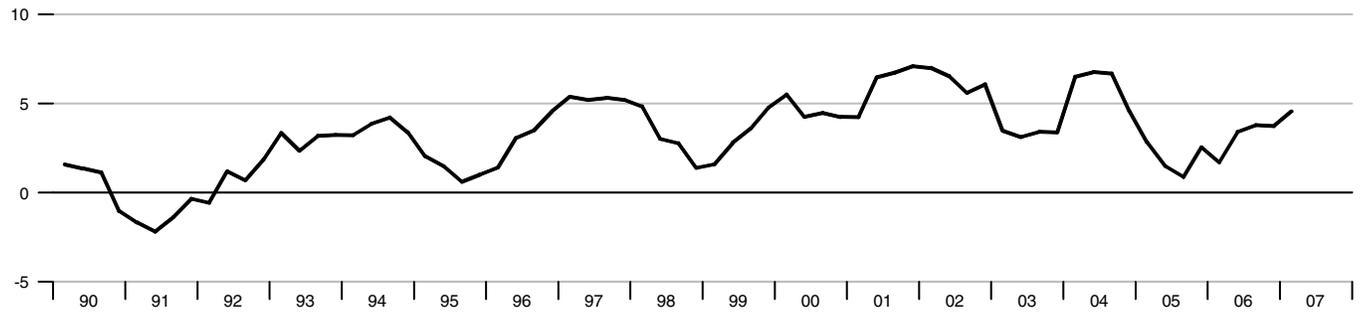
**Industrial Production**

Percent change from year ago



**Retail Sales**

Percent change from year ago



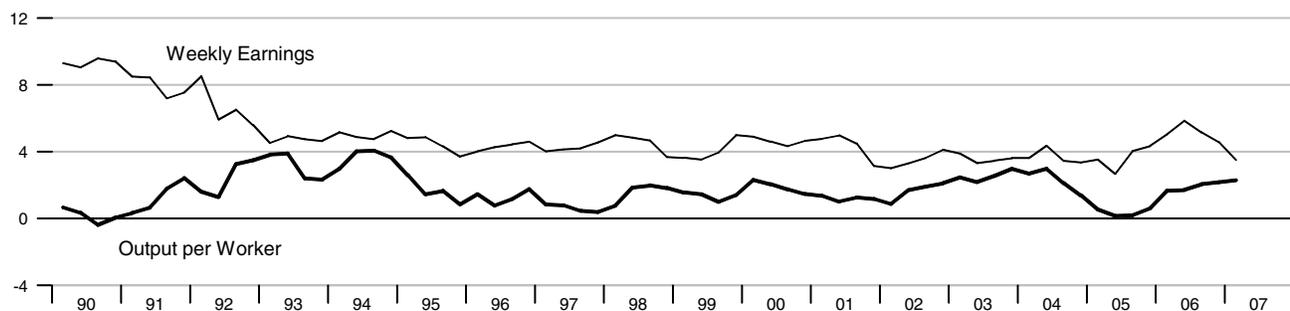
**Capacity Utilization**

Percent



### Real Weekly Earnings and Output per Worker

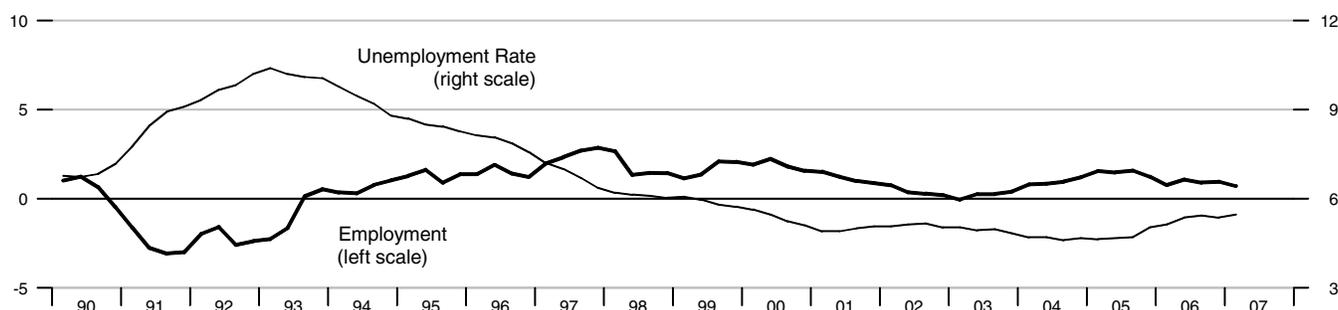
Percent change from year ago



### Labor Force Indicators

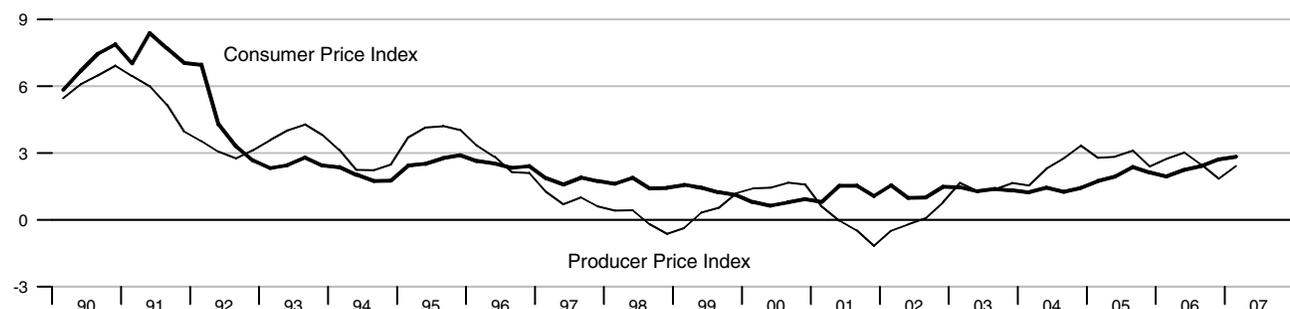
Percent change from year ago

Percent



### Inflation

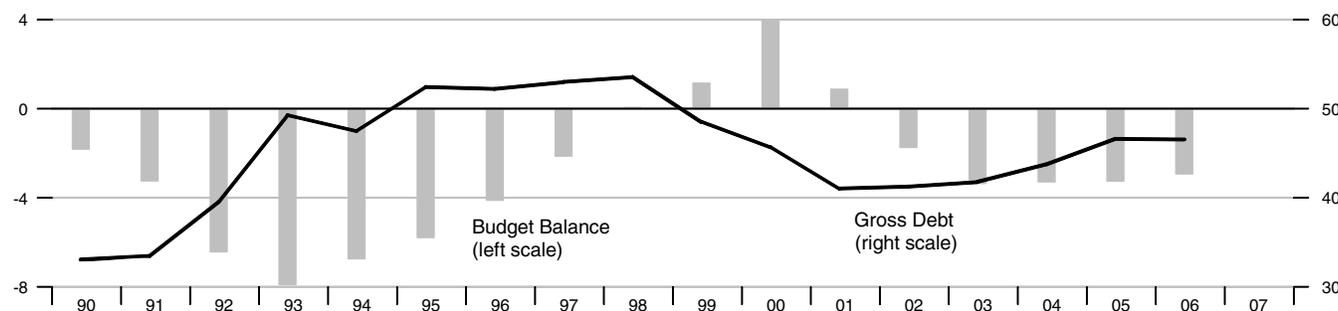
Percent change from year ago



### Gross Government Debt and Budget Balance

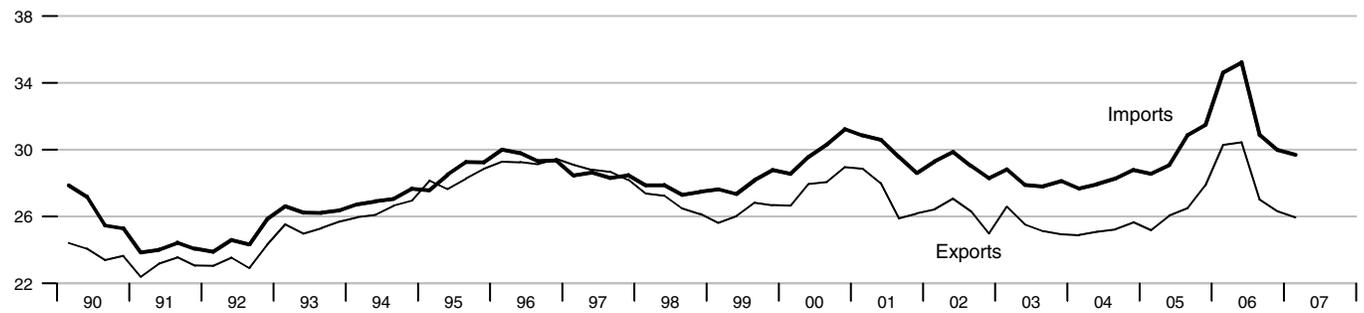
Percent of GDP, annual data

Percent of GDP, annual data



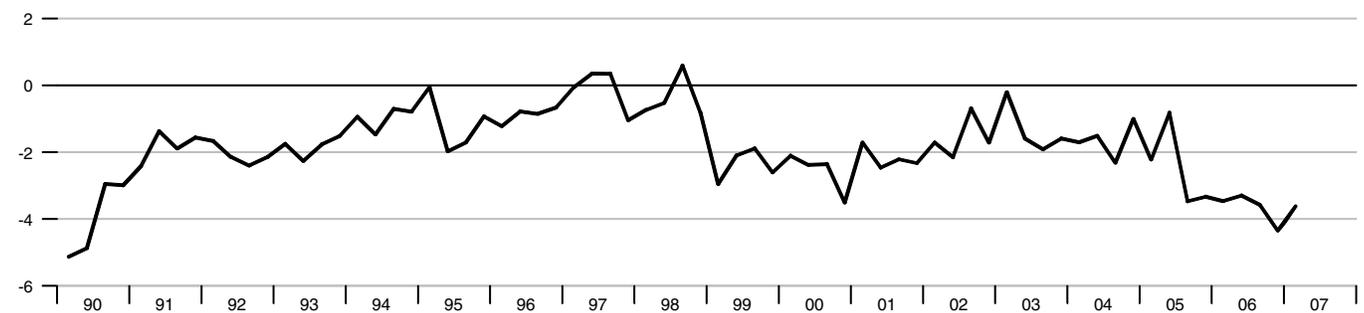
**International Trade - Goods and Services**

Percent of GDP



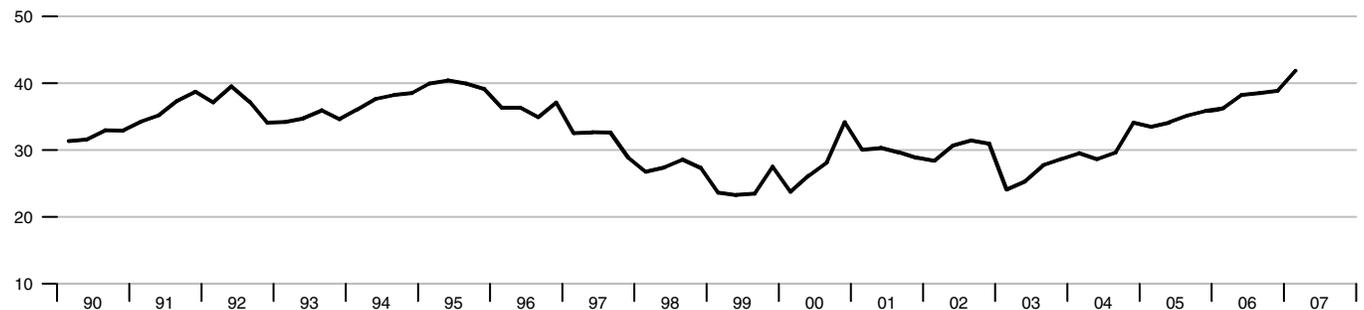
**Current Account Balance**

Percent of GDP



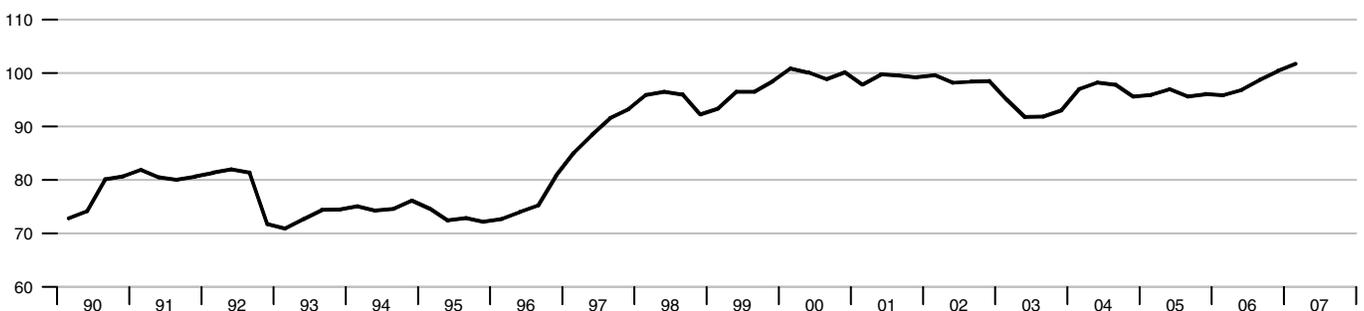
**Foreign Exchange Reserves**

Billions of US\$



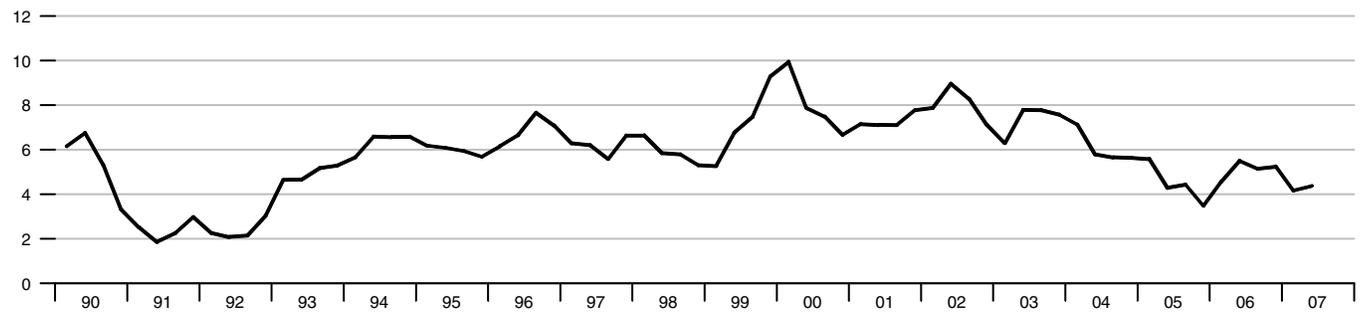
**Real Effective Exchange Rate**

Index 2000 = 100



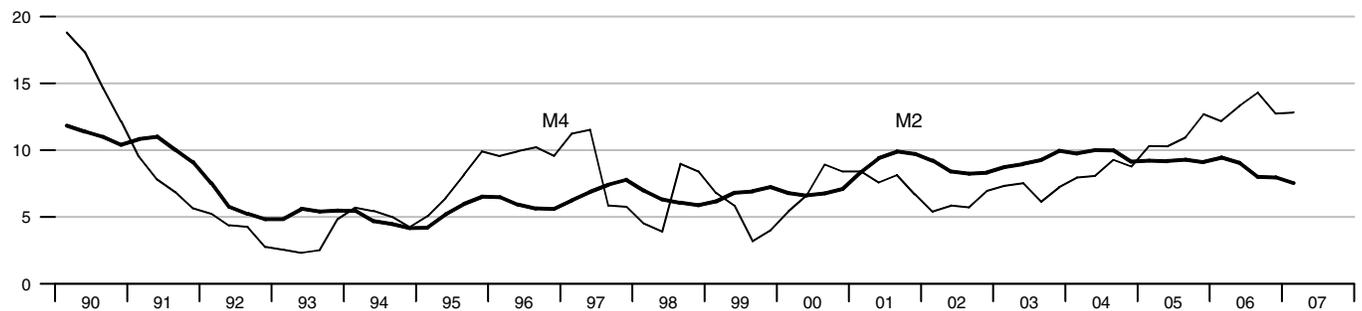
**Notes and Coins in Circulation**

Percent change from year ago



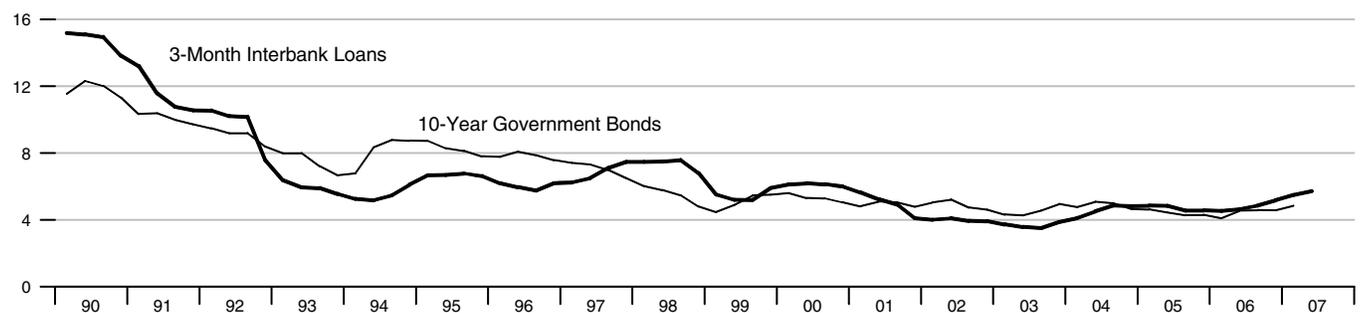
**Monetary Aggregates**

Percent change from year ago



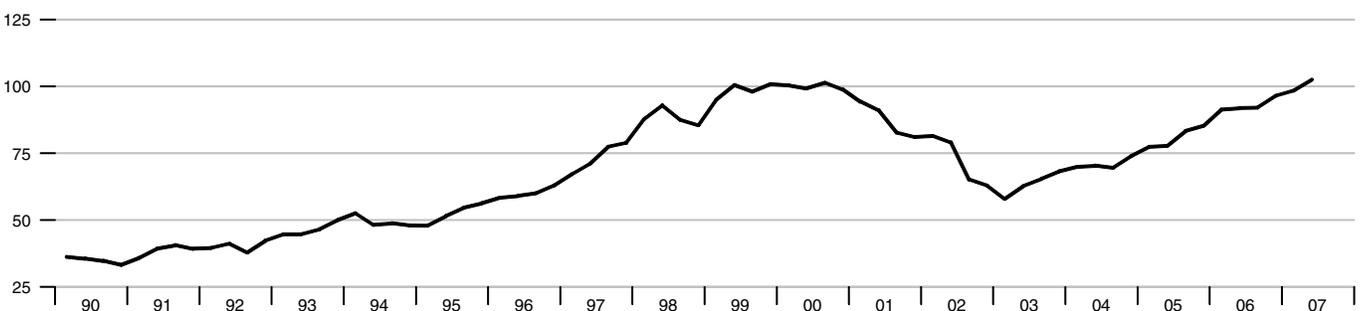
**Interest Rates**

Percent



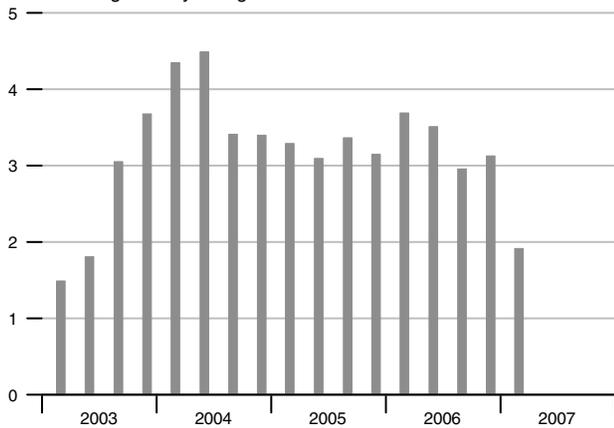
**Stock Exchange Index - Financial Times Stock Exchange**

2000 = 100



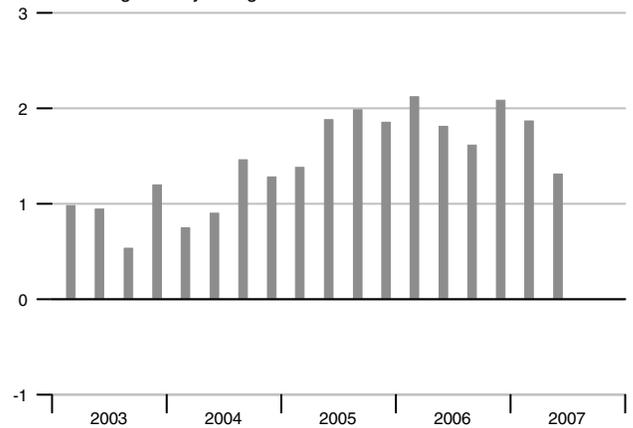
**Real GDP**

Percent change from year ago



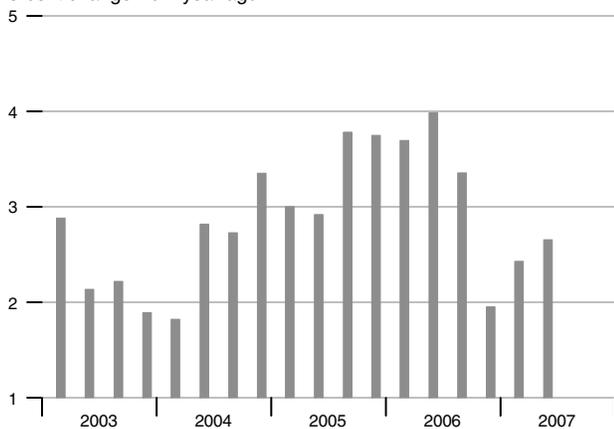
**Employment**

Percent change from year ago



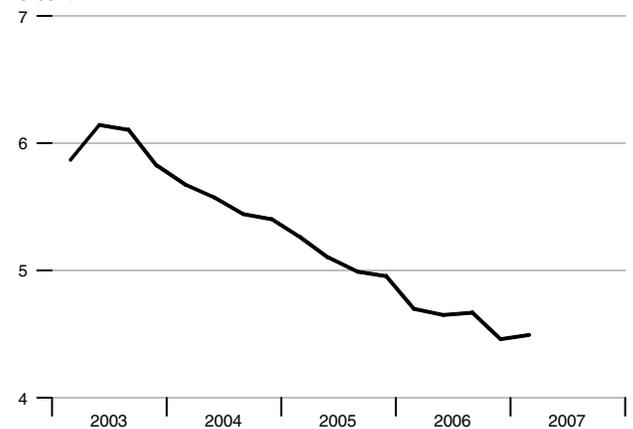
**Consumer Price Index**

Percent change from year ago



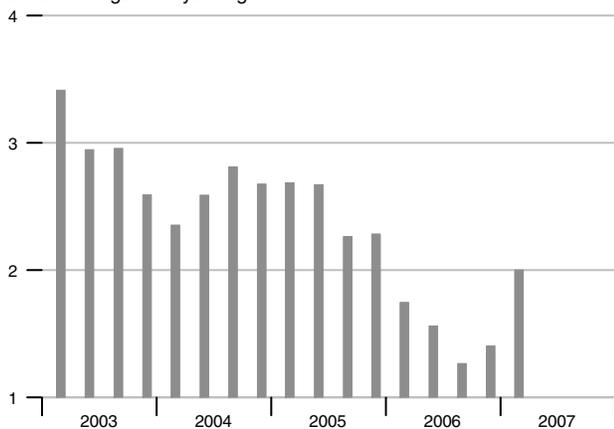
**Unemployment Rate**

Percent



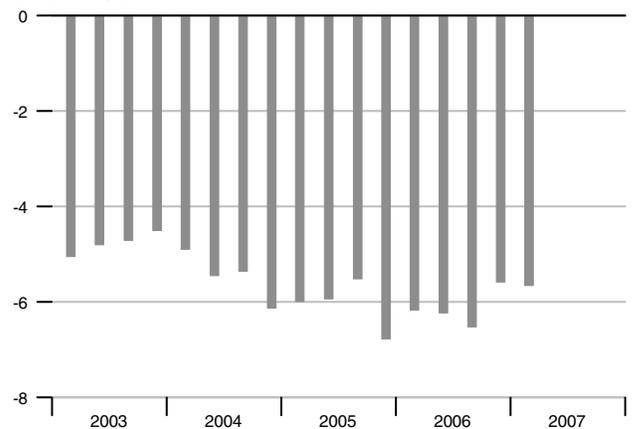
**Real Hourly Earnings**

Percent change from year ago



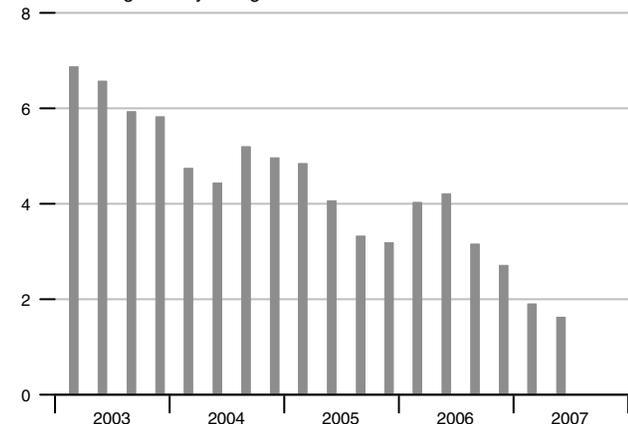
**Current Account Balance**

Percent of GDP



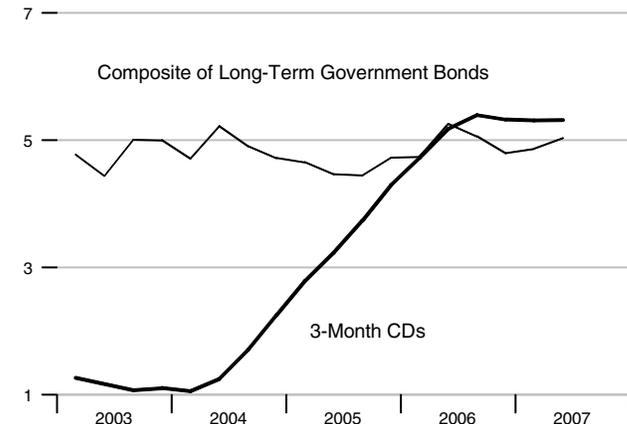
**Adjusted Monetary Base**

Percent change from year ago



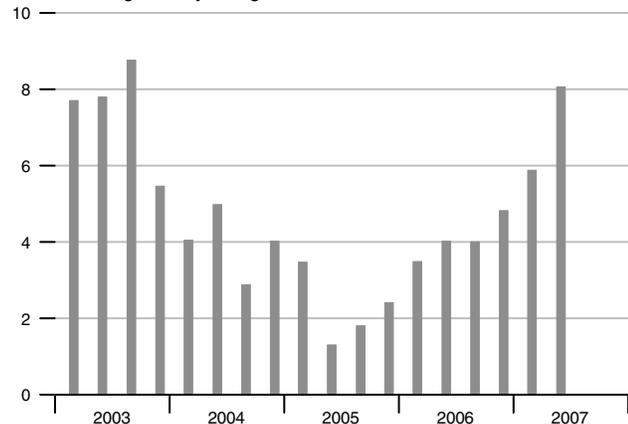
**Interest Rates**

Percent

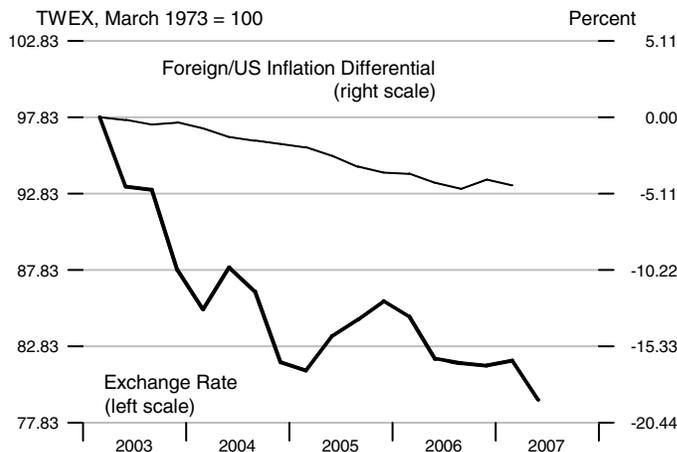


**MZM**

Percent change from year ago

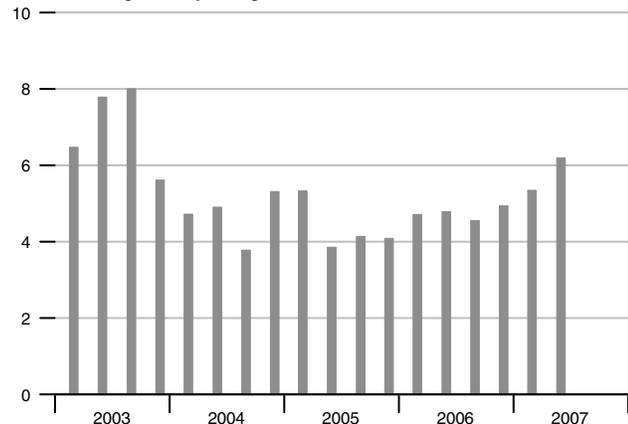


**Exchange Rate and Inflation Differential**



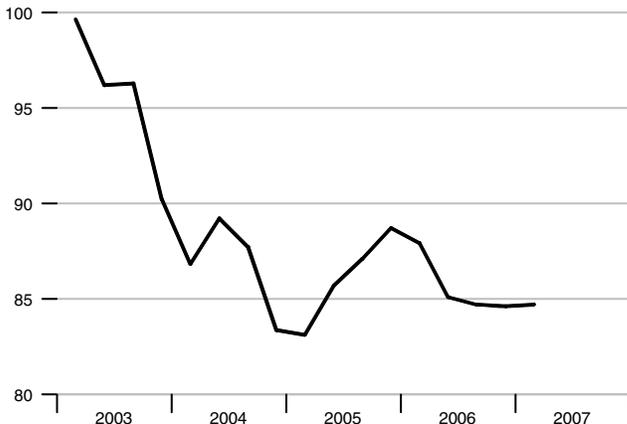
**M2**

Percent change from year ago



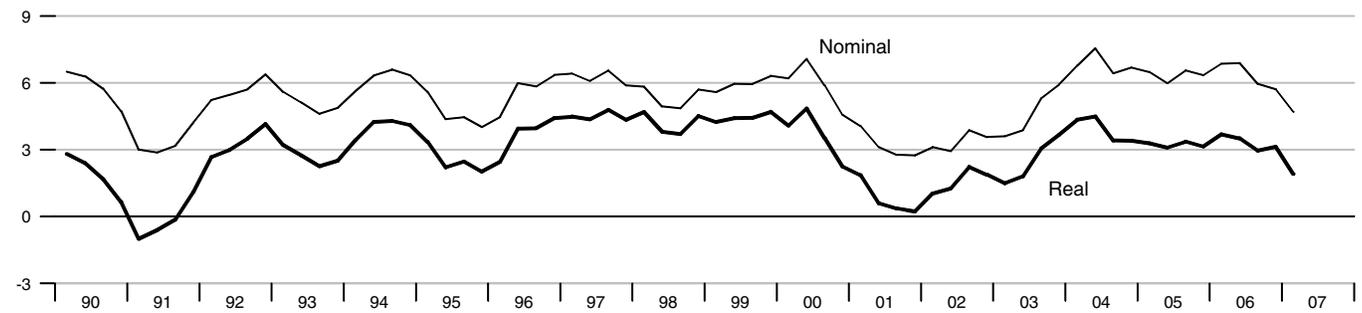
**Real Effective Exchange Rate**

Index 2000 = 100



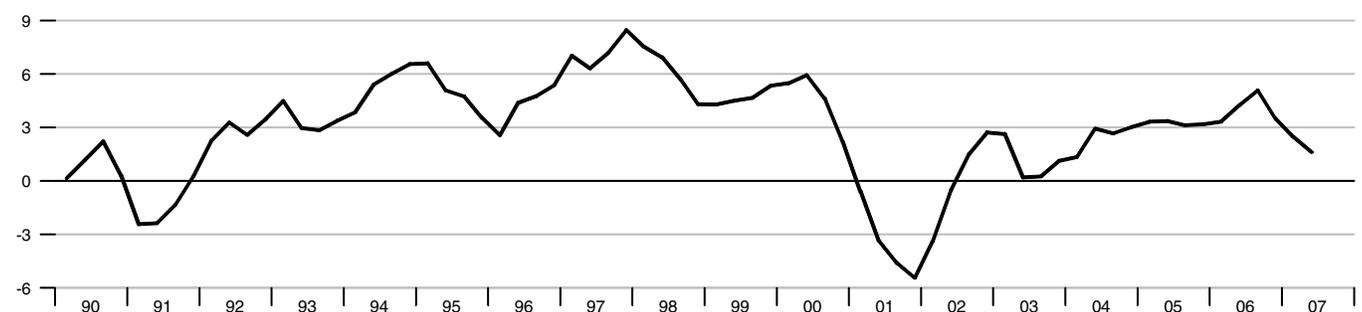
**GDP**

Percent change from year ago



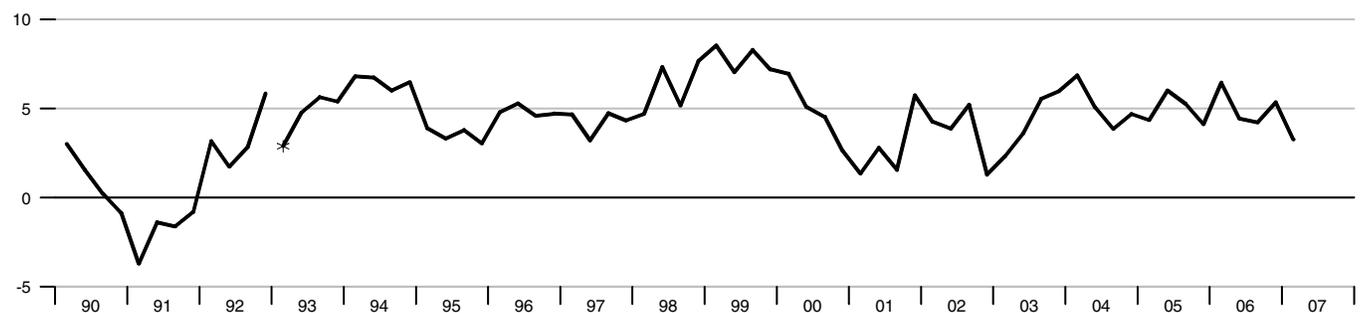
**Industrial Production**

Percent change from year ago



**Retail Sales**

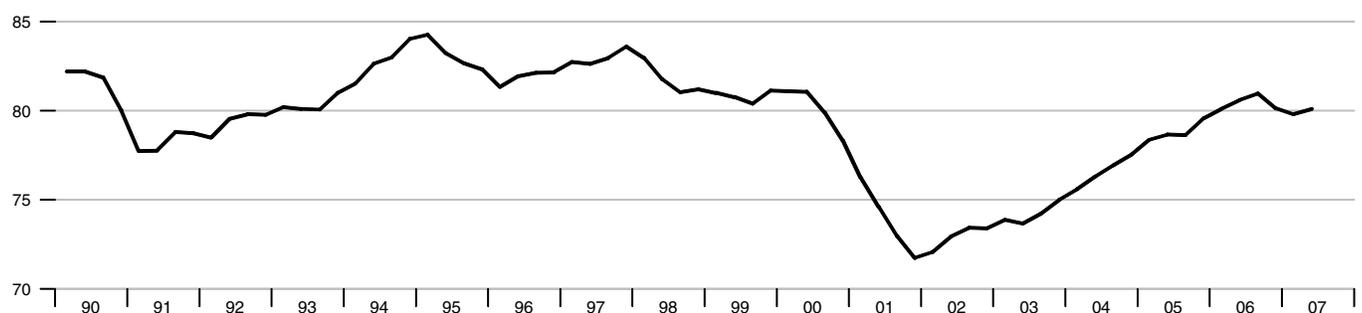
Percent change from year ago



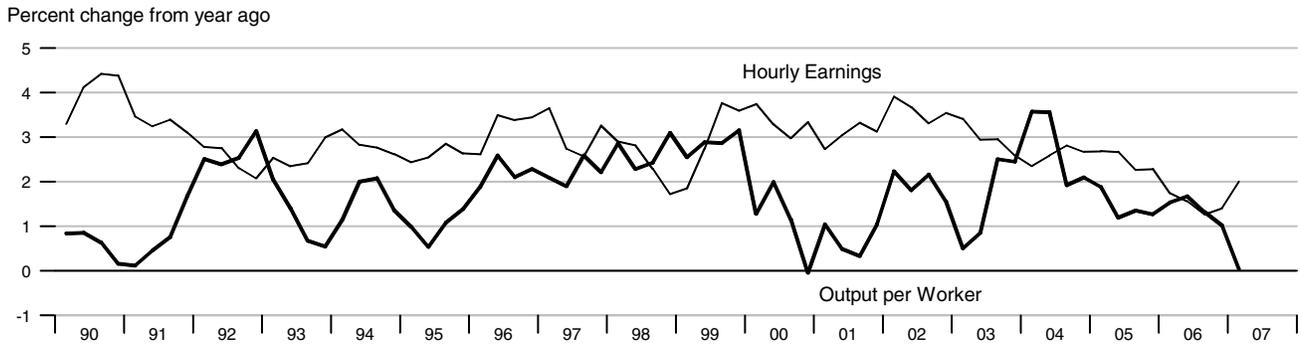
\*Data prior to 1993 may not be strictly comparable with later figures (see Notes).

**Capacity Utilization**

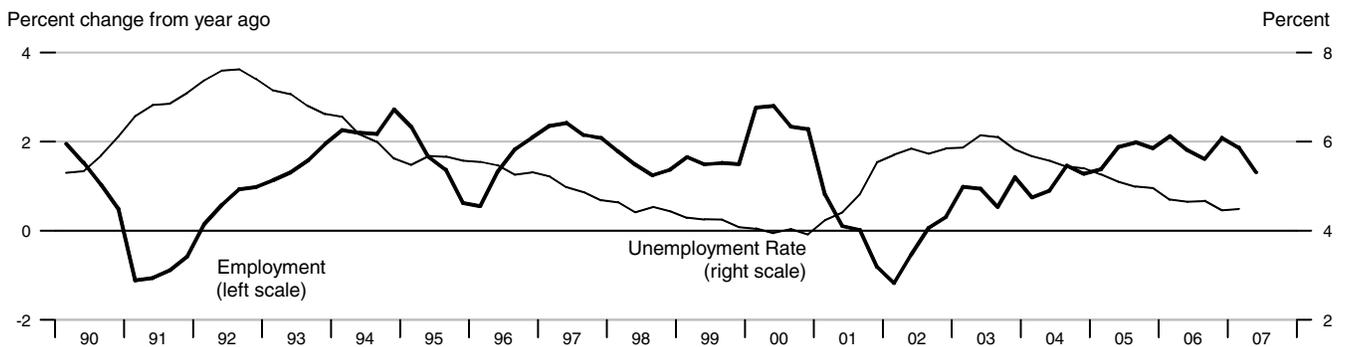
Percent



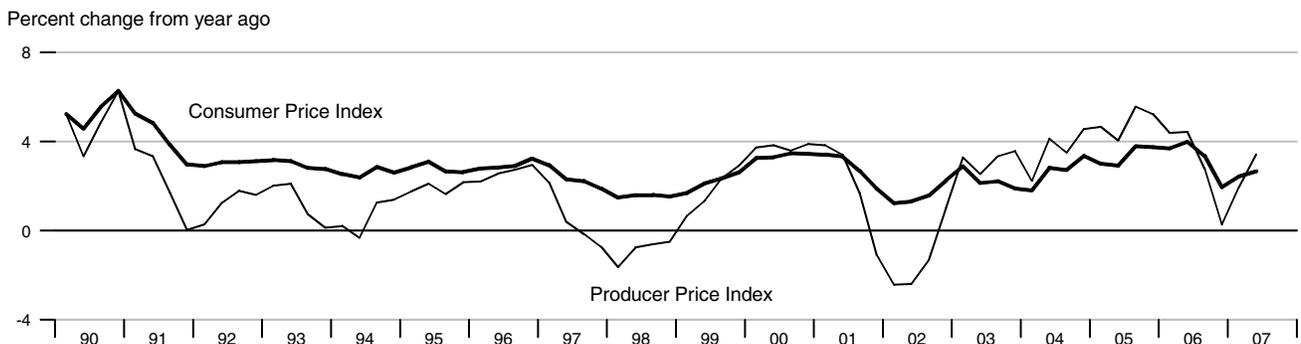
**Real Hourly Earnings and Output per Worker**



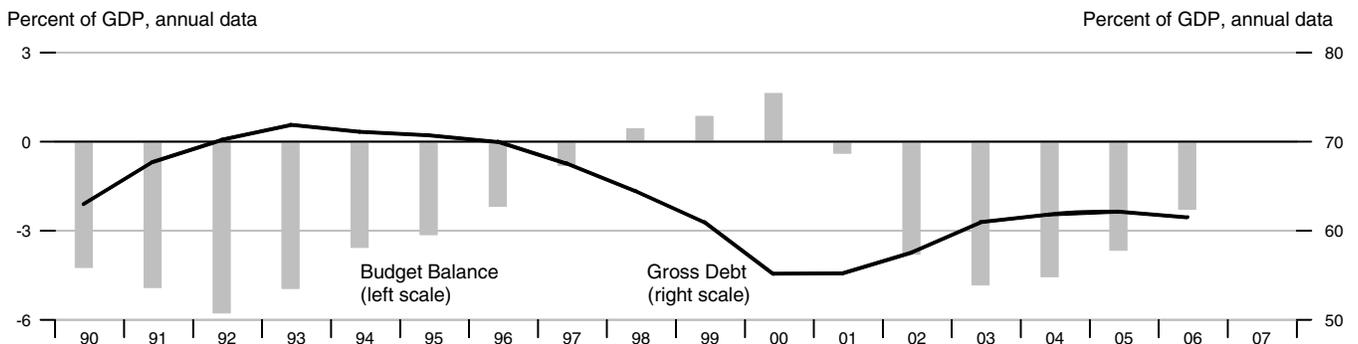
**Labor Force Indicators**



**Inflation**

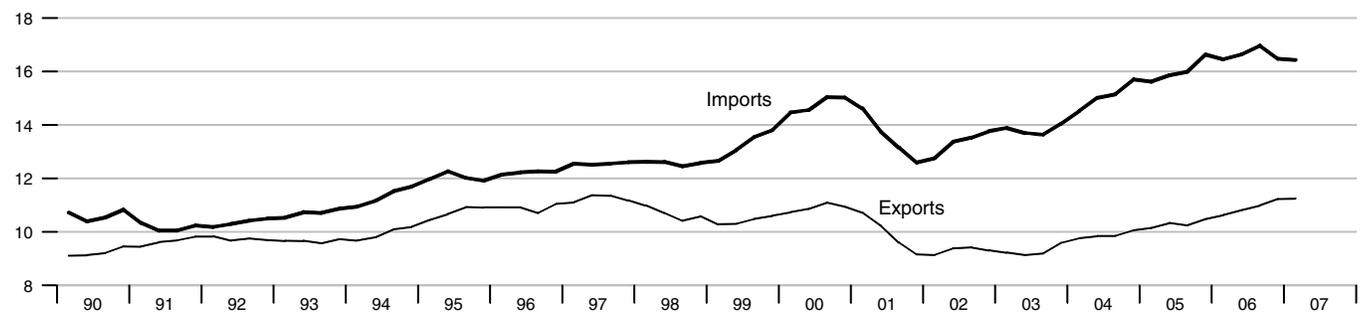


**Gross Government Debt and Budget Balance**



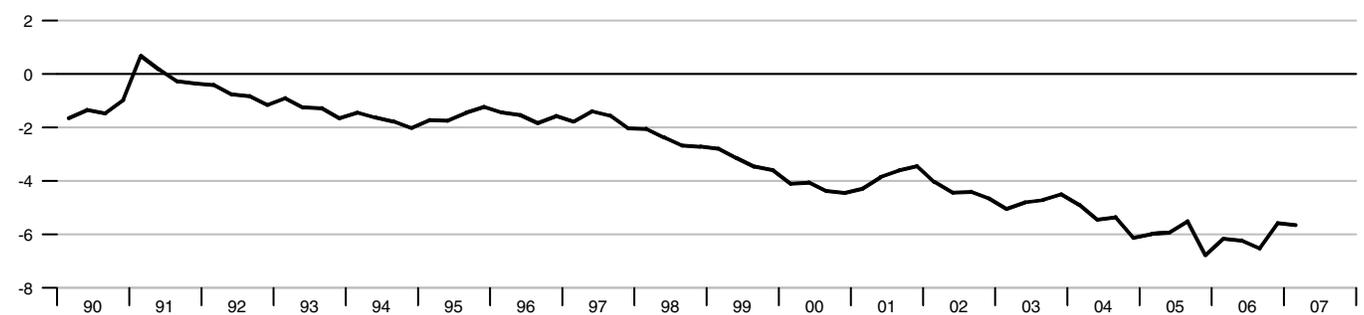
**International Trade - Goods and Services**

Percent of GDP



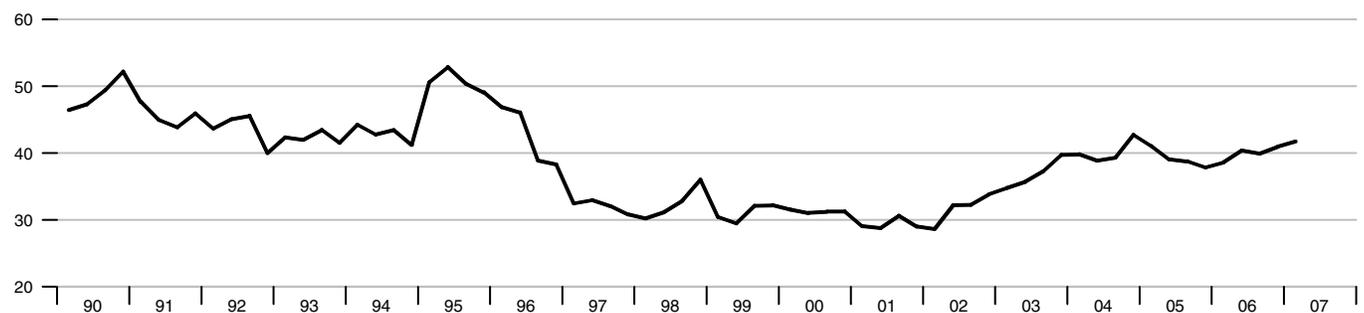
**Current Account Balance**

Percent of GDP



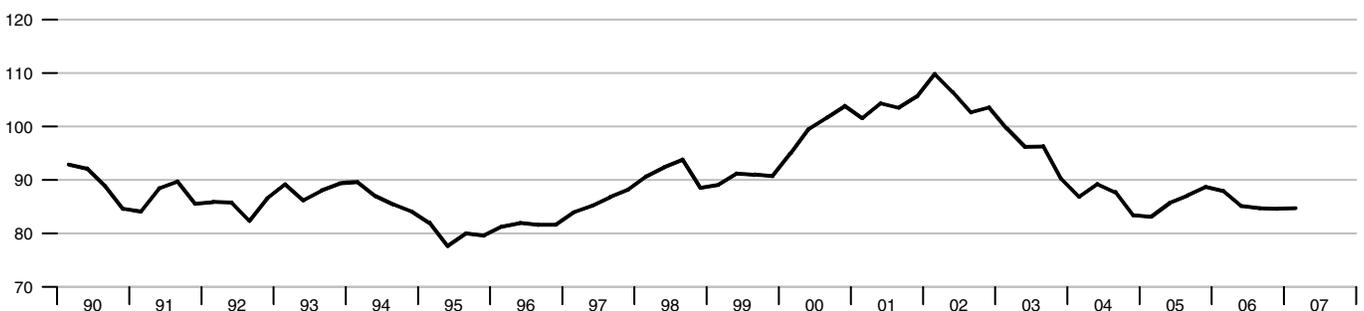
**Foreign Exchange Reserves**

Billions of US\$



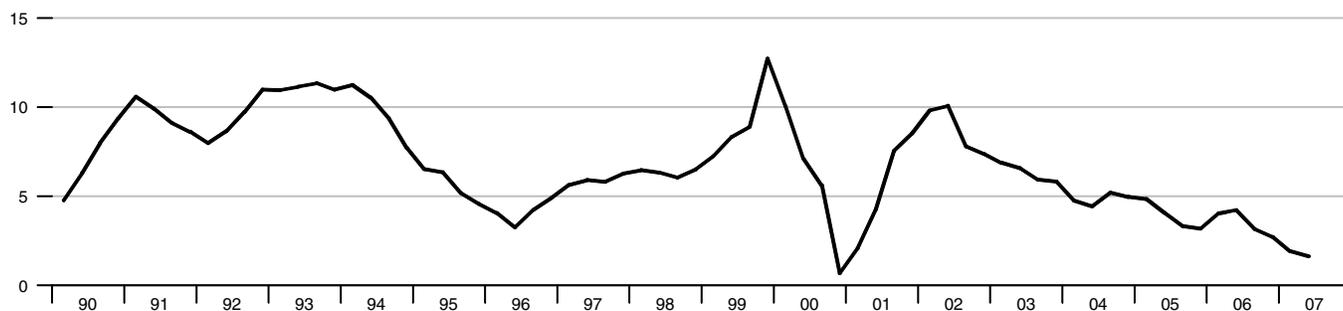
**Real Effective Exchange Rate**

Index 2000 = 100



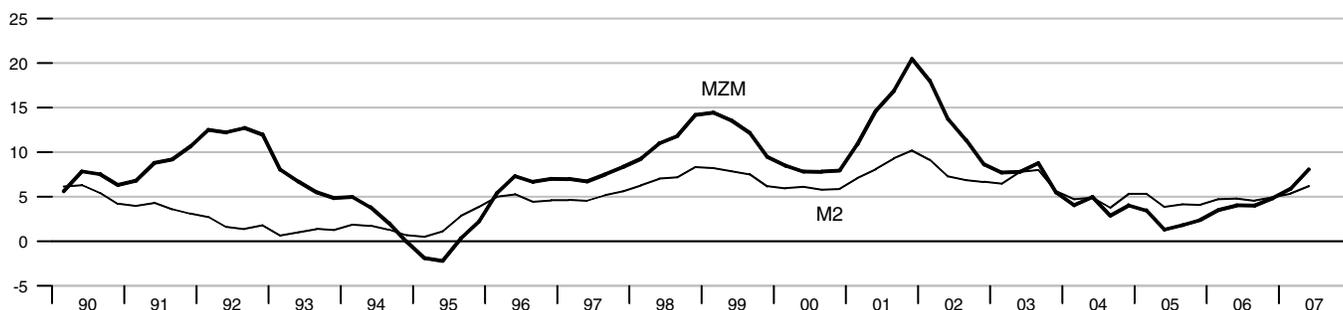
**Adjusted Monetary Base**

Percent change from year ago



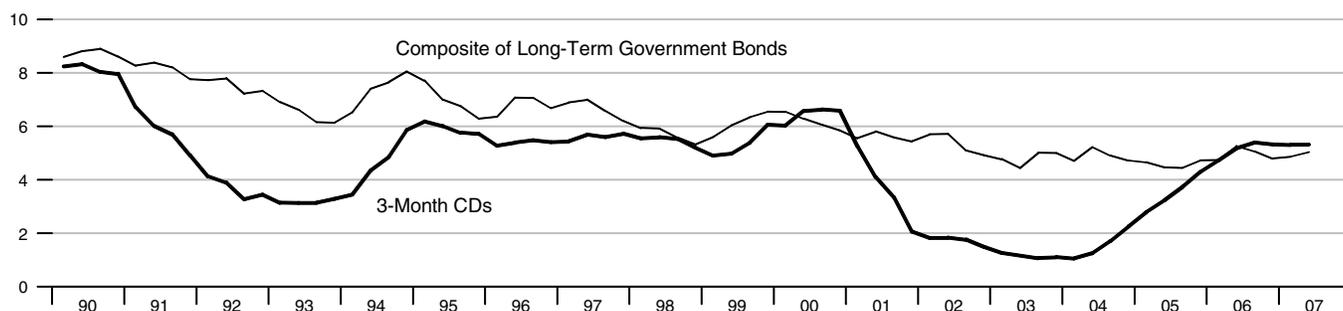
**Monetary Aggregates**

Percent change from year ago



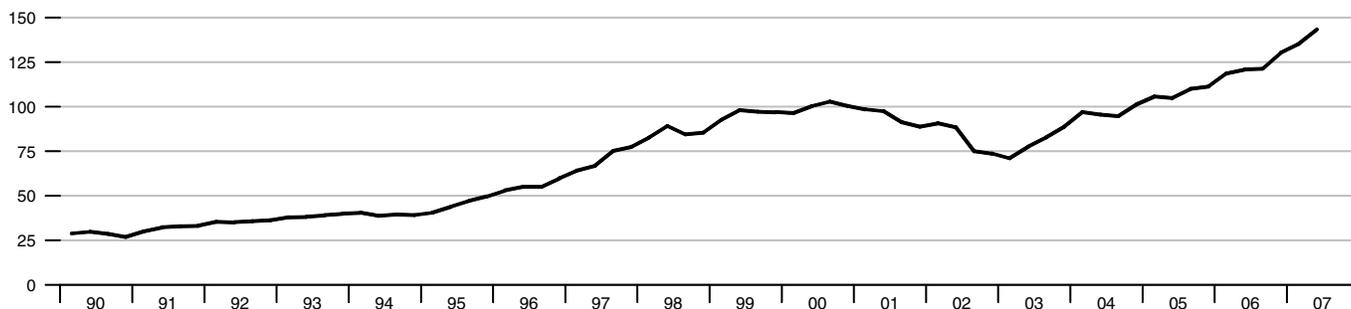
**Interest Rates**

Percent



**Stock Exchange Index - New York Stock Exchange**

2000 = 100



## Notes

**Euro-Area Data:** The euro area was enlarged to include Greece on January 1, 2001, and Slovenia on January 1, 2007. Historical euro-area series for earnings, government debt and budget balance, and industrial production include Greece. Capacity utilization, the consumer price index, current account balance, employment, gross domestic product (GDP), merchandise trade, monetary aggregates, and the producer price index include Greece and Slovenia. The series for interest rates, and retail sales include Greece starting in January 2001 and Slovenia starting January 2007. The series for unemployment, the real effective exchange rate, and the stock exchange index include Greece starting in January 2001.

Euro-area interest rates prior to December 1998 are calculated on the basis of national government yields weighted by GDP. Starting in 1999, short-term rates are euro interbank offered rates. Long-term rates are calculated on the basis of national government bond yields weighted by the nominal outstanding amounts of government bonds in each maturity band.

The euro/dollar exchange rate used in the chart on page 12 is a synthetic rate prior to January 1999. This is constructed by calculating a weighted average of the exchange rates of the euro-area countries, excluding Greece and Luxembourg, against the dollar. The weights are based on 1997 GDP shares.

**German Data:** As a result of reunification, data for all of Germany are now incorporated in the statistical series. The starting periods for unified German data are listed below. Care should be exercised when interpreting the data around these break periods.

Third quarter 1990: current account balance, international trade, and unemployment.

First quarter 1991: consumer price index, GDP, industrial production, output per worker.

Third quarter 1992: capacity utilization.

First quarter 1993: stock exchange index.

Third quarter 1993: employment.

First quarter 1995: hourly earnings.

**Capacity Utilization** covers the manufacturing sector for Canada, France, Japan, the United Kingdom, the United States, and the euro area; manufacturing excluding food, beverage, and tobacco for Germany; and mining and manufacturing for Italy.

**Consumer Price Index** is for all items. The current index is based on goods and services consumed by all individuals for Canada; all multi-person households excluding those mainly engaged in agriculture, forestry, and fisheries for Japan; all households except pensioners dependent on state pension and high income households for the United Kingdom; and all urban households for the United States. Data for the euro area, France, Germany, and Italy are based on the harmonized index of consumer prices.

**Current Account Balance** is the sum of merchandise and service exports and income receipts on domestic assets abroad minus the sum of merchandise and service imports and income payments from foreign assets in the domestic economy plus net unilateral transfers.

**Real Earnings** are based on hourly earnings in manufacturing for Canada, Germany, the United States, and the euro area; hourly earnings in manufacturing excluding construction for France, hourly earnings in industry for Italy; monthly earnings in manufacturing for Japan; and weekly earnings in manufacturing for the United Kingdom.

The **Exchange Rate** for all countries except the United States is expressed as units of local currency per U.S. dollar. For the United States the trade-weighted exchange rate, **TWEX**, is used. This is a weighted average of the exchange value of the U.S. dollar relative to the major international currencies—the euro, Canadian dollar, Japanese yen, British pound, Swiss franc, Australian dollar, and Swedish kronor. Prior to 1999, the currencies of the euro-area countries (with the exception of Greece) are used instead of the euro.

**Real Effective Exchange Rate** uses normalized unit labor costs in manufacturing. The weighting scheme used to construct the rates, for all except the euro area, is based on disaggregated data for trade among 21 industrial countries in manufactured goods for 2000. For the euro area the weights relate to the trade of the euro area with the other countries. The weights reflect the relative

importance of a country's trading partners in its direct bilateral trade relations and competition in third markets. Normalized unit labor costs in manufacturing are calculated by dividing an index of actual hourly compensation per worker by a five-year moving average index of output per man-hour.

**Employment** data refer to civilian employment for Canada, Germany, Italy, Japan, and the United States; industrial employment for France; and total employment for the euro area and the United Kingdom.

**Foreign Exchange Reserve** data are end of period. The dollar value of reserves may fluctuate as a result of changes in reserve holdings and/or changes in the value of the currencies held vis-à-vis the U.S. dollar.

**Government Budget Balance** is the difference between general government current receipts and total outlays. Total outlays consist of current expenditures and net capital expenditures. **Gross Government Debt** incorporates all financial liabilities of the general government sector. The general government sector consolidates the accounts of the central, state, local, and social security sectors.

**Cumulative Inflation Differential** is the cumulative change in the foreign consumer price index (CPI) over the change in the U.S. CPI, in percentage terms. The base period for the cumulative rate of change is taken to be the first period of the chart. For example, if the base period is 2002:Q1, then the cumulative inflation differential for Japan for 2006:Q3 is as follows:

$$\text{inflation differential} = 100 \cdot \left( \frac{P_{2006Q3}^J / P_{2006Q3}^{US}}{P_{2002Q1}^J / P_{2002Q1}^{US}} - 1 \right)$$

where  $P_{2006Q3}^J$  is the Japanese CPI in the third quarter of 2006. For the U.S. chart on page 41, foreign CPI is calculated as the weighted average of the CPIs of countries whose currencies are used in the major currency trade-weighted exchange rate index. Starting in 1999, the euro-area harmonized consumer price index is used for the euro area. Prior to 1999, the price levels for the individual euro area countries (excluding Greece and Luxembourg) are used. The cumulative inflation differential is shown because the theory of purchasing power parity states that exchange rate changes should be systematically positively related to this variable.

**Industrial Production** measures the change in the volume of output in the mining, manufacturing, oil, electricity, gas, and water industries.

The **Short-Term Interest Rate** table on page 4 uses the relevant 3-month interest rate shown in the country pages.

The **Long-Term Interest Rate** table on page 4 uses the government bond rate. The government bond rate is a composite of yields on federal government bonds with maturities of more than 10 years for the United States; 10-year benchmark bonds for France; 7- to 15-year public sector bonds for Germany; 15- to 20-year government bonds through 1990 and 10-year government bonds starting in 1991 for Italy; and 10-year government bonds for Canada, the euro area, Japan, and the United Kingdom.

The **Reserve Money** table on page 4 refers to the adjusted monetary base for Japan and the United States; reserve money for Canada; and M0 for the United Kingdom. **Reserve Money** is currency in circulation, deposits of the deposit money banks, and demand deposits of other residents (with the exception of the central government) with the monetary authority.

### Adjusted Monetary Base

Japan: currency in circulation and current deposits at the Bank of Japan.

United States: the sum of currency in circulation outside Federal Reserve banks and the U.S. Treasury, deposits of depository financial institutions at Federal Reserve banks, and an adjustment for the effects of changes in statutory reserve requirements on the quantity of base money held by depositories.

### Notes and Coins in Circulation

United Kingdom: After reforming the rules governing bank reserves, the Bank of England discontinued its M0 series in May 2006 because the data would not be comparable to previous data. *IET* now presents a related series, "Notes and Coins in Circulation," in place of M0. The Bank of England directs interested parties to "Publication of narrow money data: the implication of money market reform" in its Autumn 2005 *Quarterly Bulletin* (<http://www.bankofengland.co.uk/publications/quarterlybulletin/qb050304.pdf>).

**M1**

Japan: cash, currency in circulation, and deposit money.  
Euro area: currency in circulation and overnight deposits.

**M1B**

Canada: currency outside banks, chartered bank checkable deposits, less inter-bank checkable deposits.

**MZM**

United States: currency in circulation, travelers' checks, total publicly-held checkable deposits minus cash items in the process of collection and Federal Reserve float, savings deposits, shares in retail money market mutual funds (funds with initial investments of less than \$50,000), net of retirement accounts, and institutional money market mutual funds.

**M2**

Canada: currency outside banks, chartered bank demand and notice deposits, chartered bank personal term deposits, adjustments to M2 (continuity adjustments and inter-bank demand and notice deposits).

United Kingdom: currency in circulation and sterling retail deposits with the U.K. banks and building societies.

United States: MZM less institutional money market mutual funds plus small denomination (less than \$100,000) time deposits.

**M2 + CDs**

Japan: M1 plus private deposits, public deposits less demand deposits, and certificates of deposit.

**M3**

Euro area: M1 plus deposits with a maturity up to 2 years, deposits redeemable at notice up to 3 months, repurchase agreements, money market funds, and debt securities up to 2 years.

**M4**

United Kingdom: M2 plus wholesale deposits with the U.K. banks and building societies.

**Output Per Worker** is the ratio of real GDP to employment.

**Producer Price Index** covers manufacturing for Canada and the United Kingdom; and total industry for Japan and the United States. Data for the euro area, France, Germany, and Italy are based on the harmonized index of total industry excluding construction.

**Retail Sales** are based on a volume index. The percent change in retail sales for the United States is based on the Standard Industrial Classification system through 1992 and the North American Industrial Classification System from 1993 on.

**Stock Exchange Index** refers to all share prices except for the United Kingdom, which excludes financial firms.

**Unemployment Rate** is the standardized unemployment rate. It is the percentage of the civilian labor force that is unemployed. The unemployed are all persons of working age who are without work, readily available for work, and actively seeking work. The standardized rate may differ from the national unemployment rate calculations.

## Sources

**Abbreviations**

Board of Governors of the Federal Reserve System (BOG)  
Bureau of Economic Analysis, U.S. Department of Commerce (BEA)  
Bureau of Labor Statistics, U.S. Department of Labor (BLS)  
International Monetary Fund, *International Financial Statistics* (IMF)  
Organization for Economic Cooperation and Development,  
*Economic Outlook* (OECD1)  
*Main Economic Indicators* (OECD2)  
*National Accounts Quarterly* (OECD3)

**Canada**

Bank of Canada: M1B and M2.  
BOG: exchange rate.  
IMF: foreign exchange reserves, merchandise and service trade, real effective exchange rate, and reserve money.  
OECD1: gross government debt and budget balance.  
OECD2: capacity utilization, consumer price index, current account balance, GDP, hourly earnings, industrial production, interest rates, producer price index, retail sales, stock exchange index, and unemployment rate.  
Statistics Canada: employment.

**Euro Area**

European Central Bank: current account balance and employment.  
Eurostat: capacity utilization, consumer price index, GDP, interest rates, merchandise trade, producer price index, and retail sales.  
Haver Analytics: synthetic euro exchange rate.  
IMF: real effective exchange rate.  
OECD1: gross government debt and budget balance.  
OECD2: hourly earnings, industrial production, M1, M3, stock exchange index, and unemployment.

**France**

BOG: exchange rate.  
Eurostat: capacity utilization, consumer price index, and producer price index.  
IMF: foreign exchange reserves, merchandise and service trade, and real effective exchange rate.  
Institut National de la Statistique et des Etudes Economiques: employment.  
OECD1: gross government debt and budget balance.  
OECD2: current account balance, GDP, hourly earnings, industrial production, retail sales, interest rates, stock exchange index, and unemployment.

**Germany**

BOG: exchange rate.  
Bundesanstalt Fur Arbeit: employment.  
Eurostat: capacity utilization, consumer price index, and producer price index.  
IMF: foreign exchange reserves, merchandise and service trade, and real effective exchange rate.  
OECD1: gross government debt and budget balance.  
OECD2: current account balance, GDP, hourly earnings, industrial production, M1, M3, retail sales, interest rates, stock exchange index, and unemployment.

**Italy**

BOG: exchange rate.  
Eurostat: capacity utilization, consumer price index, and producer price index.  
IMF: foreign exchange reserves, merchandise and service trade, and real effective exchange rate.  
Istituto Nazionale di Statistica: employment.  
OECD1: gross government debt and budget balance.  
OECD2: current account balance, GDP, hourly earnings, industrial production, long-term interest rates, retail sales, stock exchange index, and unemployment.

**Japan**

Bank of Japan: adjusted monetary base and long-term interest rate.  
BOG: exchange rate.  
IMF: foreign exchange reserves, merchandise and service trade, and real effective exchange rate.  
OECD1: gross government debt and budget balance.  
OECD2: capacity utilization, consumer price index, current account balance, employment, GDP, hourly earnings, industrial production, M1, M2, producer price index, retail sales, short-term interest rate, stock exchange index, and unemployment.

**United Kingdom**

Bank of England: M2.  
BOG: exchange rate.  
IMF: foreign exchange reserves, merchandise and service trade, and real effective exchange rate.  
OECD1: gross government debt and budget balance.  
OECD2: capacity utilization, consumer price index, current account balance, GDP, industrial production, interest rates, M4, producer price index, retail sales, stock exchange index, unemployment, and weekly earnings.  
U.K. Office for National Statistics: employment and Notes and Coins in Circulation.

**United States**

BOG: capacity utilization, exchange rate, industrial production index, M2, and interest rates.  
BEA: GDP, current account balance, merchandise and service trade, and retail sales.  
BLS: employment, consumer price index, and producer price index.  
Federal Reserve Bank of St. Louis: adjusted monetary base and MZM.  
IMF: foreign exchange reserves and real effective exchange rate.  
OECD1: gross government debt and budget balance.  
OECD2: hourly earnings, stock exchange index, and unemployment.