International Economic Trends
May 2010

Economic Growth and the Global Savings Glut

Emerging countries are generally expected to have low savings rates and high investment rates. Citizens of such countries are not expected to save a lot because their incomes are rising rapidly; why should they save a lot—forgoing current consumption—when they will be much richer soon? Similarly, emerging countries—where capital is scarce—will tend to invest heavily because the returns to additional capital are high. A combination of a low savings rate and a high investment rate means that emerging markets would tend to borrow to import capital goods, thereby running current account deficits and capital account surpluses. On the other hand, rich countries would have lower investment, higher savings, and large current account surpluses.

In fact, however, the opposite is occurring: Many emerging countries, particularly China, save a great deal and run current account surpluses, while the United States saves very little and runs current account deficits. As a result, capital flows from where it is scarce—in the emerging markets—to where it is relatively plentiful—in the developed world.

What causes this seemingly counterintuitive flow of capital? One reason is that emerging economies save a great deal despite—or perhaps because of—their fast income growth. Empirical evidence suggests that high growth leads to high saving, rather than vice versa (see, e.g., Carroll, Overland, and Weil, 2000).

The idea that high income growth induces high savings rather than decreases them seems to contradict Friedman's (1957) permanent income hypothesis (PIH). The PIH argues that people like "smooth" consumption; they don't like to starve in one period and gorge in another. Therefore, if they can borrow and lend, their consumption is determined by their lifetime average income, not just current income. Thus, people who expect higher income in the future should borrow against that future income, or at least not save as much. But in reality, people (especially those in emerging markets) often save a lot despite expectations of higher income in the future.

A key reason for this apparent contradiction is that the PIH assumes that people can borrow freely to consume future income when their current income is low. Wen (2009) shows that when people are subject to borrowing constraints, their marginal propensity to save increases with income because they must accumulate money for emergencies—called "precautionary saving"—rather than being able to borrow money for such contingencies. That is, the inability to borrow not only makes people save more excessively than they would otherwise, but their saving rate also increases with income growth.

Thus, economic theory predicts that fast growth can lead to high saving rates if people lack financial institutions that allow them to borrow. This prediction is consistent with empirical evidence. For example, the average household saving rate in China in the past 30 years has increased as income has grown and is currently around 30 percent, despite low interest rates (see the chart). China's financial system has not yet caught up with its economic growth. Japan in the 1960-70s and South Korea in the 1980-90s experienced similarly high saving rates during their fast-growth periods.

The underdeveloped financial systems of emerging countries have restricted their citizens' ability to borrow against future income, limited their investment opportunities, and diverted their savings toward developed countries. These global savings/investment imbalances are likely to persist until emerging countries develop sophisticated financial and banking systems.

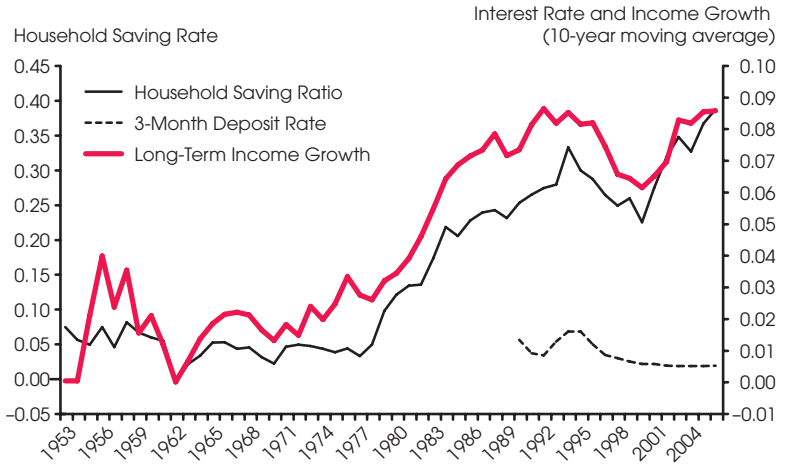
—Yi Wen

Carroll, Christopher D., Overland, Judy and Weil, David N. "Saving and Growth with Habit Formation." *American Economic Review*, June 2000, *90*(3), pp. 341-55.

Friedman, Milton. *A Theory of the Consumption Function*. Princeton, NJ: Princeton University Press, 1957.

Wen, Yi. "Saving and Growth under Borrowing Constraints: Explaining the 'High Saving Rate' Puzzle." Working Paper No. 2009-045B, Federal Reserve Bank of St. Louis, revised October 2009; http://research.stlouisfed.org/wp/2009/2009-045.pdf.

Household Saving Rate and Income Growth (China, 1953-2004)



SOURCE: Wen (2009).

Views expressed do not necessarily reflect official positions of the Federal Reserve System.

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Conventions used in this publication:

1. Charts and tables contain data that were current through April 2010. 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.

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Real Gross Domestic Product

Percent change from year ago

	07.1	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4
Canada	1.82	2.56	2.99	2.76	1.69	0.70	0.27	-0.97	-2.54	-3.47	-3.35	-1.22
Euro Area	3.45	2.71	2.68	2.16	2.14	1.41	0.37	-1.89	-5.03	-4.86	-4.07	-2.16
France	2.55	1.85	2.49	2.13	1.84	1.03	0.12	-1.67	-3.43	-2.74	-2.31	-0.27
Germany	3.77	2.58	2.47	1.58	2.86	1.96	0.83	-1.77	-6.70	-5.76	-4.78	-2.38
Italy	2.32	1.83	1.41	-0.03	0.16	-0.62	-1.58	-3.24	-6.26	-6.11	-4.81	-2.99
Japan	3.31	2.36	1.87	1.72	1.14	-0.21	-1.34	-4.33	-8.40	-5.98	-4.92	-1.40
United Kingdom	2.44	2.71	2.69	2.40	2.41	1.67	0.24	-2.10	-5.33	-5.90	-5.29	-3.13
United States	1.42	1.86	2.74	2.53	2.04	1.60	0.03	-1.86	-3.30	-3.83	-2.64	0.06

Nominal Gross Domestic Product

Percent change from year ago

	07.1	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4
Canada	4.46	6.09	5.77	6.56	5.33	5.74	5.97	0.77	-3.80	-6.91	-6.62	-0.76
Euro Area	5.93	5.25	5.22	4.62	4.33	3.72	2.60	0.43	-3.29	-3.82	-3.18	-1.77
France	5.14	4.50	5.11	4.50	4.33	3.55	2.56	0.75	-1.71	-1.78	-1.82	-0.17
Germany	5.55	4.56	4.58	3.58	4.21	3.42	2.24	0.16	-5.24	-4.47	-2.93	-1.35
Italy	4.66	4.04	4.29	3.17	2.88	2.59	0.77	-0.77	-3.31	-4.55	-2.55	-1.81
Japan	2.70	1.89	1.10	0.55	0.00	-1.55	-2.49	-3.89	-8.04	-6.60	-5.60	-4.29
United Kingdom	5.52	6.10	5.39	5.03	5.52	4.60	2.84	1.13	-3.86	-4.95	-3.59	-1.67
United States	4.64	4.87	5.40	5.34	4.19	3.58	2.59	0.07	-1.36	-2.39	-2.09	0.74

Consumer Price Index

Percent change from year ago

	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4	10.1
Canada	2.14	2.11	2.41	1.83	2.33	3.43	1.89	1.28	0.03	-0.86	0.78	.
Euro Area	1.87	1.88	2.89	3.37	3.63	3.85	2.30	0.96	0.17	-0.37	0.42	1.10
France	1.24	1.34	2.54	3.31	3.68	3.64	2.03	0.69	-0.25	-0.45	0.42	1.45
Germany	1.96	2.18	3.07	3.07	3.02	3.27	1.68	0.78	0.25	-0.43	0.34	0.81
Italy	1.84	1.69	2.58	3.28	3.77	4.07	2.89	1.35	0.86	0.13	0.73	1.26
Japan	-0.06	-0.17	0.52	1.01	1.36	2.14	1.02	-0.11	-0.99	-2.26	-2.04	.
United Kingdom	2.57	1.76	2.08	2.40	3.37	4.81	3.87	3.02	2.12	1.46	2.09	.
United States	2.67	2.35	4.01	4.16	4.30	5.27	1.56	-0.16	-0.97	-1.60	1.46	2.42

Employment

Percent change from year ago

	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4	10.1
Canada	1.99	2.29	2.42	2.08	1.89	1.37	0.75	-1.25	-1.79	-1.83	-1.47	0.43
Euro Area	1.71	1.88	1.71	1.52	1.12	0.48	-0.15	-1.26	-1.79	-2.05	.	.
France	1.71	1.68	1.83	1.40	0.88	0.21	-0.88	-2.19	-2.50	.	.	.
Germany	1.65	1.58	1.66	1.62	1.48	1.38	1.09	0.44	0.06	-0.24	-0.37	.
Italy	0.53	1.55	0.95	0.57	0.13	-0.88	-1.11	-2.04	-2.72	-2.96	-3.13	.
Japan	0.90	0.31	0.24	0.09	-0.43	-0.58	-0.77	-0.76	-2.07	-1.77	-1.88	.
United Kingdom	0.44	0.89	0.70	0.87	0.67	-0.08	-1.16	-1.92	-2.61	-2.75	-2.15	.
United States	1.26	0.96	0.43	0.07	0.09	-0.48	-1.54	-3.19	-3.82	-4.06	-4.02	-2.09

Unemployment Rate

Percent

	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4	10.1
Canada*	6.03	6.00	5.97	5.93	6.07	6.13	6.50	7.80	8.40	8.53	8.40	.
Euro Area*	7.50	7.43	7.33	7.23	7.37	7.60	8.00	8.80	9.30	9.67	9.87	.
France*	8.50	8.20	7.90	7.63	7.67	7.83	8.20	8.90	9.40	9.70	9.97	.
Germany*	8.47	8.27	8.03	7.63	7.37	7.13	7.10	7.30	7.60	7.57	7.50	.
Italy*	6.00	6.20	6.30	6.53	6.80	6.73	7.00	7.37	7.50	7.80	8.20	.
Japan*	3.77	3.77	3.87	3.90	3.97	4.03	4.07	4.47	5.13	5.43	5.23	.
United Kingdom*	5.33	5.27	5.07	5.13	5.27	5.83	6.30	7.03	7.70	7.80	7.73	.
United States*	4.50	4.63	4.80	4.97	5.30	6.03	6.97	8.17	9.27	9.63	10.03	9.70

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Reserve Money

Percent change from year ago

	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4	10.1
Canada	5.44	5.65	4.85	2.88	3.66	2.43	5.42	7.45	12.94	11.67	9.02	.
Japan	-4.32	0.89	0.41	-0.25	0.18	1.14	1.98	6.67	6.19	4.82	5.25	1.95
United Kingdom	4.31	4.86	5.57	6.45	6.05	5.38	6.76	8.14	8.65	8.77	6.92	5.60
United States	1.62	2.11	1.81	1.18	1.11	4.76	67.57	94.22	105.24	95.70	40.65	25.62

Narrow Money

Percent change from year ago

	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4	10.1
Canada	9.39	10.29	7.10	7.43	8.04	7.87	12.36	12.65	12.73	13.95	13.18	.
Euro Area	6.58	6.61	3.80	2.80	1.58	1.46	3.74	7.38	10.35	13.26	12.71	.
Japan	-0.26	-0.33	0.62	-0.24	-0.46	-0.35	-1.04	-0.01	0.60	0.86	1.25	.
United Kingdom	7.29	7.45	6.67	6.69	6.46	5.40	4.60	4.17	3.58	4.44	5.83	.
United States	7.62	10.10	12.56	15.09	16.12	13.54	11.64	12.14	10.09	9.24	6.58	0.96

Broad Money

Percent change from year ago

	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4	10.1
Canada	7.94	8.17	6.44	7.35	8.50	8.45	12.50	14.50	14.45	14.37	10.94	.
Euro Area	11.15	11.14	11.62	10.78	10.26	9.75	8.59	6.05	4.22	1.99	-0.71	.
Japan	1.76	1.75	2.06	2.23	2.17	2.20	1.80	2.22	2.48	2.97	3.23	.
United Kingdom	13.00	13.02	11.89	11.55	10.71	10.87	15.71	16.87	12.10	10.50	5.67	.
United States	6.45	6.65	6.26	6.77	6.71	6.36	8.50	9.58	8.68	7.81	5.14	2.03

Short-Term Interest Rates

Percent

	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4	10.1
Canada*	4.52	5.11	4.79	3.57	3.16	3.29	2.32	1.06	0.57	0.40	0.38	0.39
Euro Area	4.07	4.50	4.73	4.48	4.86	4.98	4.21	2.01	1.31	0.87	0.72	0.66
Japan*	0.60	0.73	0.76	0.75	0.71	0.74	0.78	0.56	0.34	0.27	0.23	0.20
United Kingdom*	5.72	6.30	6.31	5.69	5.86	5.81	4.60	2.06	1.33	0.82	0.59	0.60
United States	5.32	5.42	5.02	3.23	2.76	3.06	2.82	1.08	0.62	0.30	0.22	0.21

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Long-Term Interest Rates

Percent

	07.2	07.3	07.4	08.1	08.2	08.3	08.4	09.1	09.2	09.3	09.4	10.1
Canada*	4.36	4.48	4.17	3.75	3.66	3.62	3.38	2.89	3.20	3.42	3.42	3.48
Euro Area	4.41	4.46	4.34	4.14	4.51	4.57	4.05	3.90	3.97	3.79	3.67	.
France*	4.39	4.44	4.33	4.08	4.47	4.48	3.90	3.64	3.79	3.63	3.53	.
Germany*	4.33	4.34	4.19	3.93	4.25	4.26	3.50	3.07	3.32	3.30	3.19	3.18
Italy*	4.54	4.64	4.53	4.38	4.78	4.90	4.66	4.54	4.46	4.19	4.06	4.02
Japan	1.75	1.73	1.57	1.40	1.62	1.52	1.43	1.28	1.45	1.35	1.32	1.33
United Kingdom*	5.21	5.18	4.79	4.52	4.91	4.78	4.15	3.54	3.58	3.73	3.74	4.06
United States	5.03	4.98	4.59	4.25	4.46	4.38	3.90	3.55	4.05	4.16	4.10	4.32

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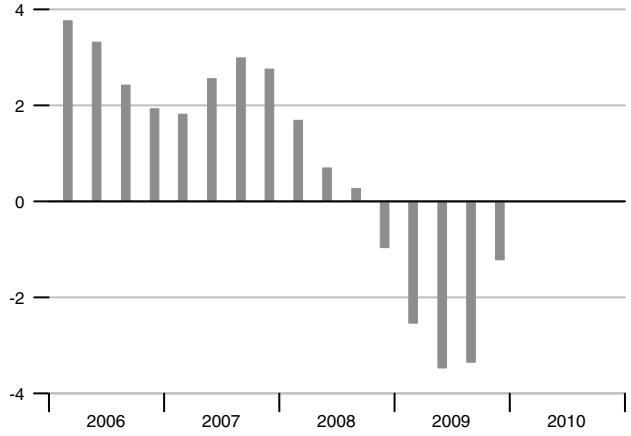
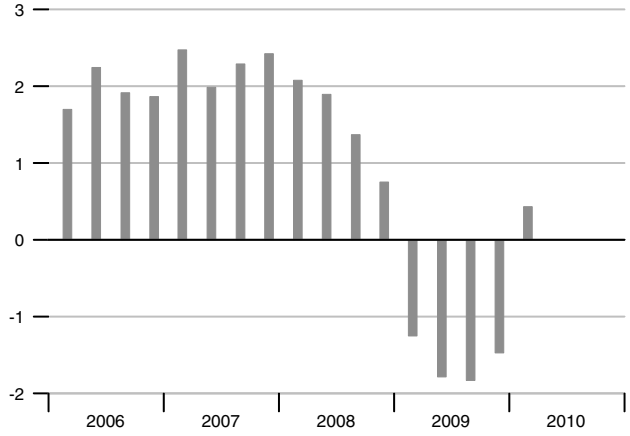
Real GDP

Percent change from year ago



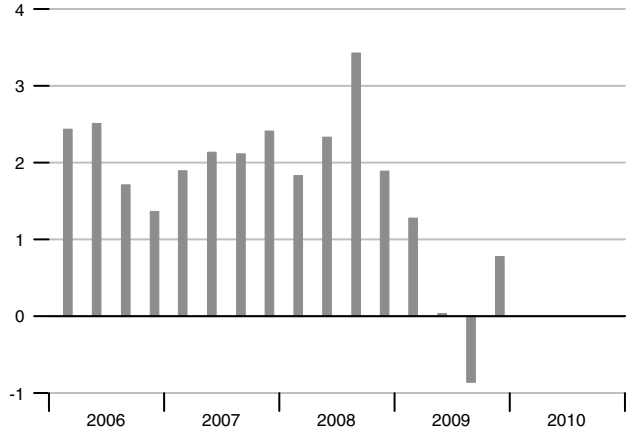
Employment

Percent change from year ago



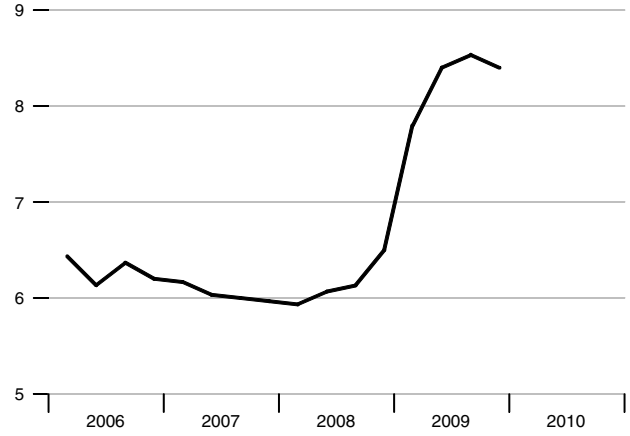
Consumer Price Index

Percent change from year ago



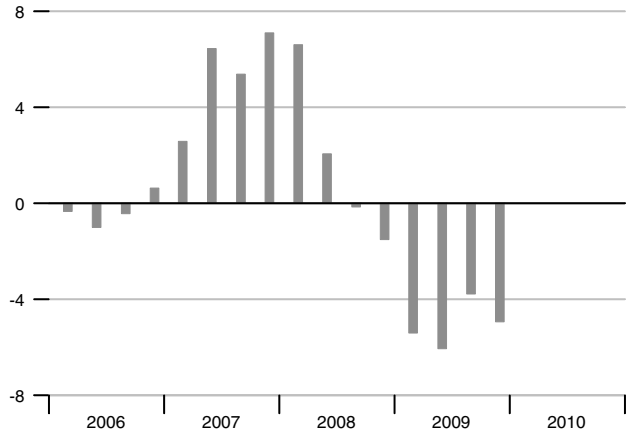
Unemployment Rate

Percent



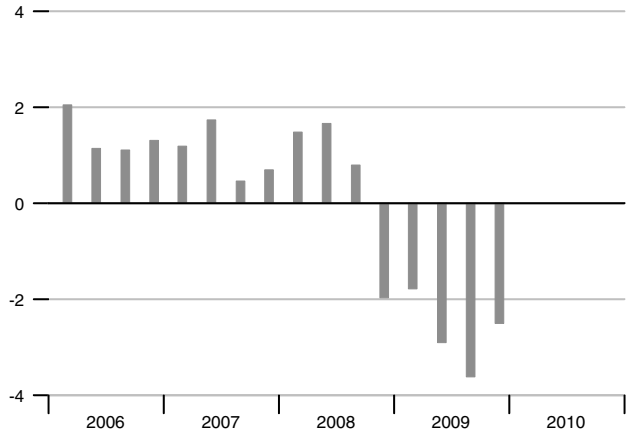
Real Hourly Earnings

Percent change from year ago

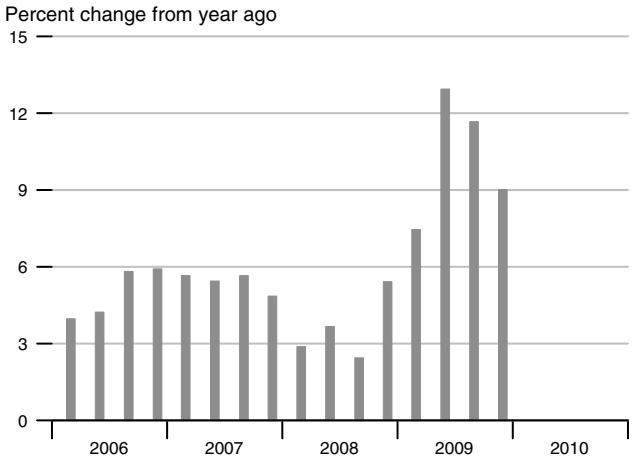


Current Account Balance

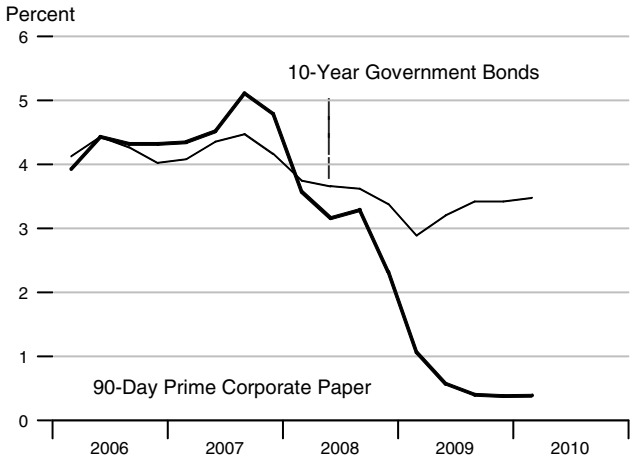
Percent of GDP



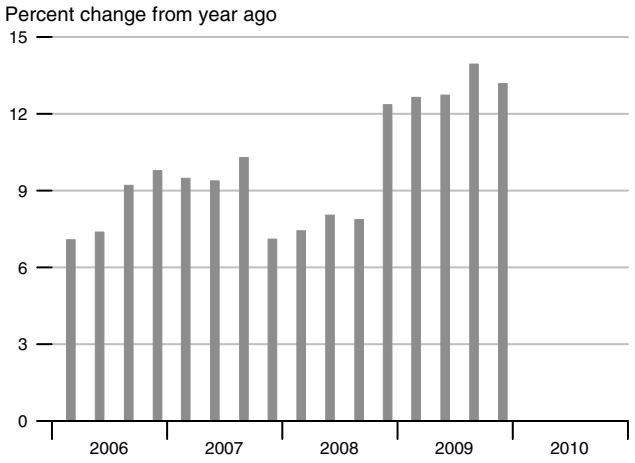
Reserve Money



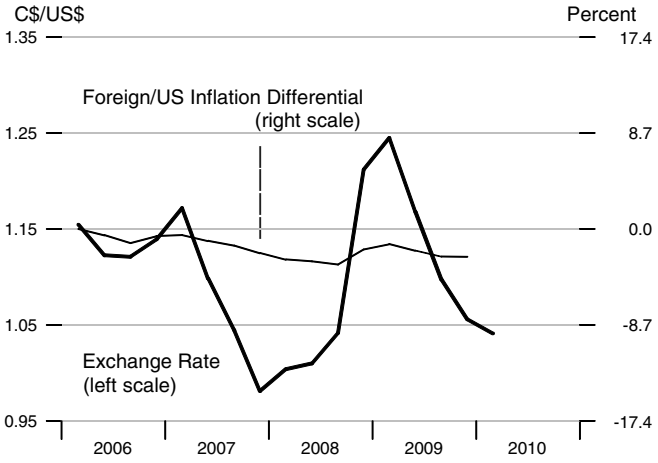
Interest Rates



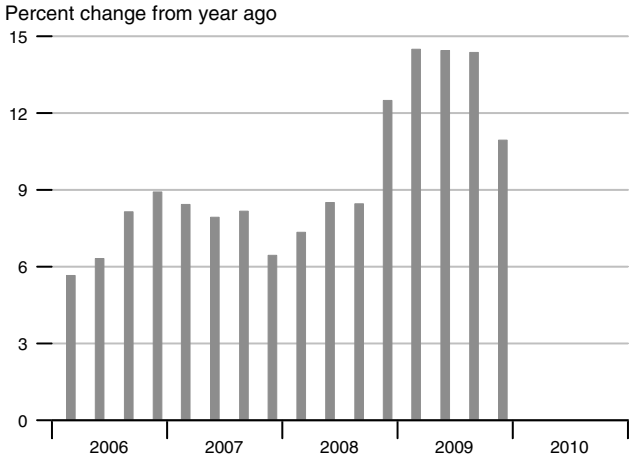
M1B



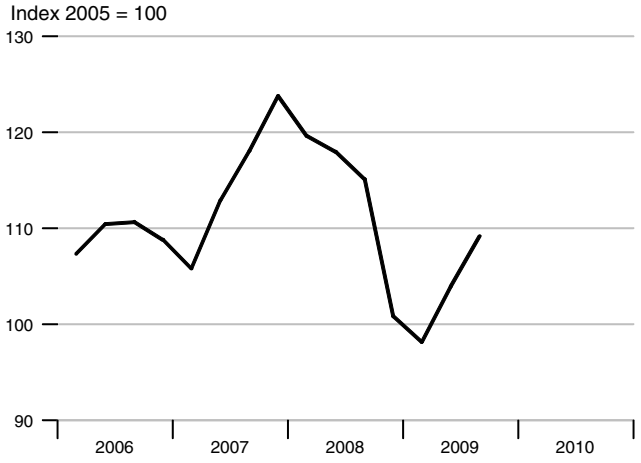
Exchange Rate and Inflation Differential



M2

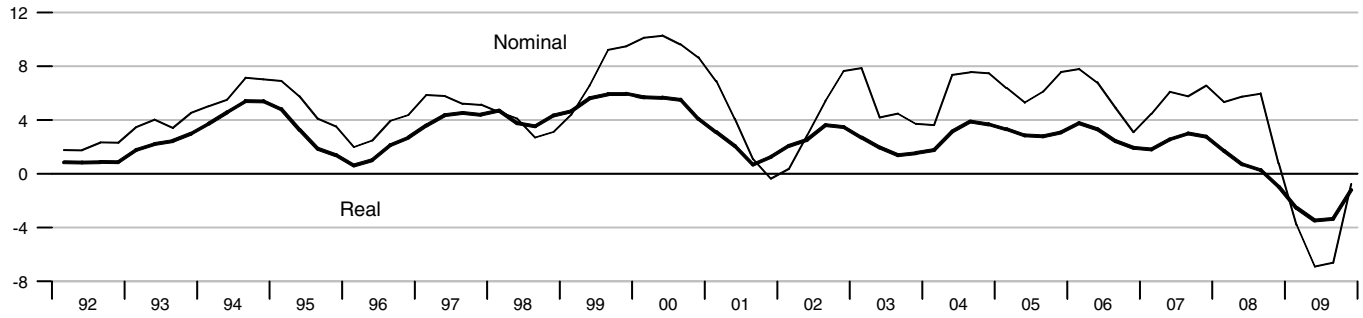


Real Effective Exchange Rate



GDP

Percent change from year ago

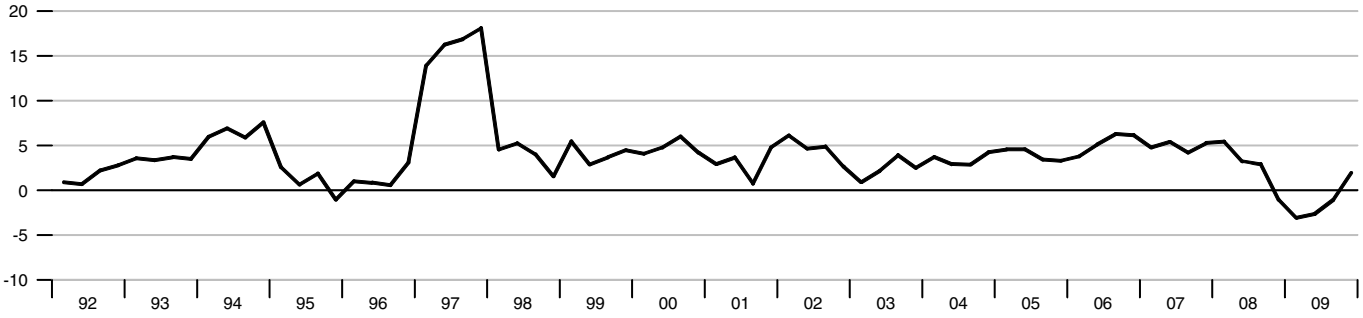


Industrial Production

Percent change from year ago

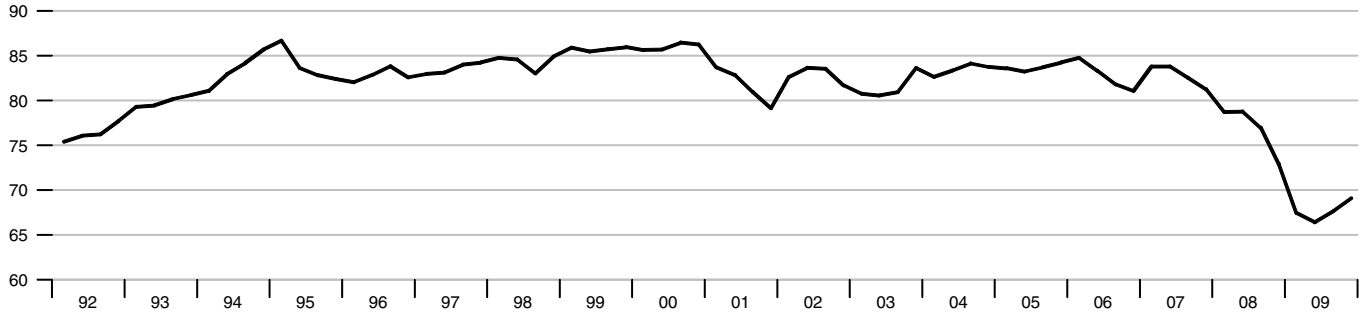
Retail Sales

Percent change from year ago



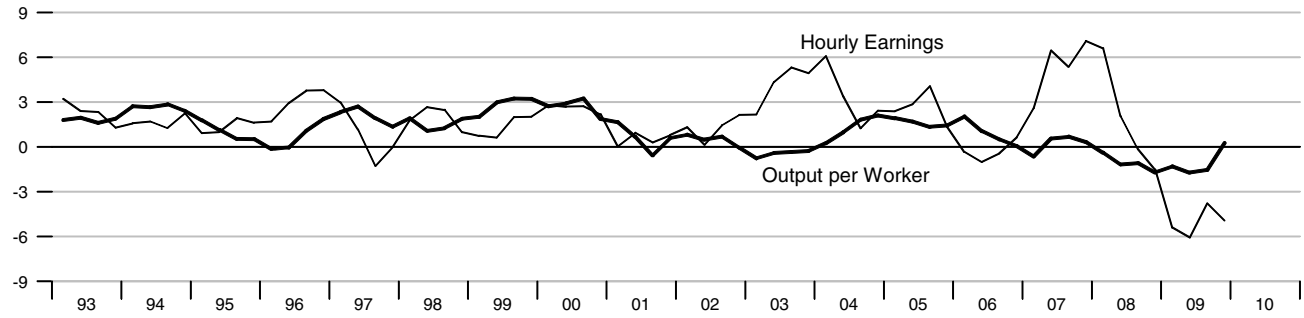
Capacity Utilization

Percent



Real Hourly Earnings and Output per Worker

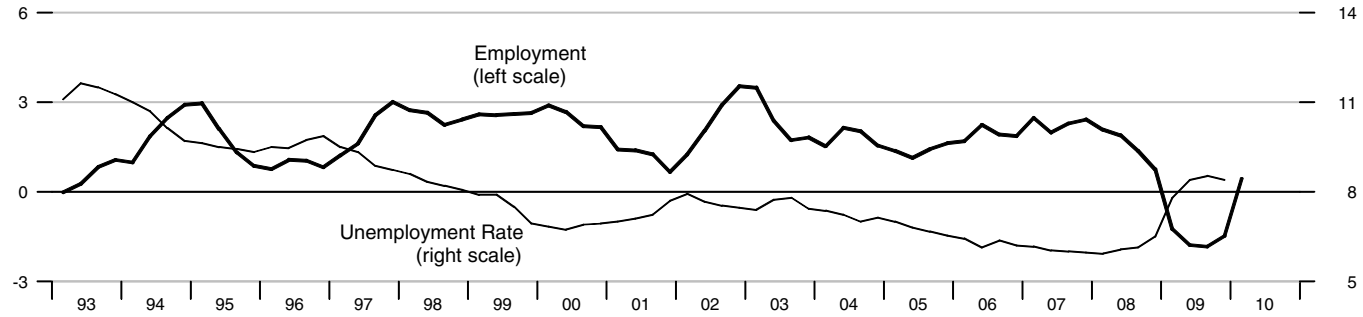
Percent change from year ago



Labor Force Indicators

Percent change from year ago

Percent



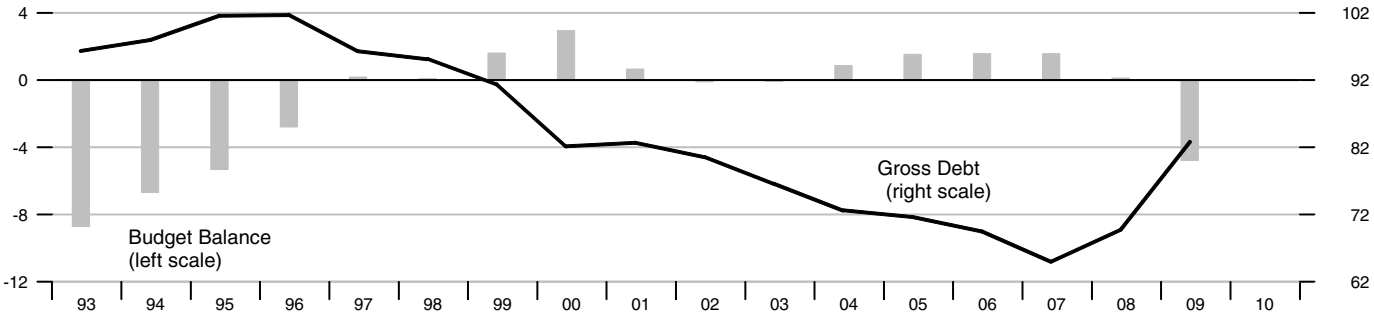
Inflation

Percent change from year ago

Gross Government Debt and Budget Balance

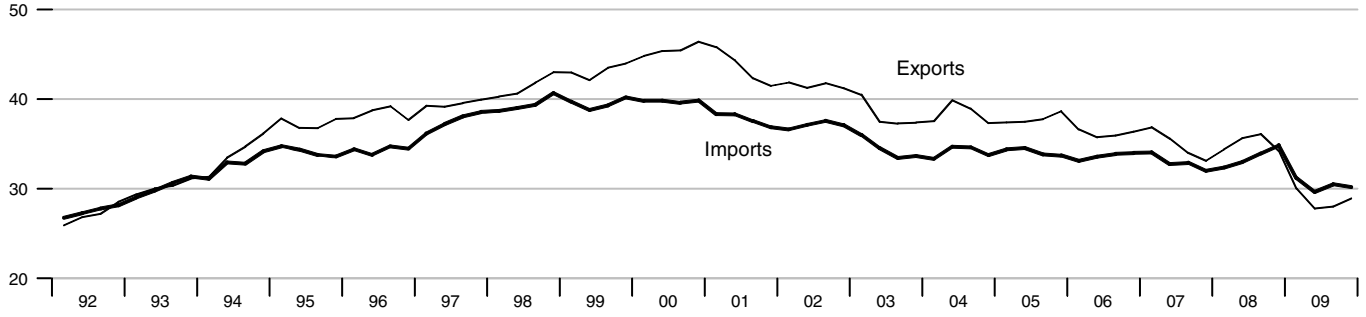
Percent of GDP, annual data

Percent of GDP, annual data



International Trade - Goods and Services

Percent of GDP

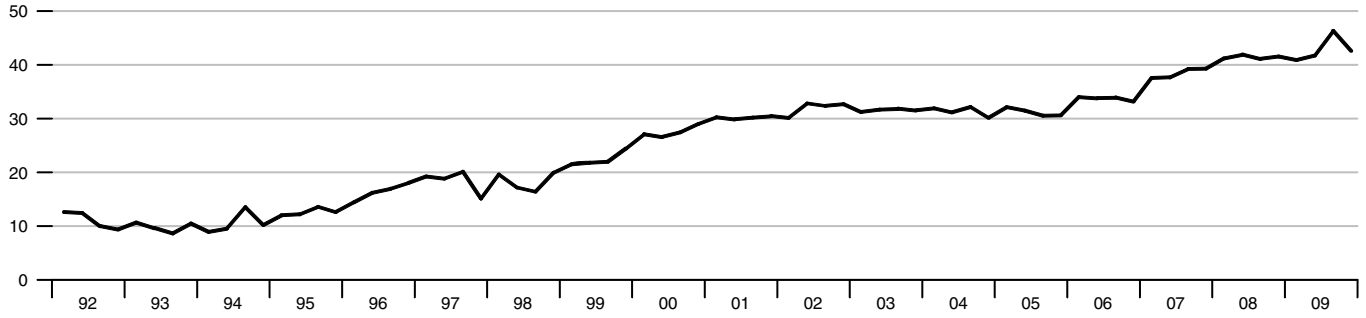


Current Account Balance

Percent of GDP

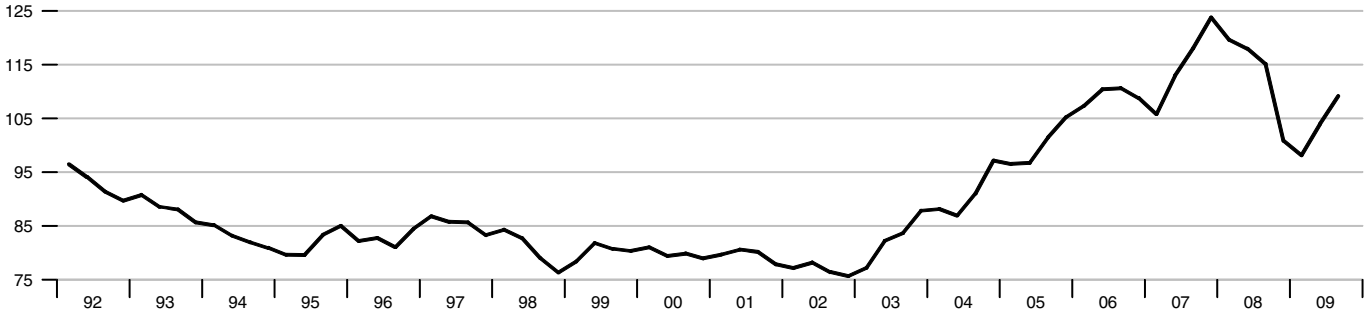
Foreign Exchange Reserves

Billions of US$



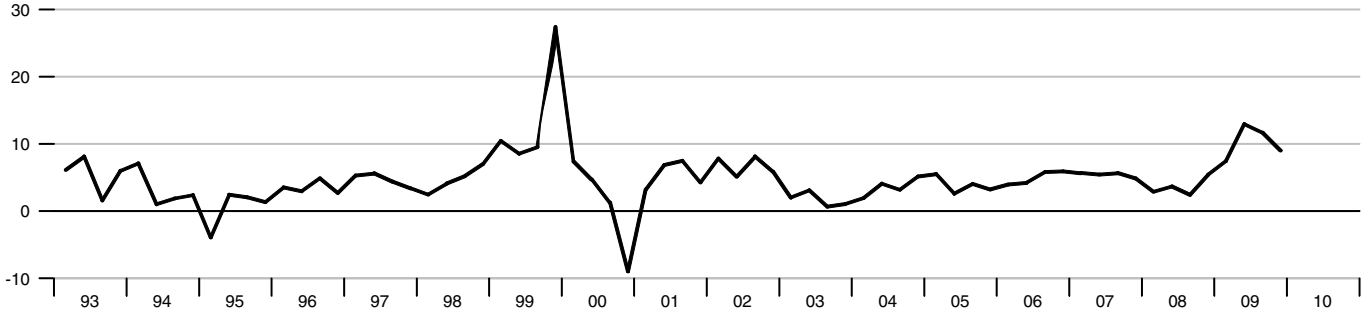
Real Effective Exchange Rate

Index 2005 = 100



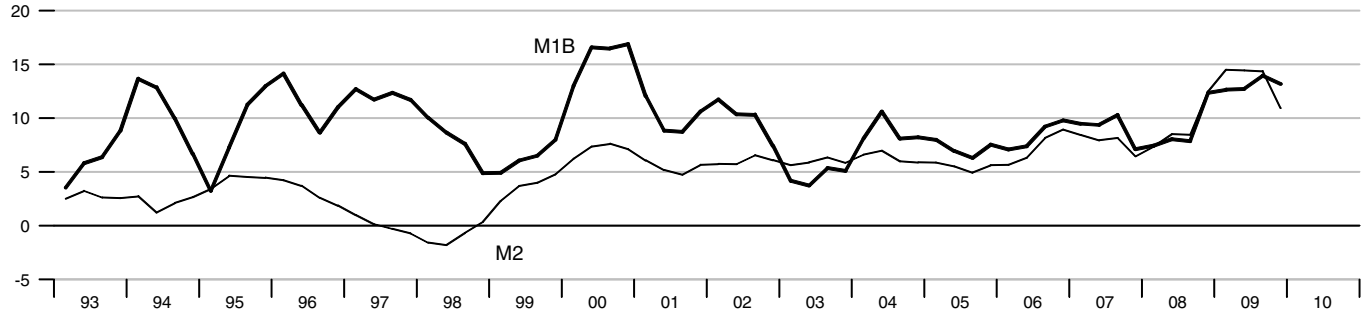
Reserve Money

Percent change from year ago



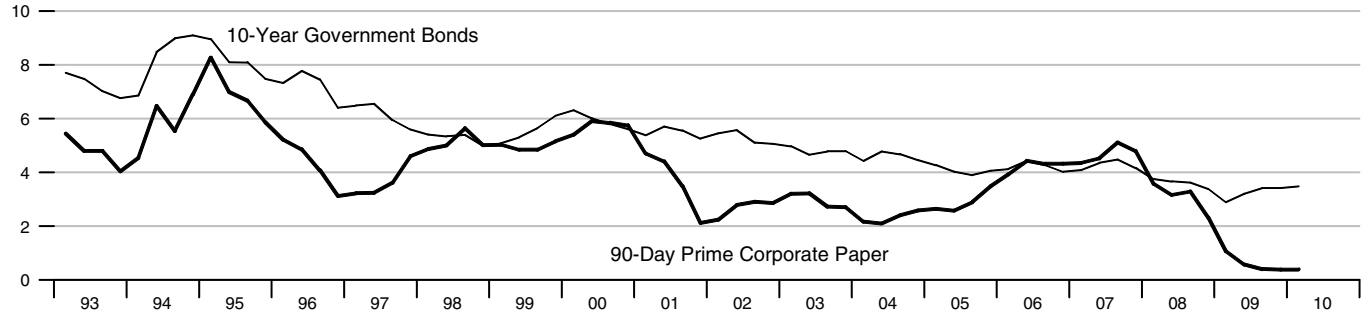
Monetary Aggregates

Percent change from year ago



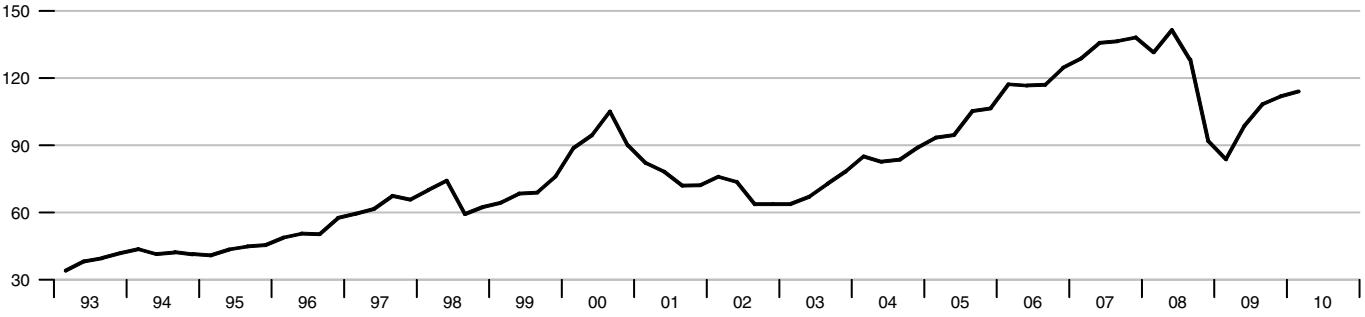
Interest Rates

Percent



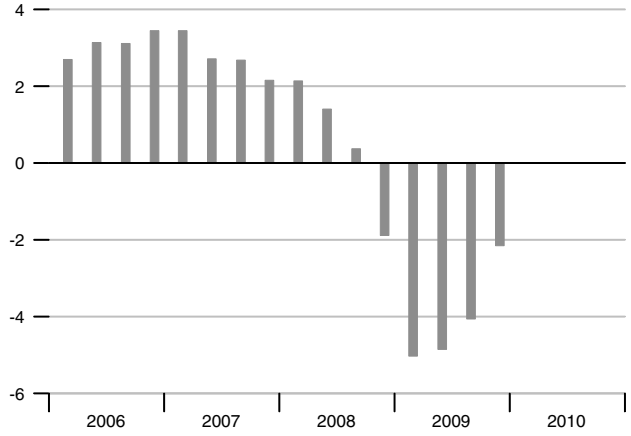
Stock Exchange Index - Toronto Stock Exchange

2005 = 100



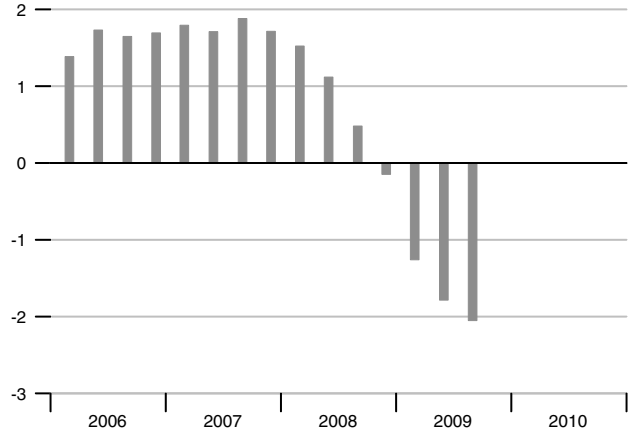
Real GDP

Percent change from year ago



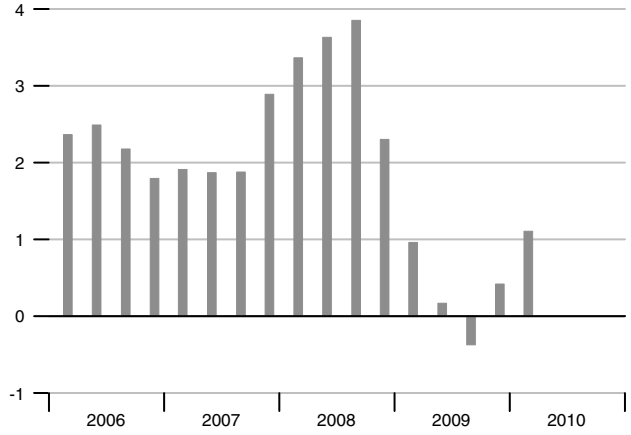
Employment

Percent change from year ago



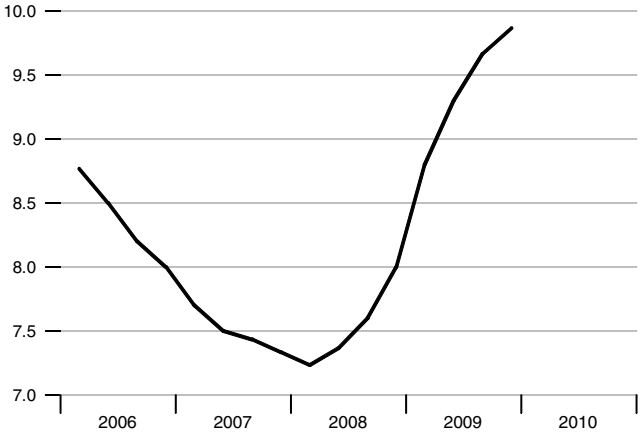
Consumer Price Index

Percent change from year ago



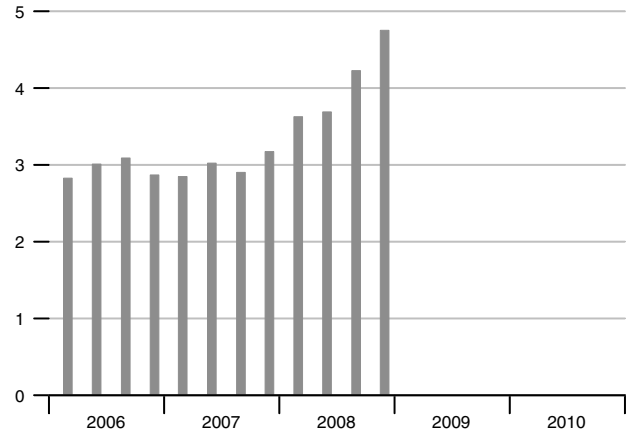
Unemployment Rate

Percent



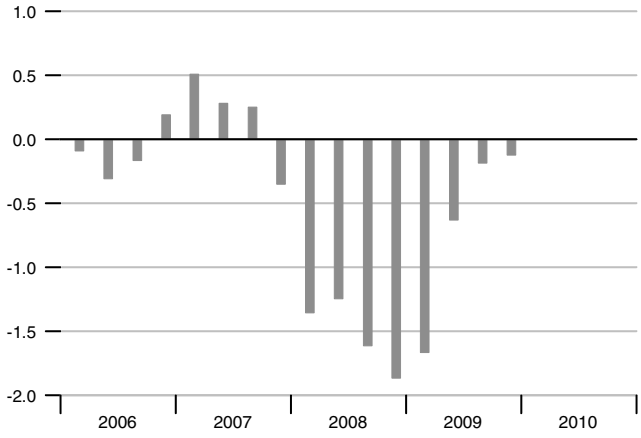
Real Hourly Earnings

Percent change from year ago



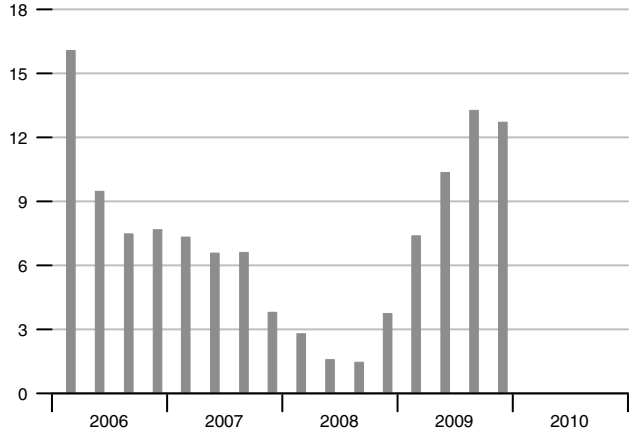
Current Account Balance

Percent of GDP



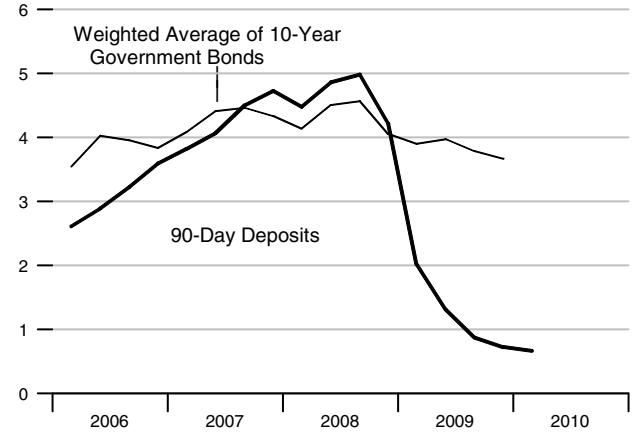
M1

Percent change from year ago



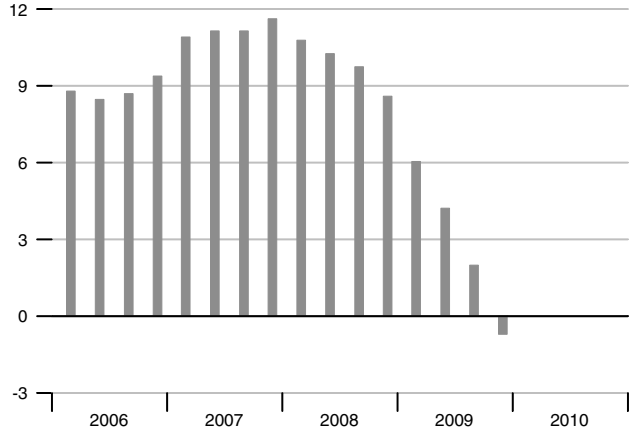
Interest Rates

Percent



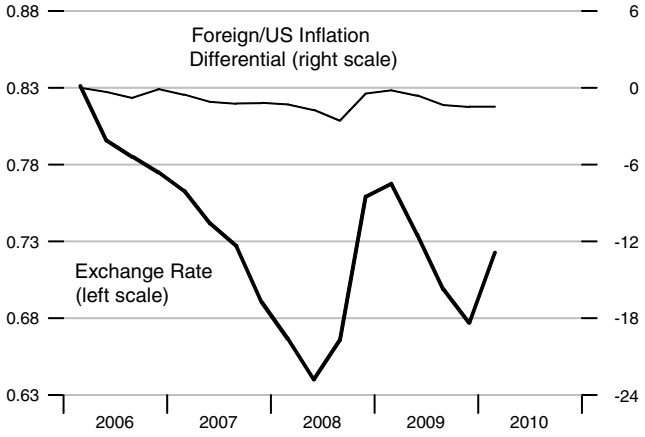
M3

Percent change from year ago



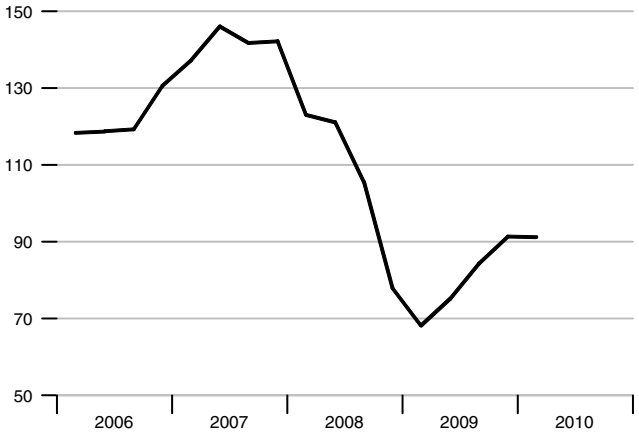
Exchange Rate and Inflation Differential

Euro/US$ Percent



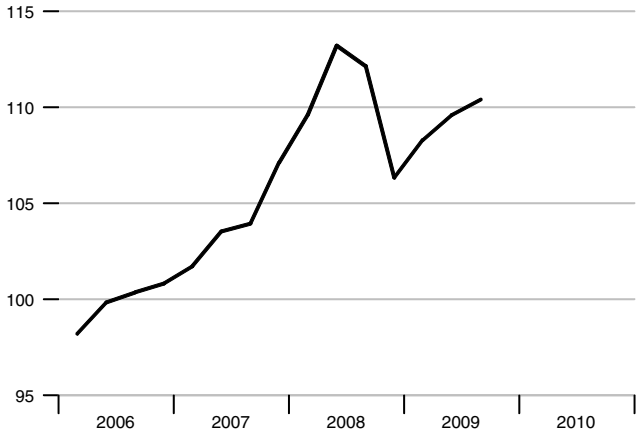
Stock Exchange Index - Dow Jones EURO STOXX[SM]

2005 = 100



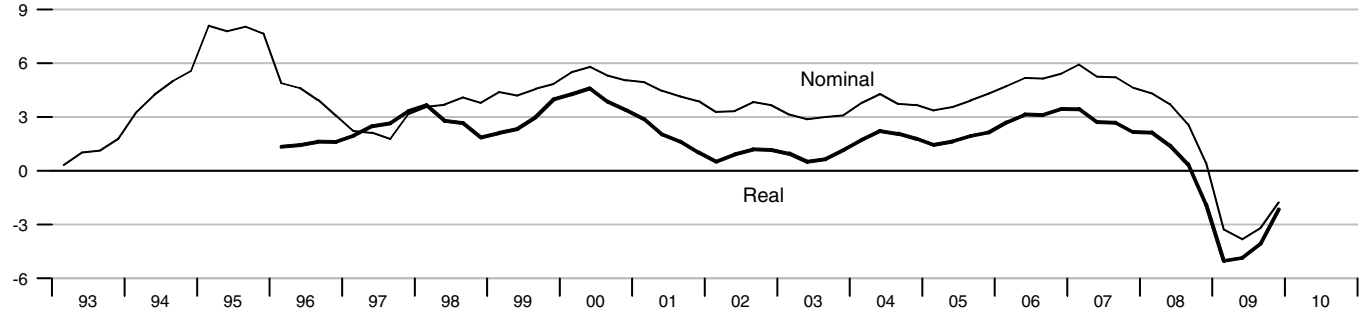
Real Effective Exchange Rate

Index 2005 = 100



GDP

Percent change from year ago

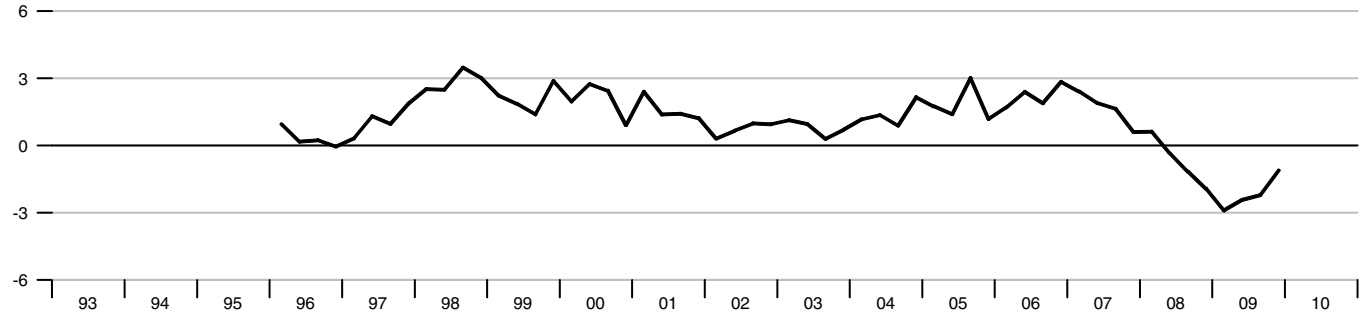


Industrial Production

Percent change from year ago

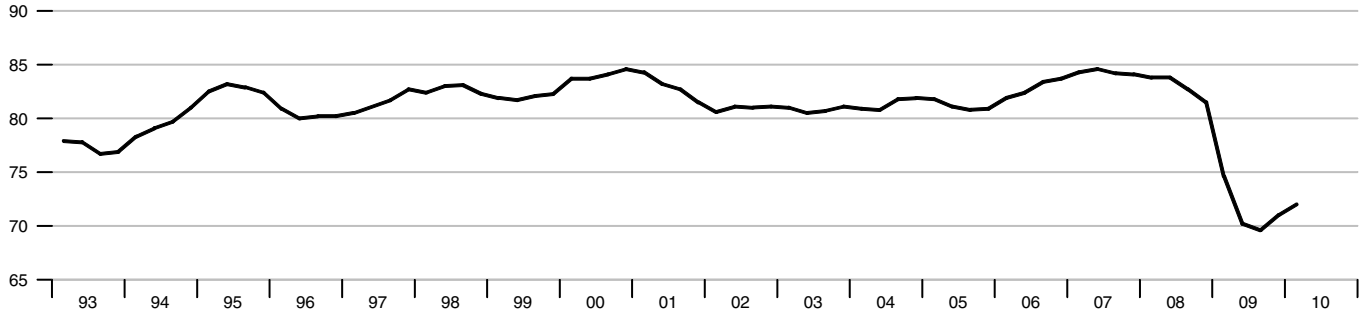
Retail Sales

Percent change from year ago



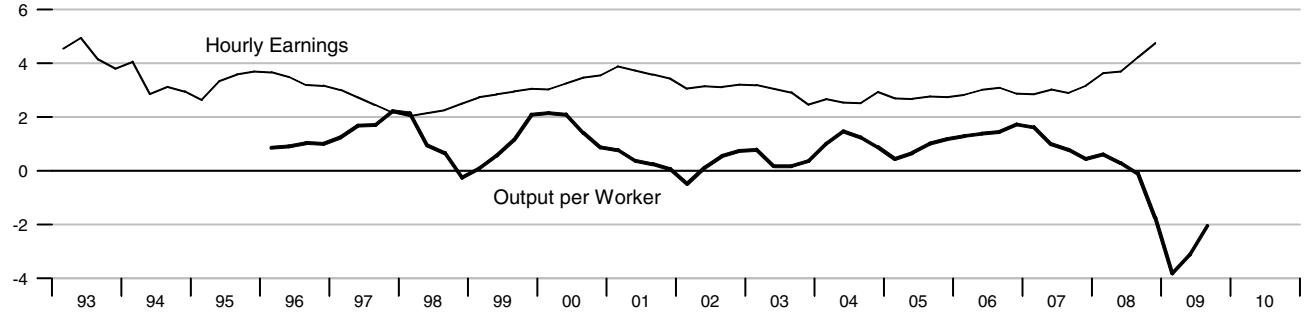
Capacity Utilization

Percent



Real Hourly Earnings and Output per Worker

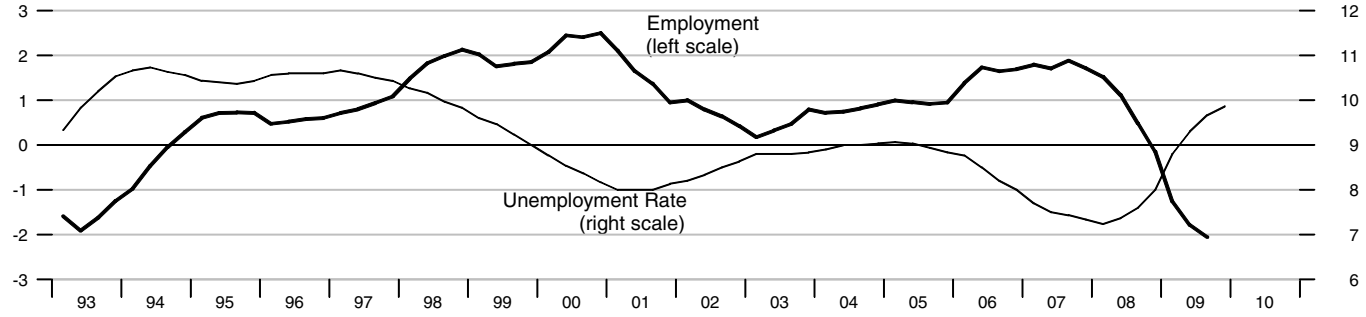
Percent change from year ago



Labor Force Indicators

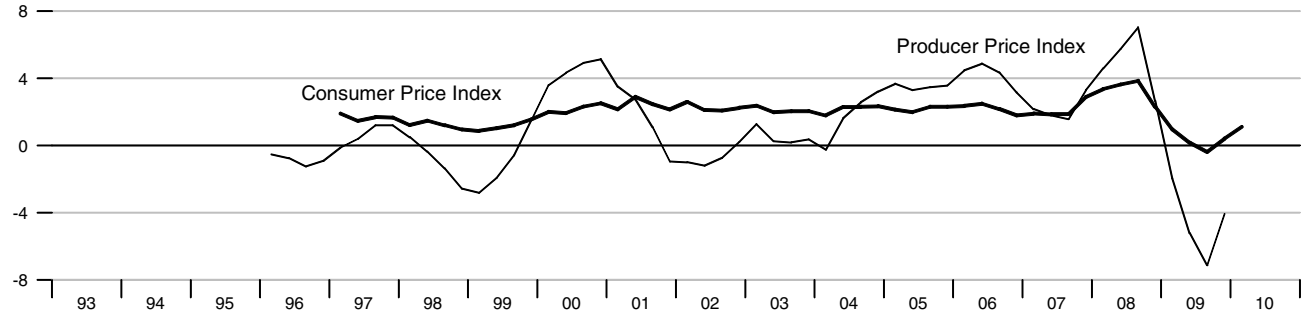
Percent change from year ago

Percent



Inflation

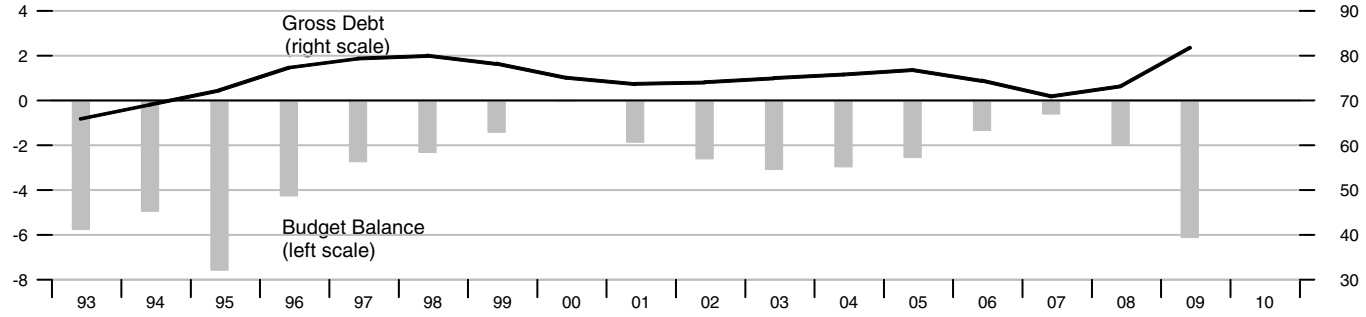
Percent change from year ago



Gross Government Debt and Budget Balance

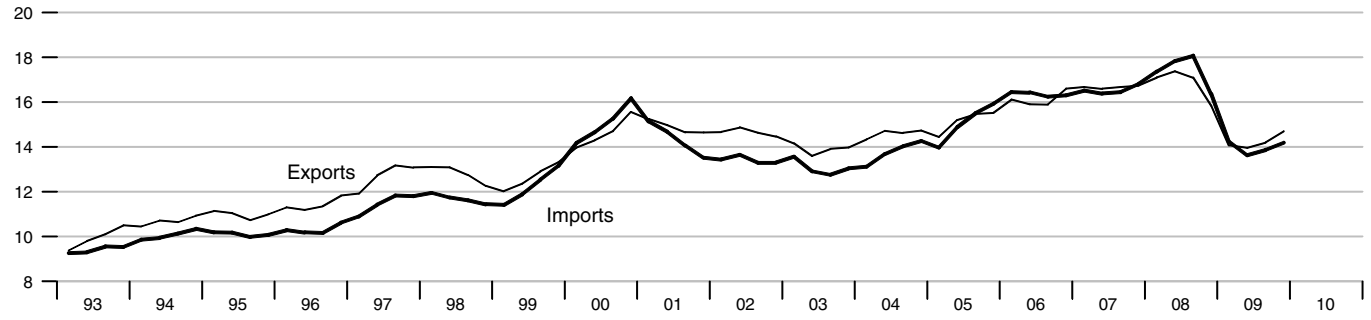
Percent of GDP, annual data

Percent of GDP, annual data



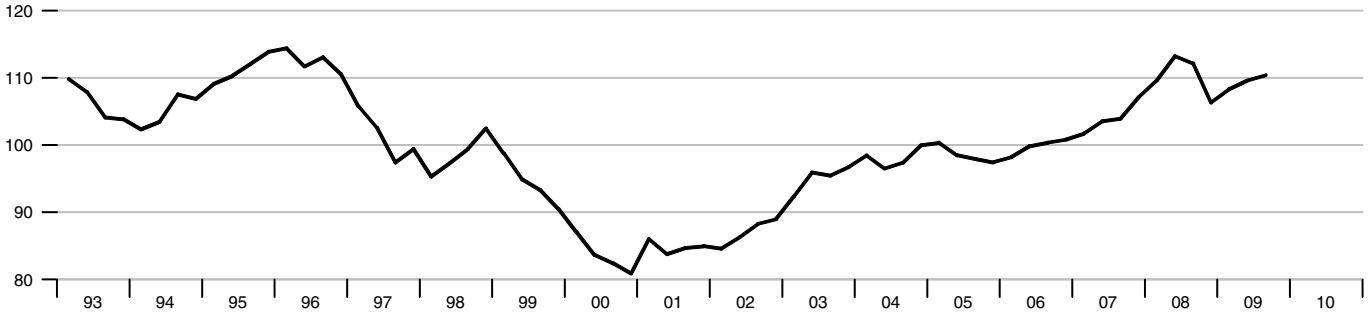
International Trade - Goods

Percent of GDP



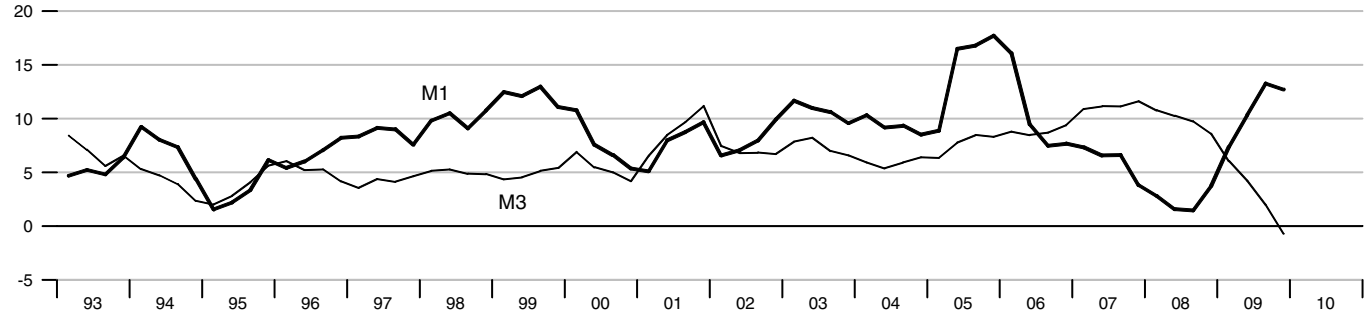
Real Effective Exchange Rate

Index 2005 = 100



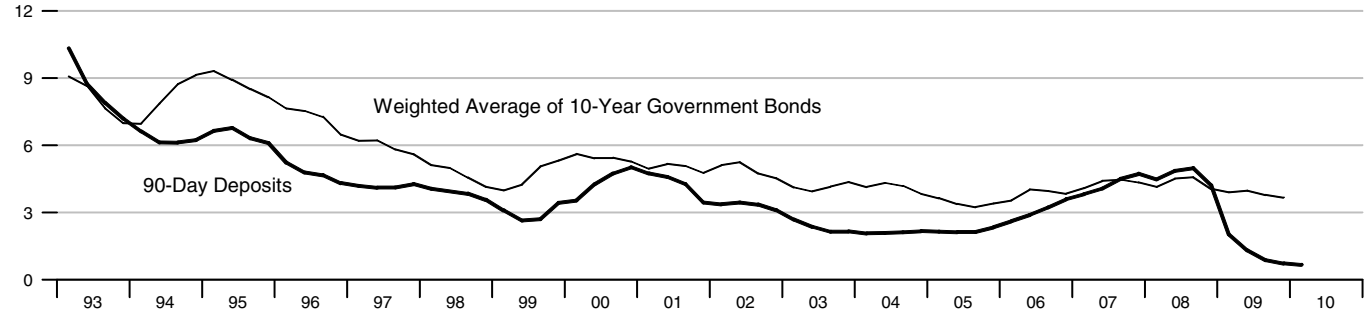
Monetary Aggregates

Percent change from year ago



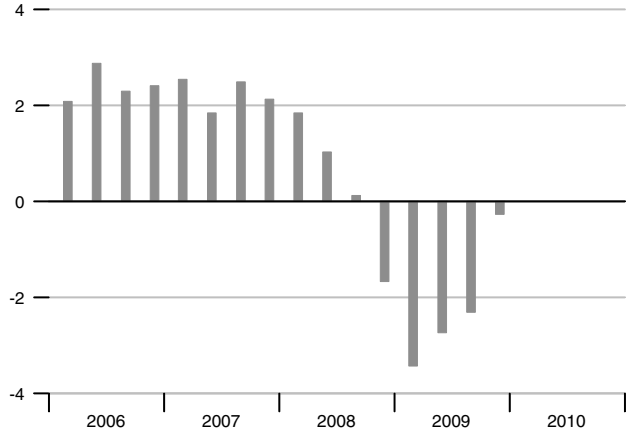
Interest Rates

Percent



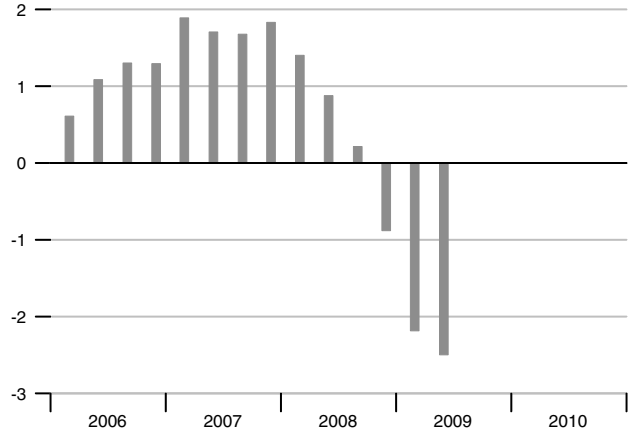
Real GDP

Percent change from year ago



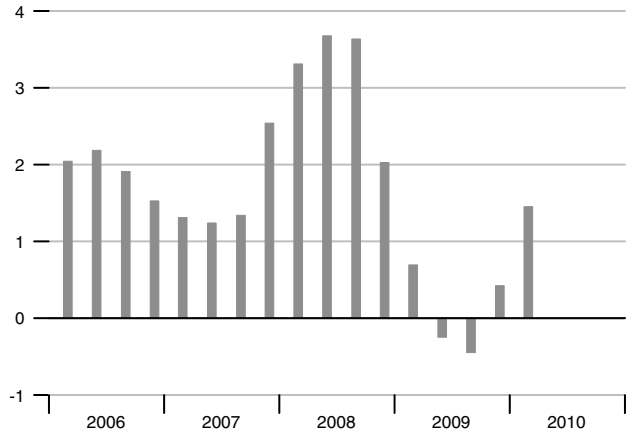
Employment

Percent change from year ago



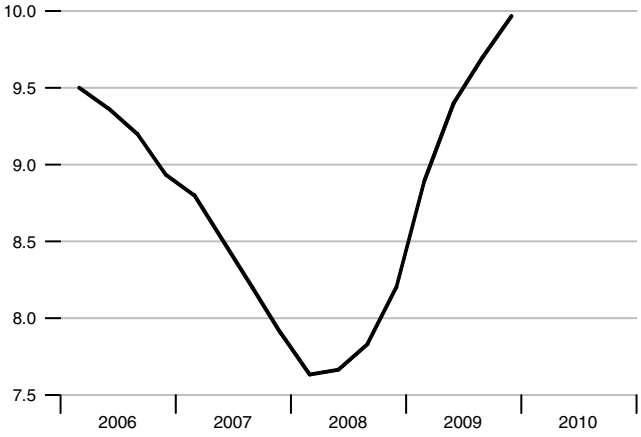
Consumer Price Index

Percent change from year ago



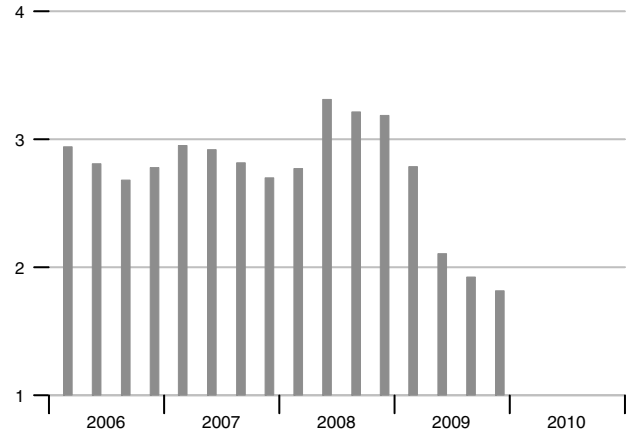
Unemployment Rate

Percent



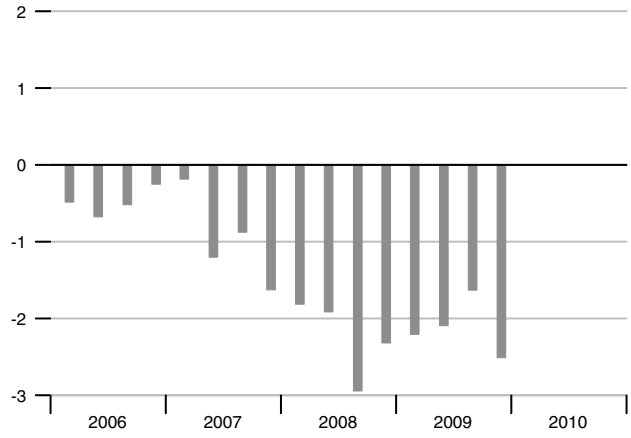
Real Hourly Earnings

Percent change from year ago



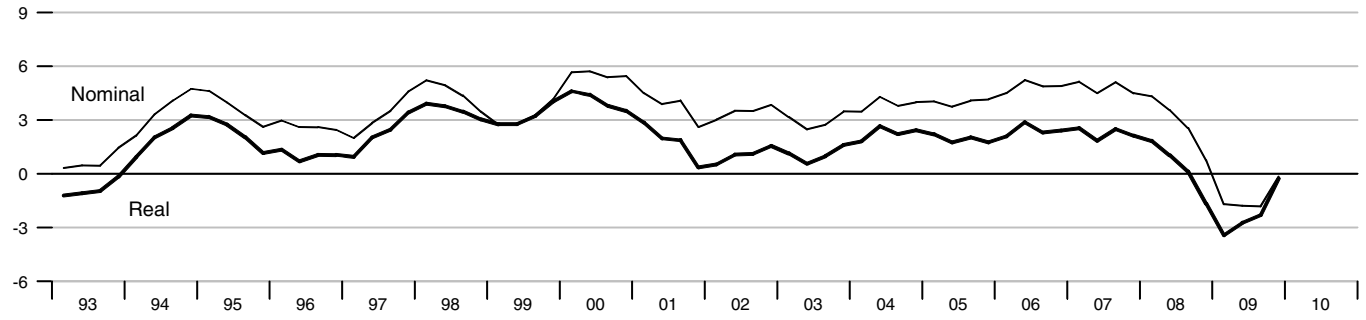
Current Account Balance

Percent of GDP



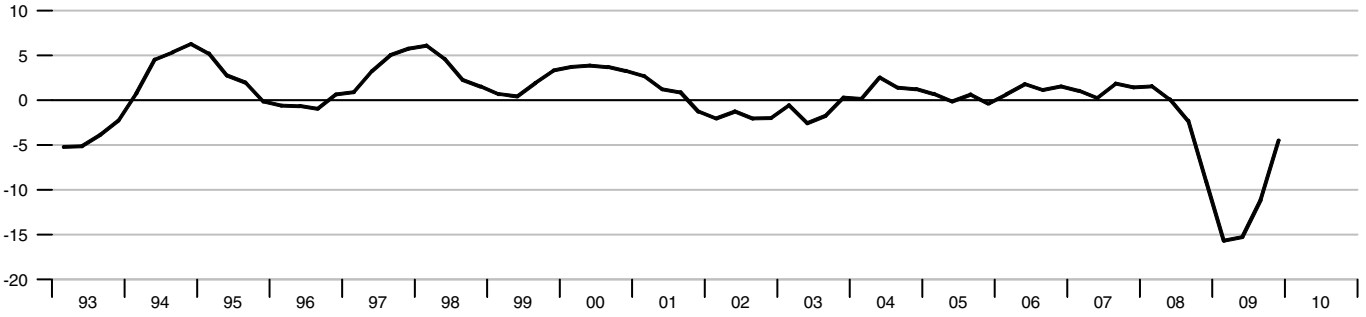
GDP

Percent change from year ago



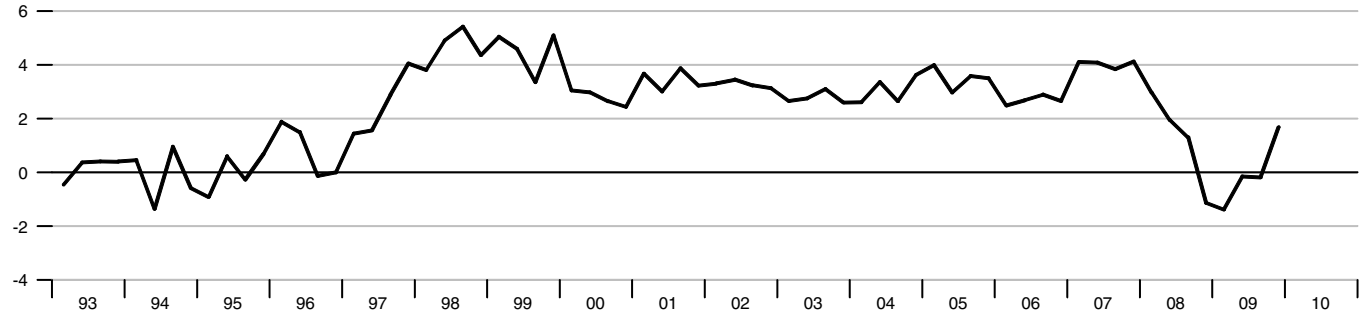
Industrial Production

Percent change from year ago



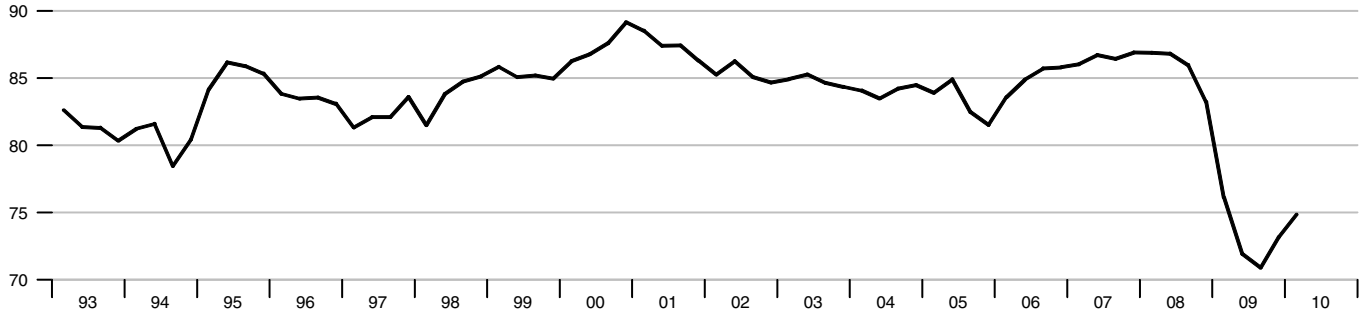
Retail Sales

Percent change from year ago



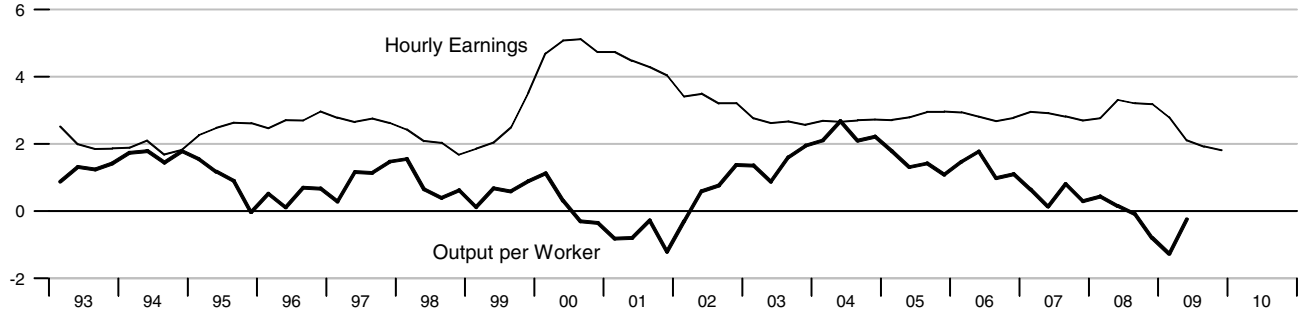
Capacity Utilization

Percent



Real Hourly Earnings and Output per Worker

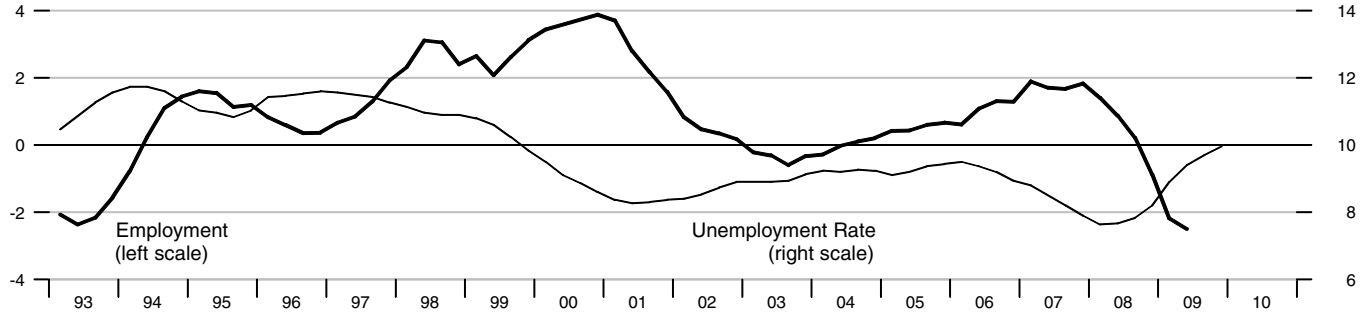
Percent change from year ago



Labor Force Indicators

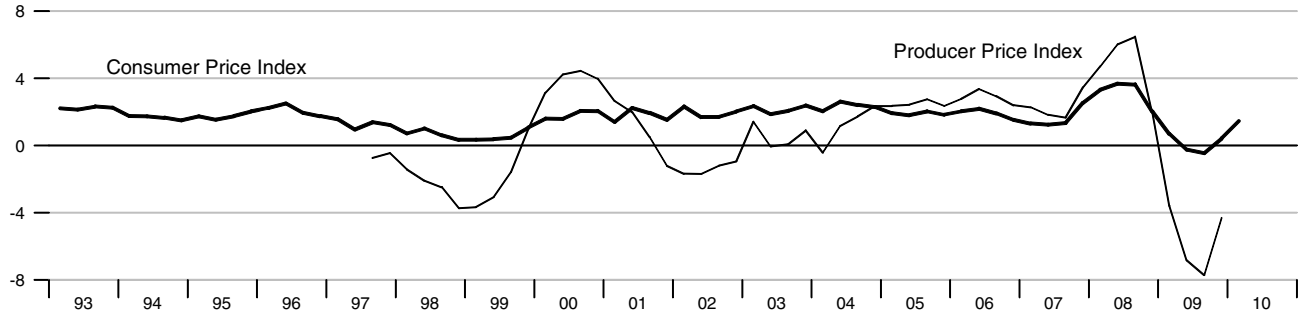
Percent change from year ago

Percent



Inflation

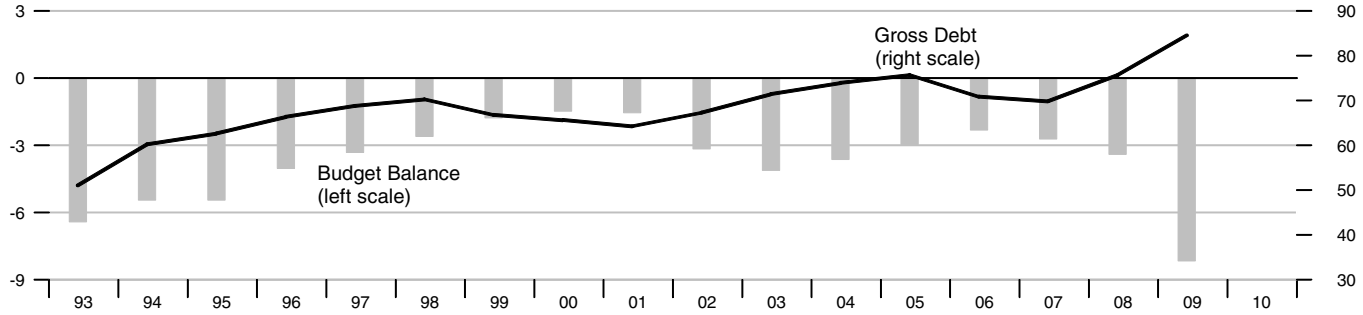
Percent change from year ago



Gross Government Debt and Budget Balance

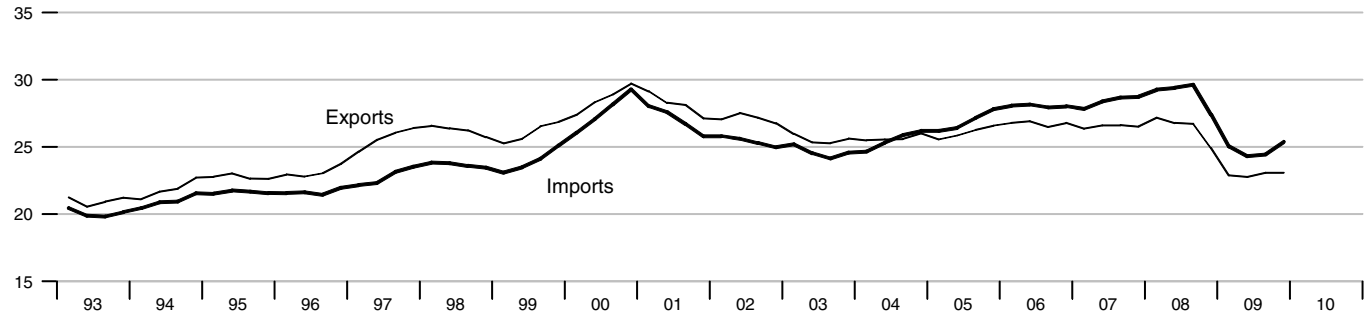
Percent of GDP, annual data

Percent of GDP, annual data



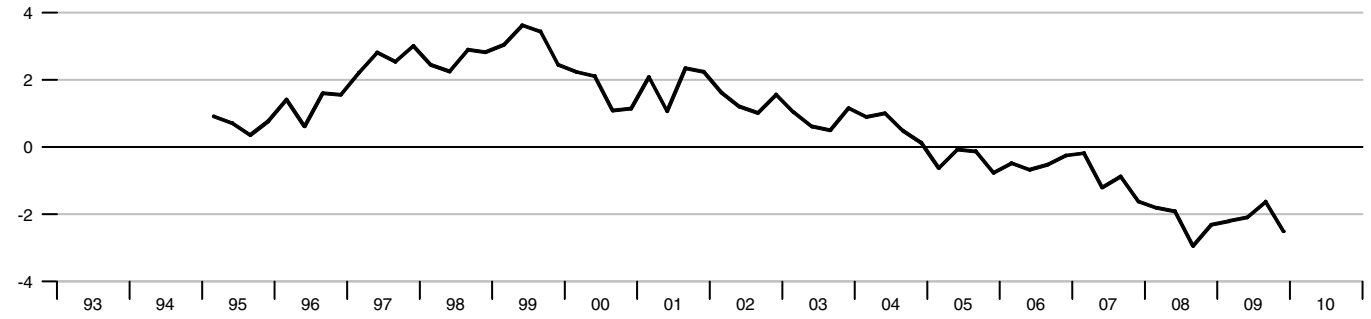
International Trade - Goods and Services

Percent of GDP



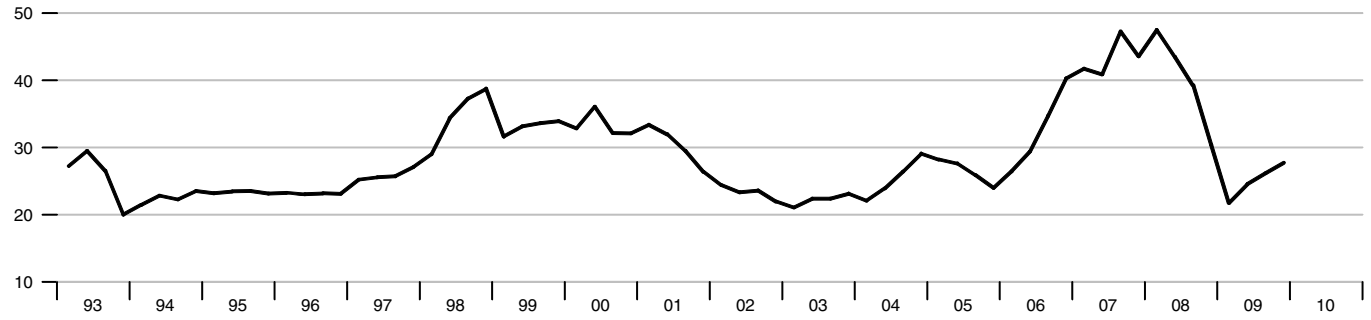
Current Account Balance

Percent of GDP



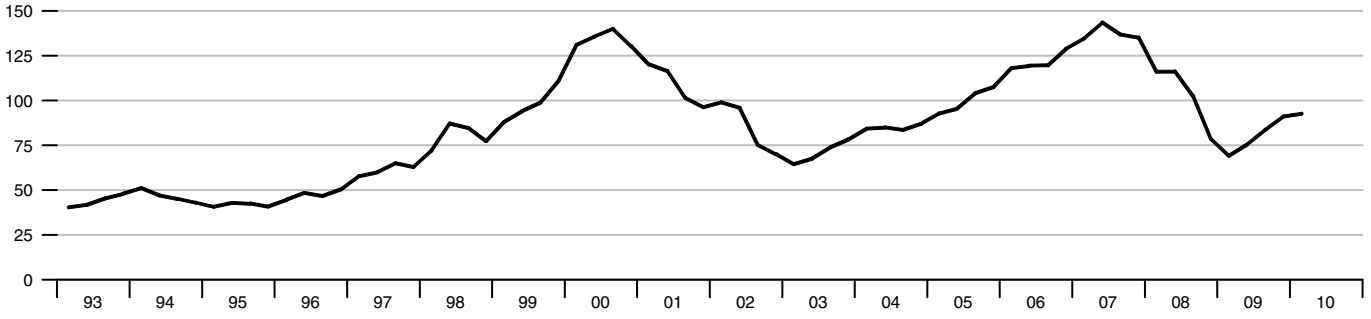
Foreign Exchange Reserves

Billions of US$



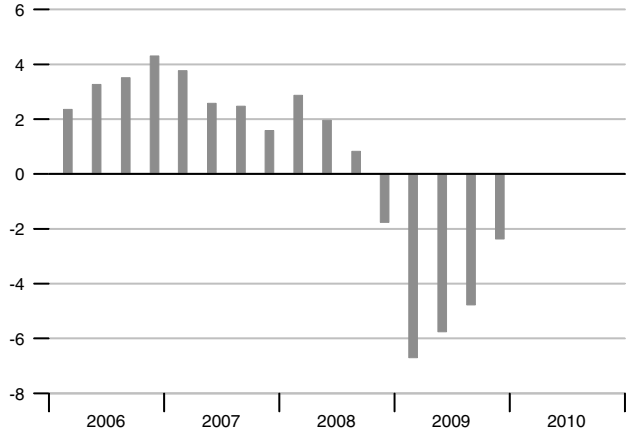
Stock Exchange Index - SBF 250

2005 = 100



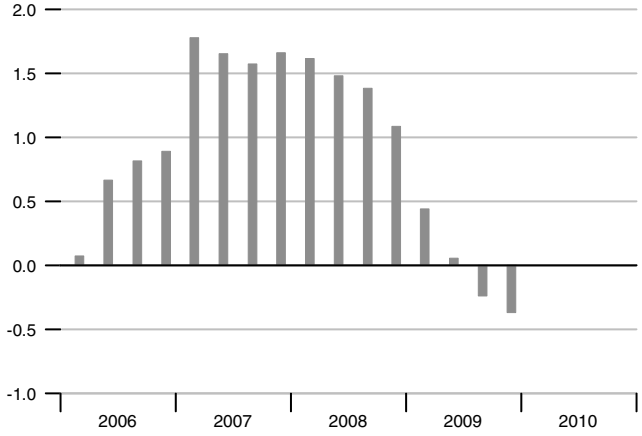
Real GDP

Percent change from year ago



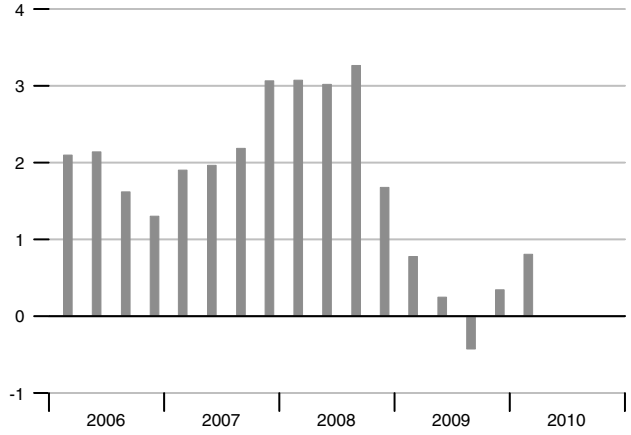
Employment

Percent change from year ago



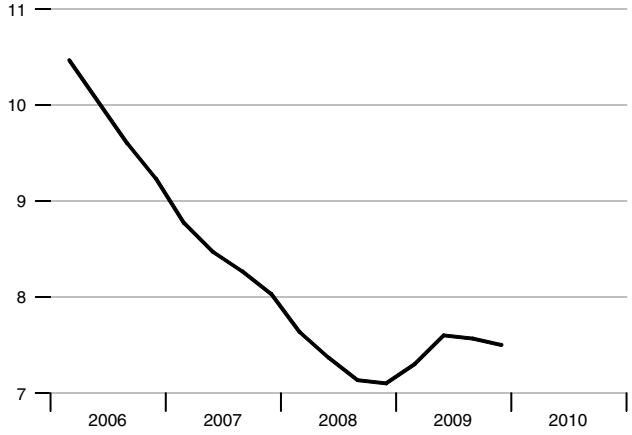
Consumer Price Index

Percent change from year ago



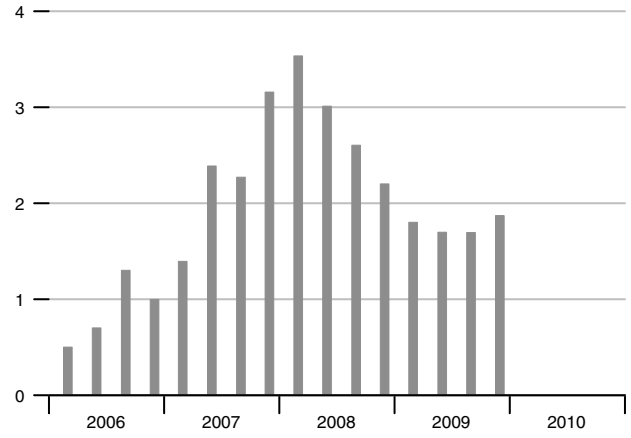
Unemployment Rate

Percent



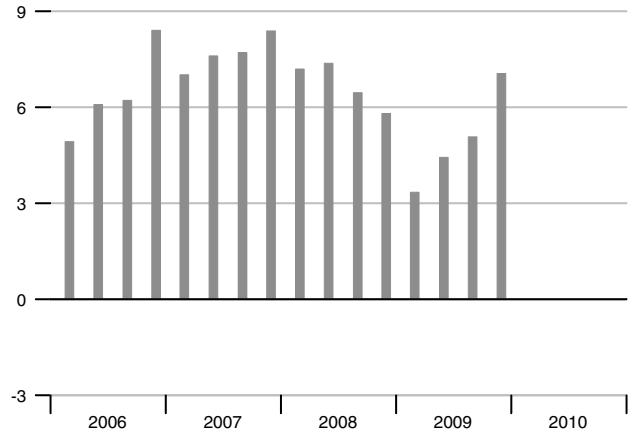
Real Hourly Earnings

Percent change from year ago



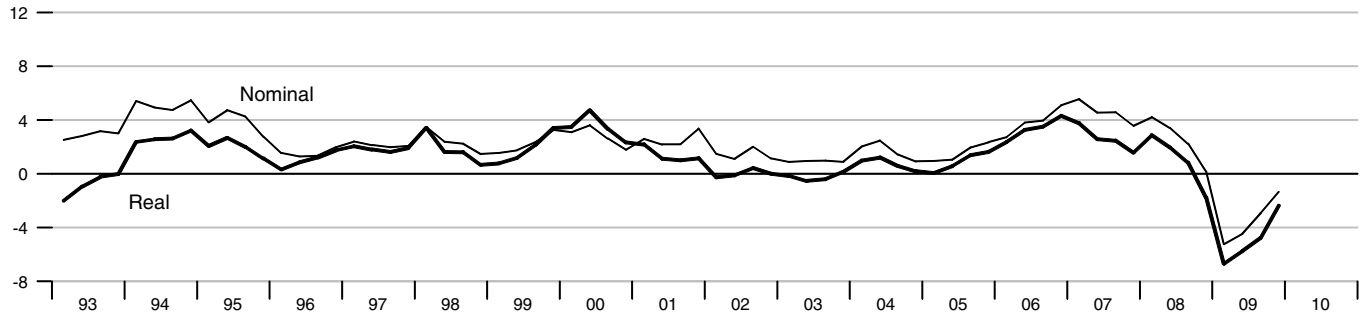
Current Account Balance

Percent of GDP



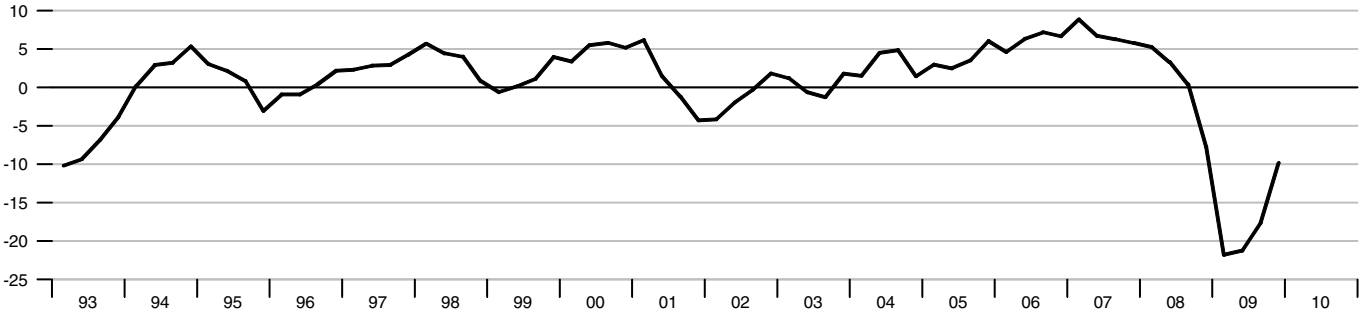
GDP

Percent change from year ago



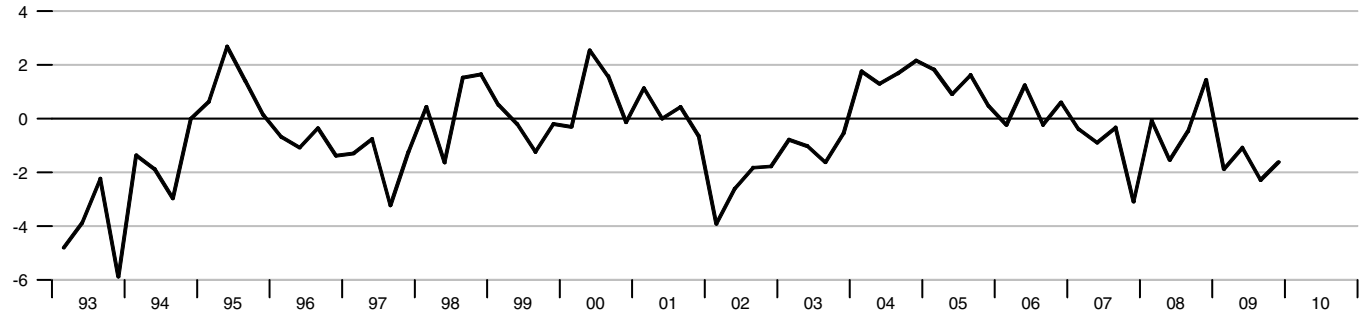
Industrial Production

Percent change from year ago



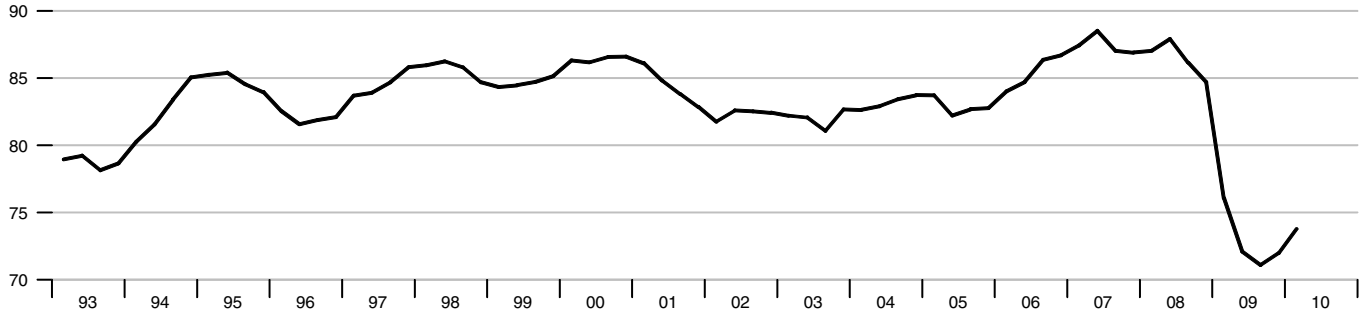
Retail Sales

Percent change from year ago



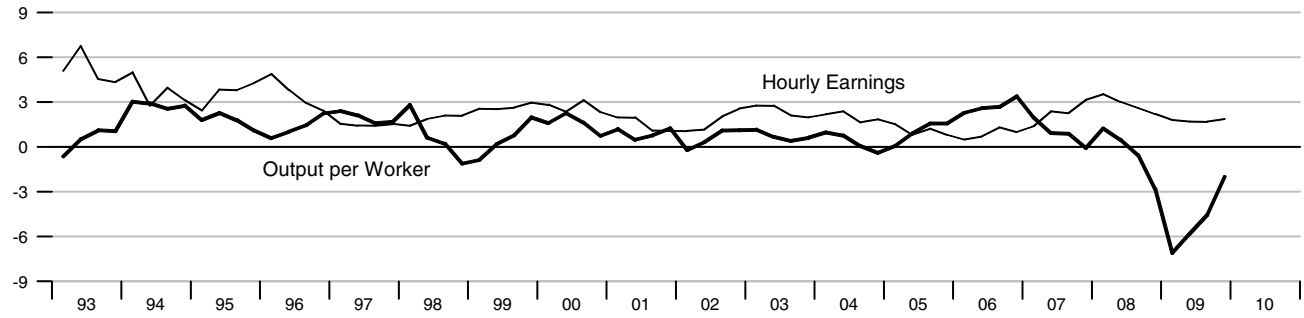
Capacity Utilization

Percent



Real Hourly Earnings and Output per Worker

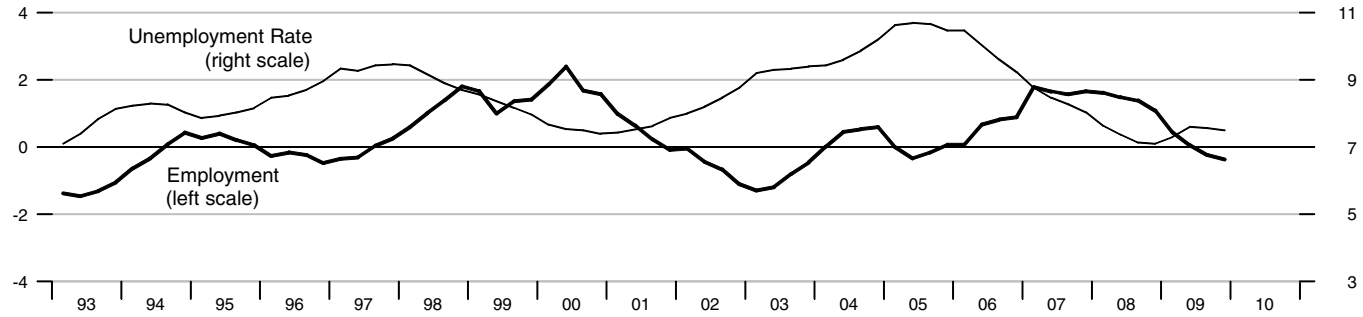
Percent change from year ago



Labor Force Indicators

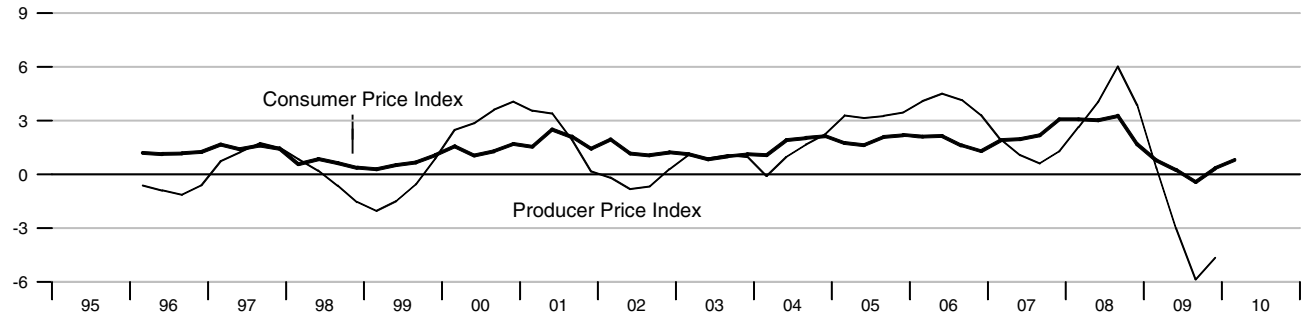
Percent change from year ago

Percent



Inflation

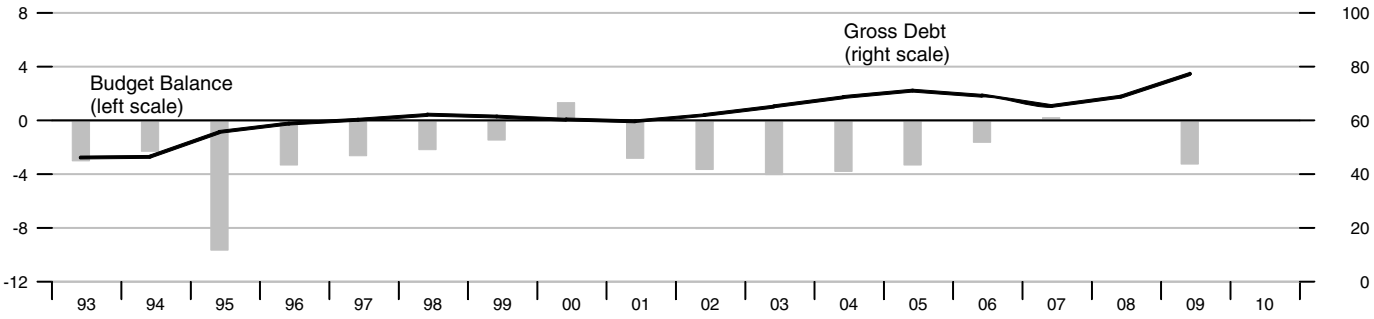
Percent change from year ago



Gross Government Debt and Budget Balance

Percent of GDP, annual data

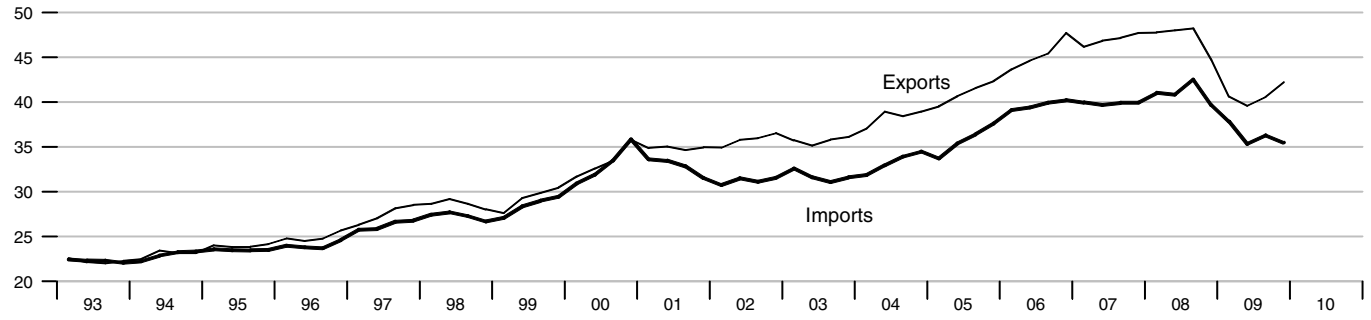
Percent of GDP, annual data



The actual value for budget balance in 2008 is 0.0%.

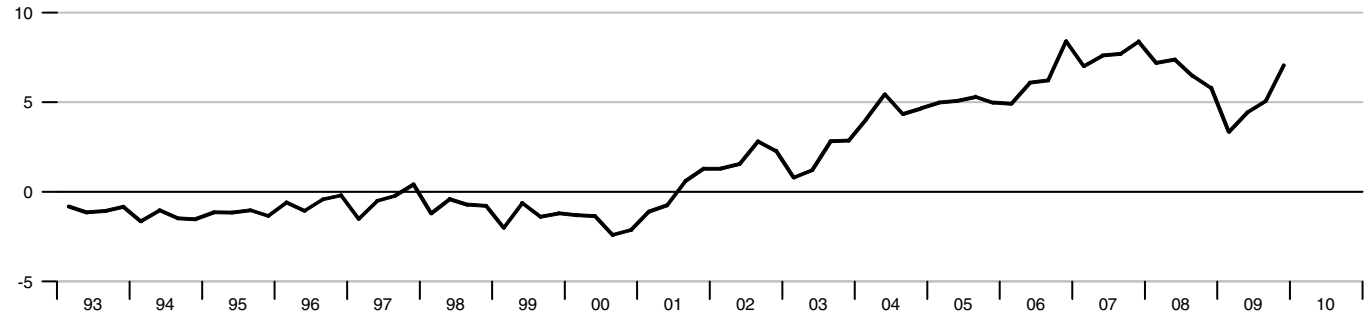
International Trade - Goods and Services

Percent of GDP



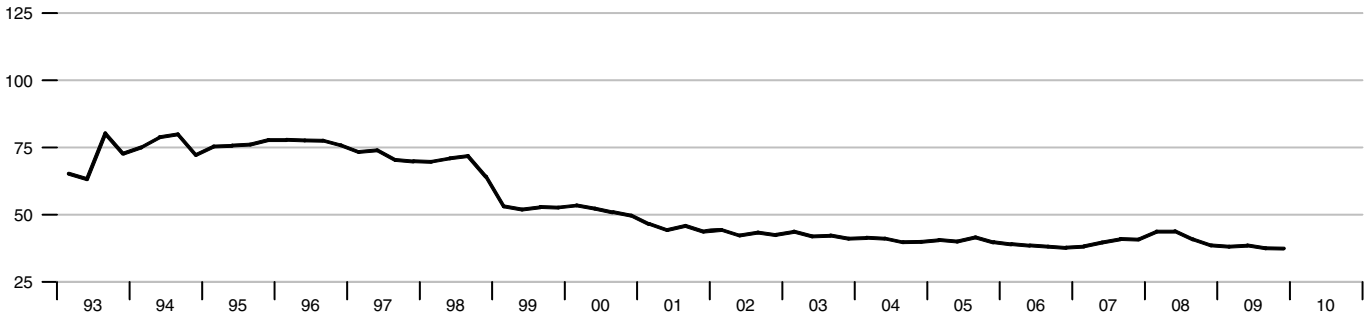
Current Account Balance

Percent of GDP



Foreign Exchange Reserves

Billions of US$

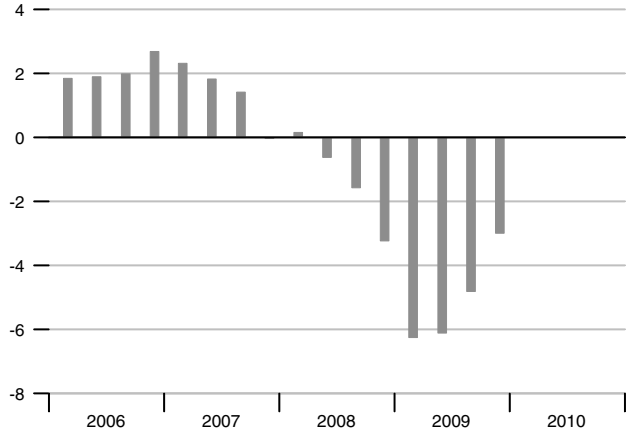


Stock Exchange Index - CDAX

2005 = 100

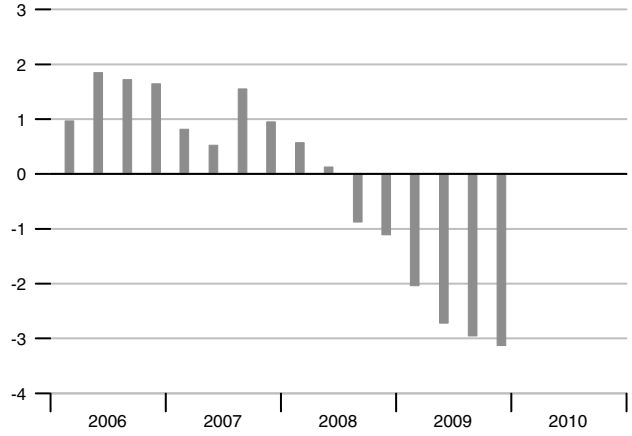
Real GDP

Percent change from year ago



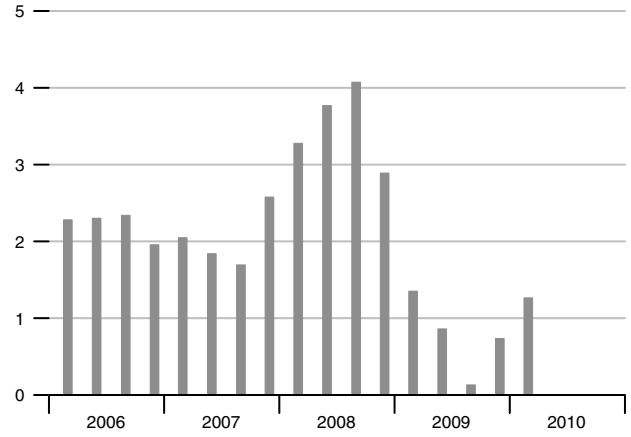
Employment

Percent change from year ago



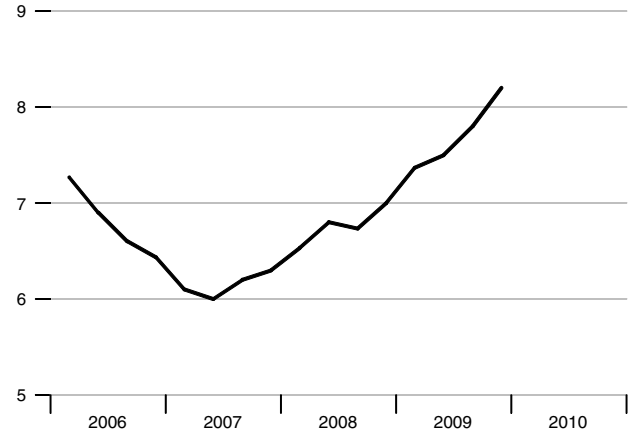
Consumer Price Index

Percent change from year ago



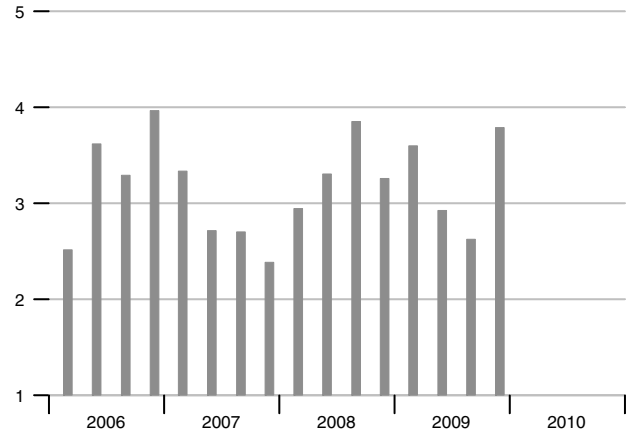
Unemployment Rate

Percent



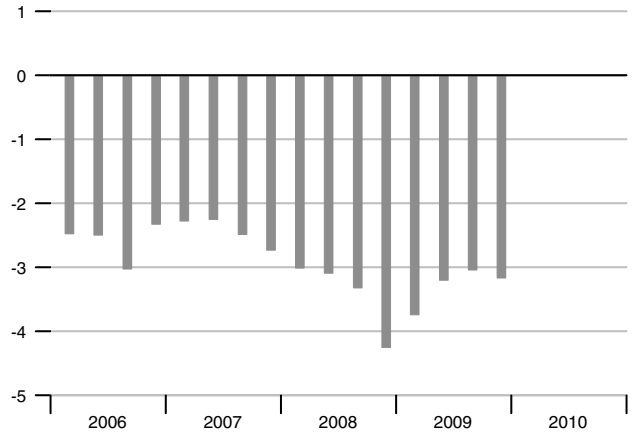
Real Hourly Earnings

Percent change from year ago



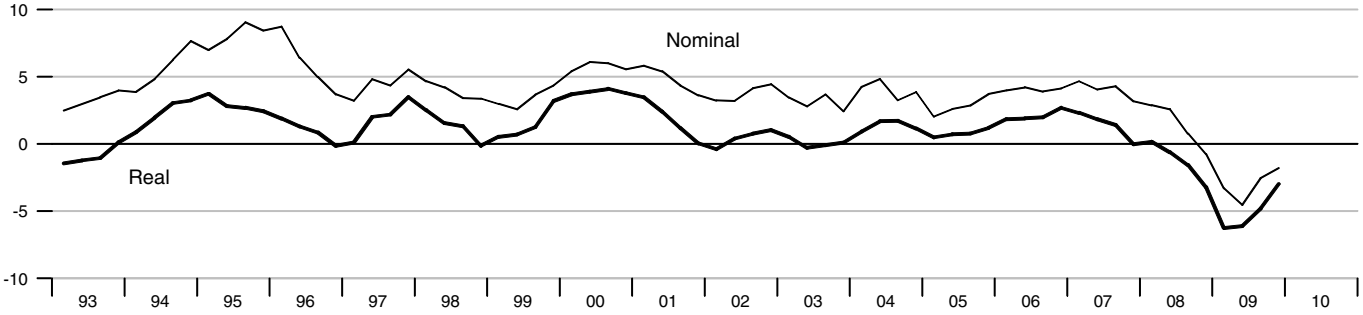
Current Account Balance

Percent of GDP



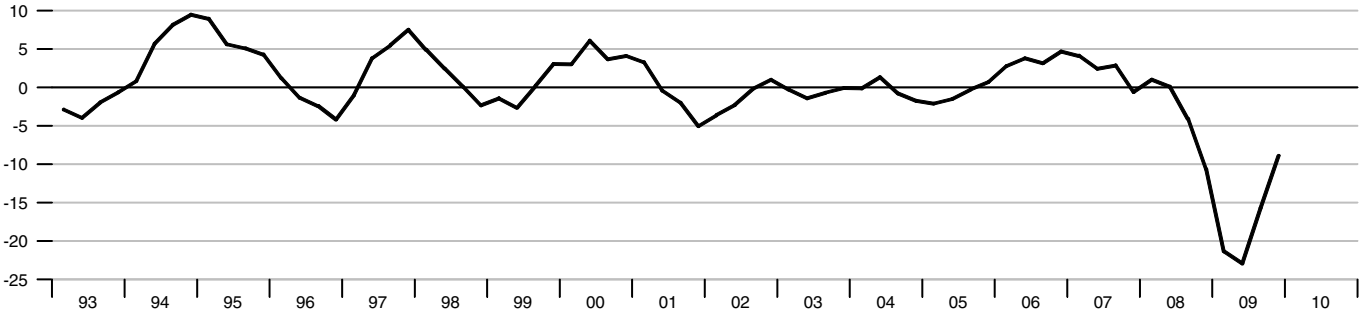
GDP

Percent change from year ago



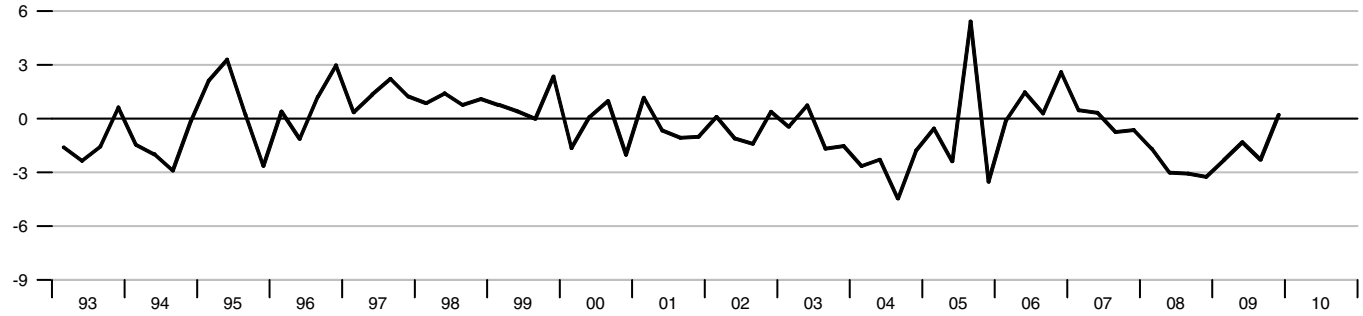
Industrial Production

Percent change from year ago



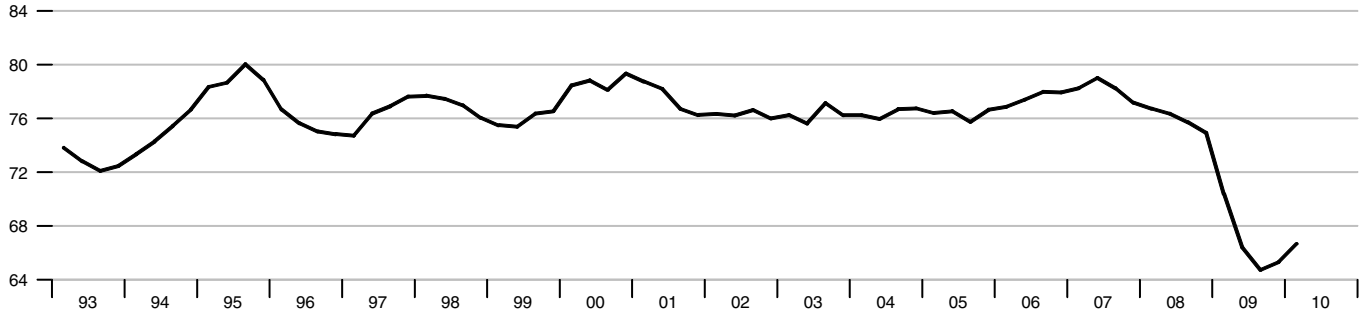
Retail Sales

Percent change from year ago



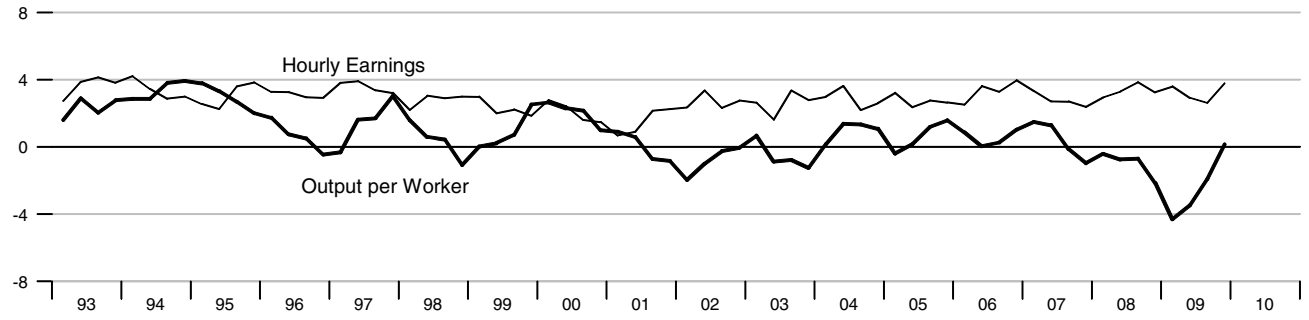
Capacity Utilization

Percent



Real Hourly Earnings and Output per Worker

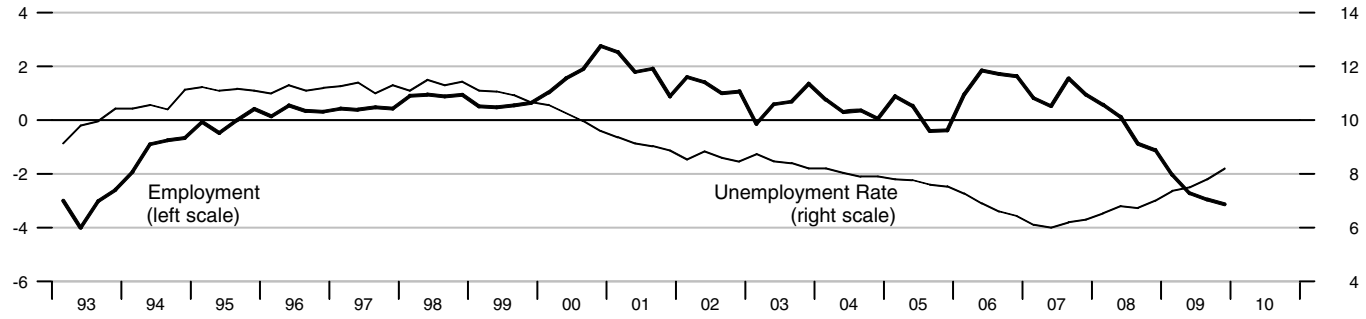
Percent change from year ago



Labor Force Indicators

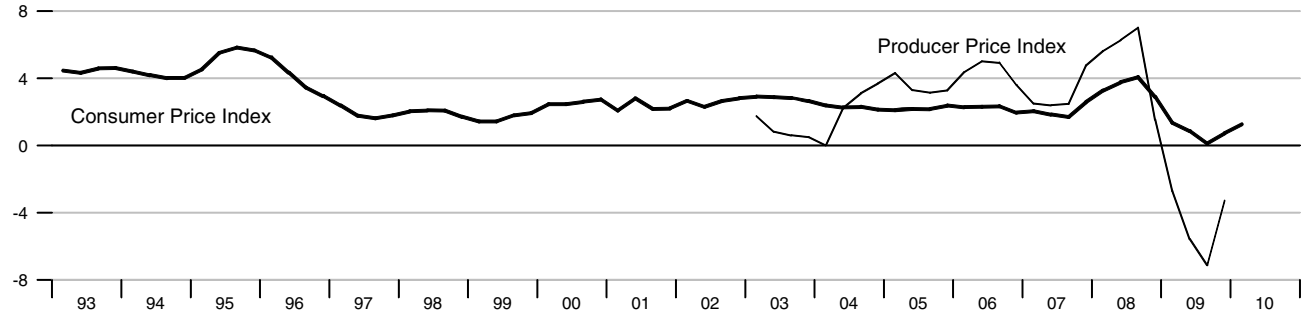
Percent change from year ago

Percent



Inflation

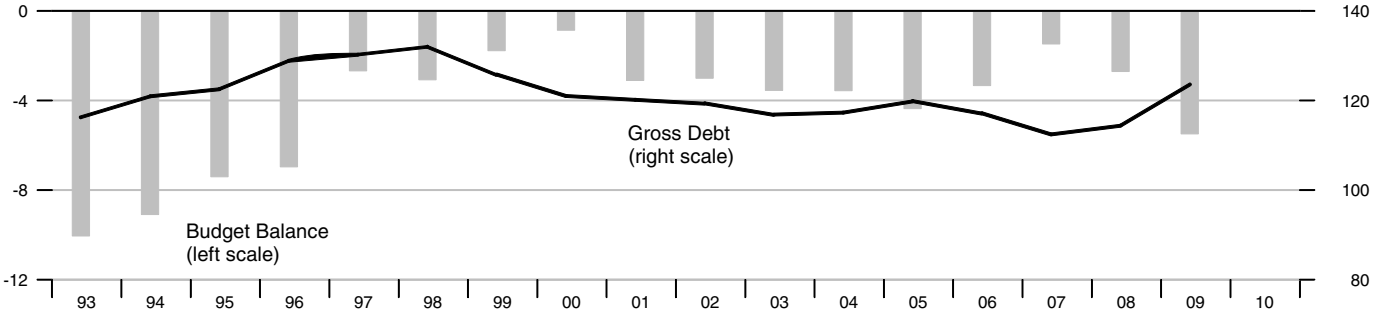
Percent change from year ago



Gross Government Debt and Budget Balance

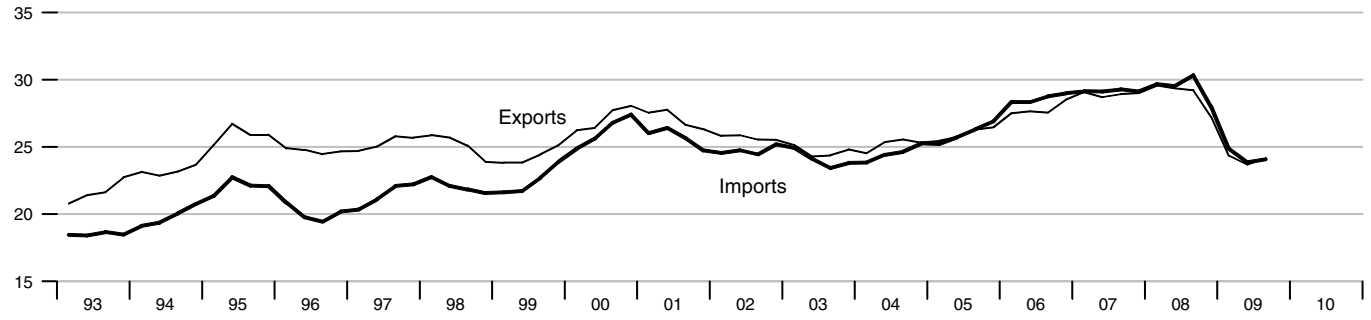
Percent of GDP, annual data

Percent of GDP, annual data



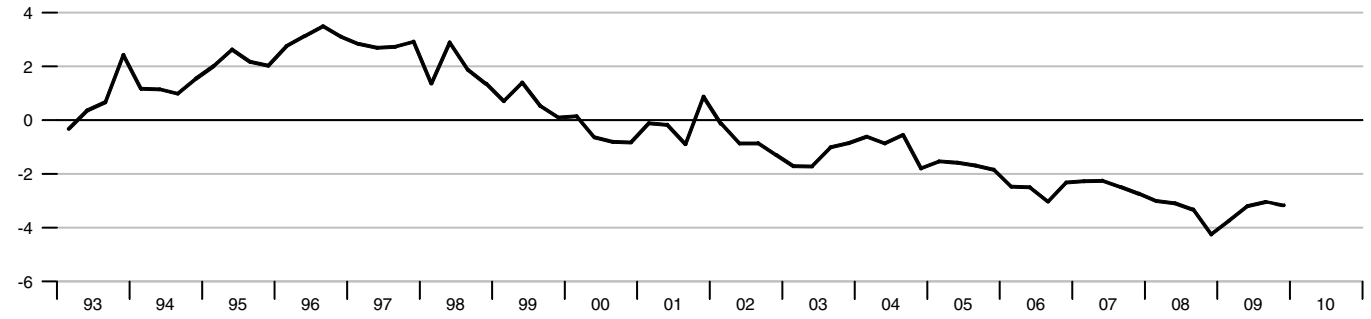
International Trade - Goods and Services

Percent of GDP



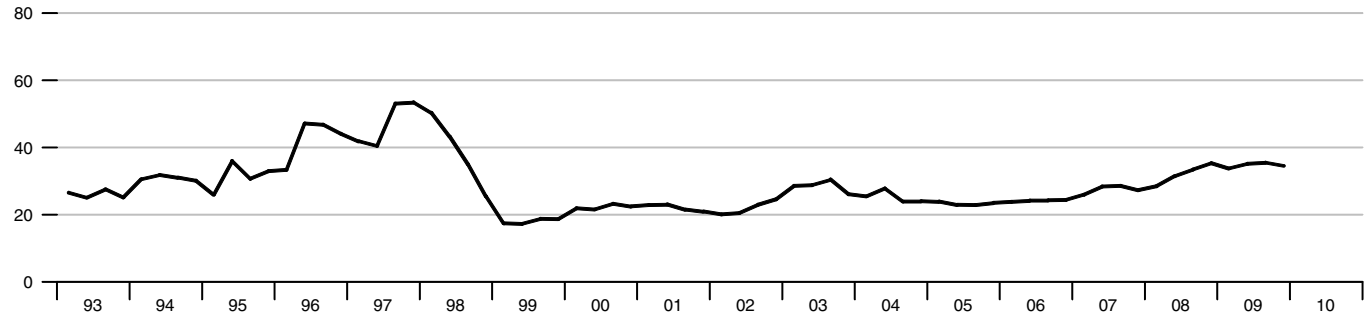
Current Account Balance

Percent of GDP



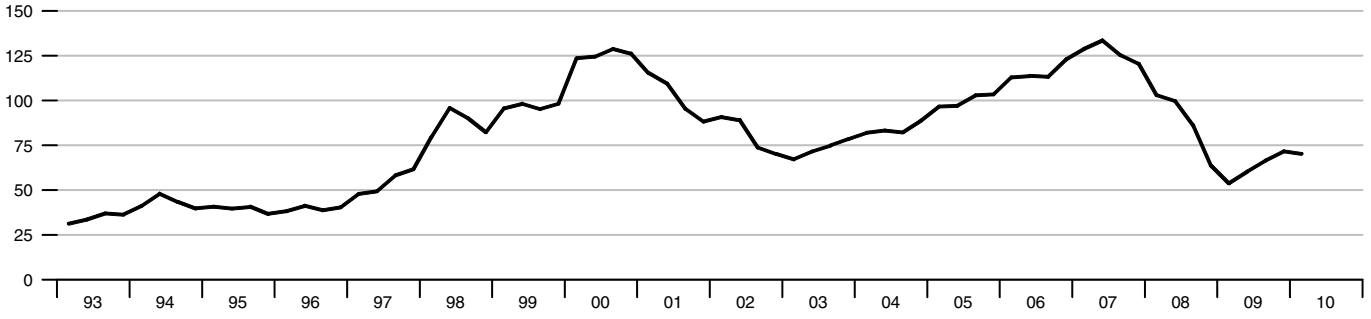
Foreign Exchange Reserves

Billions of US$



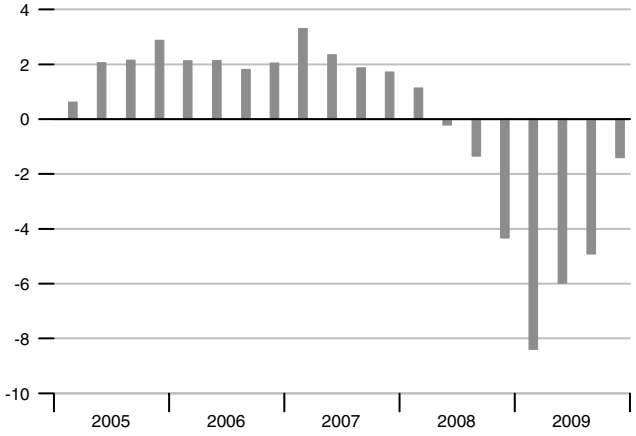
Stock Exchange Index - Milan Stock Exchange

2005 = 100



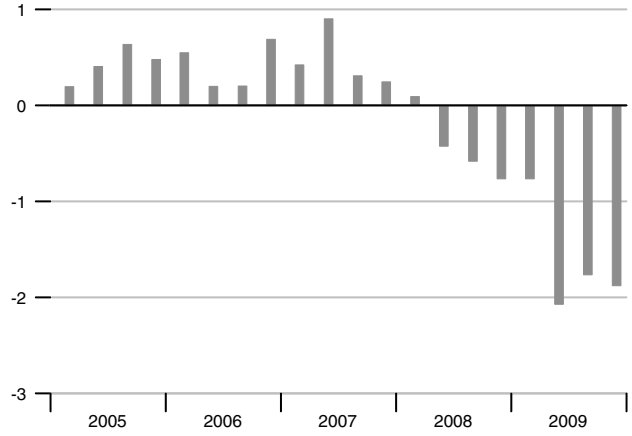
Real GDP

Percent change from year ago



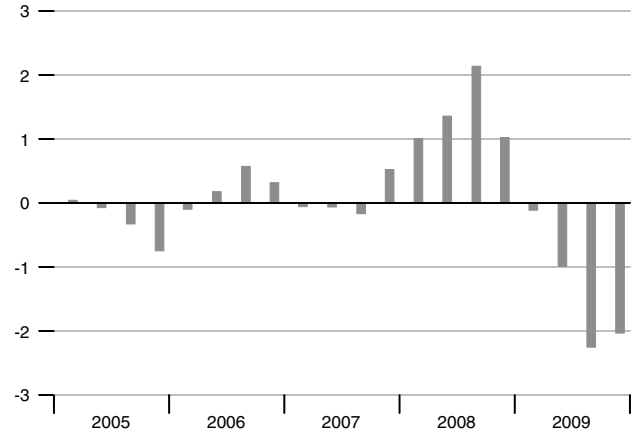
Employment

Percent change from year ago



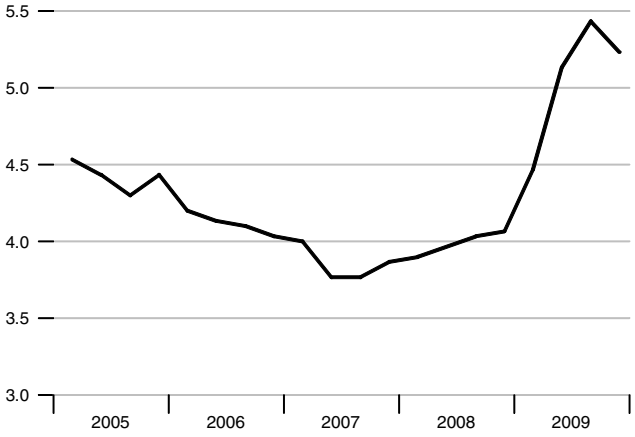
Consumer Price Index

Percent change from year ago



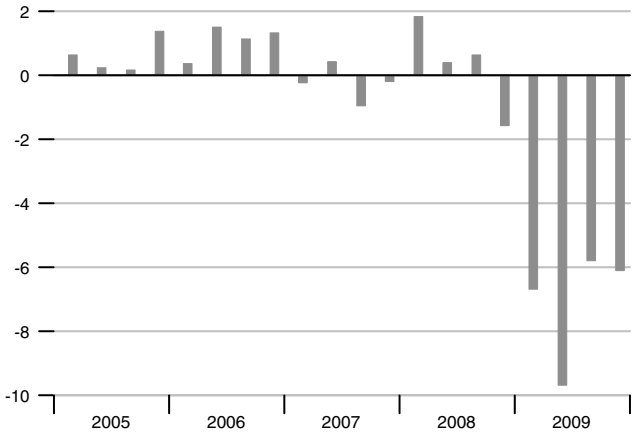
Unemployment Rate

Percent



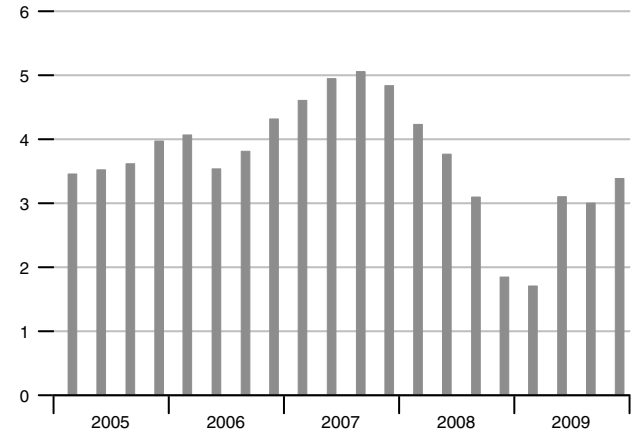
Real Monthly Earnings

Percent change from year ago

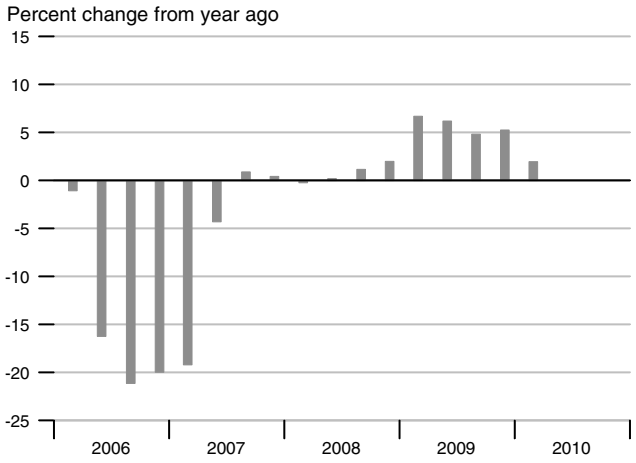


Current Account Balance

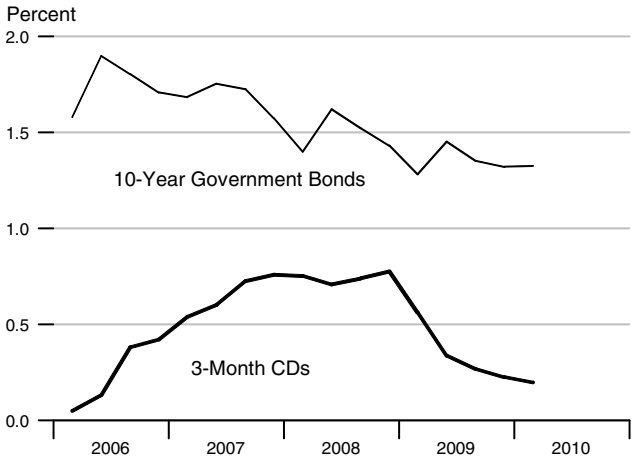
Percent of GDP



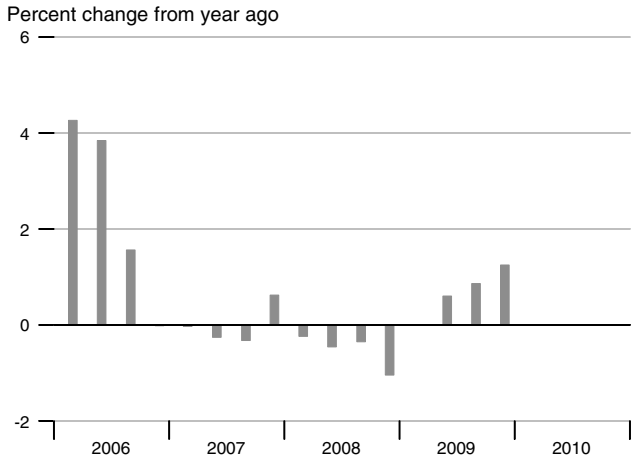
Adjusted Monetary Base



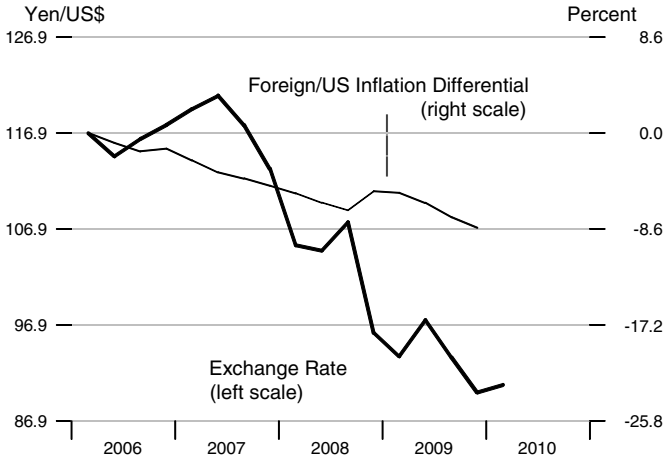
Interest Rates



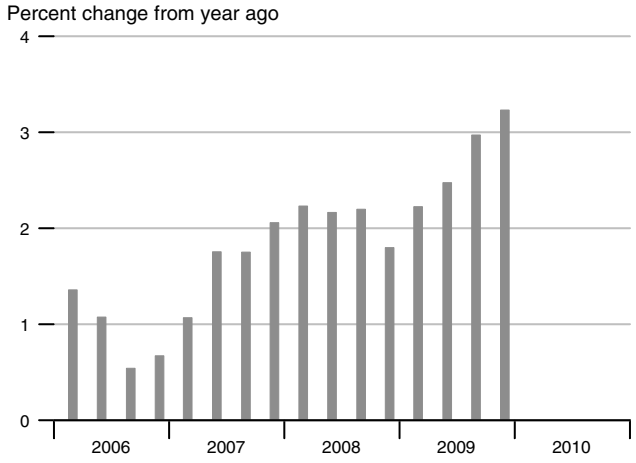
M1



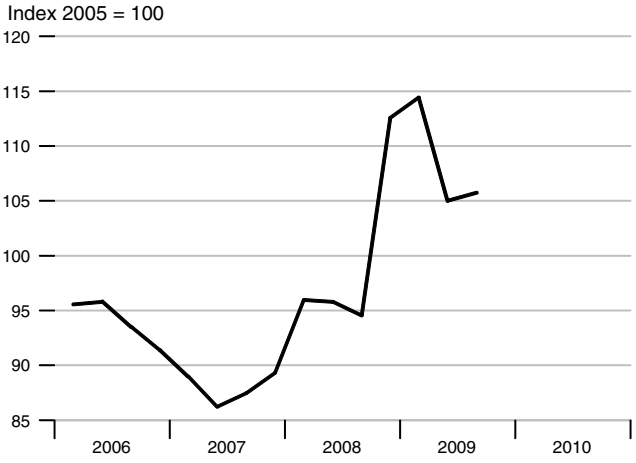
Exchange Rate and Inflation Differential



M2

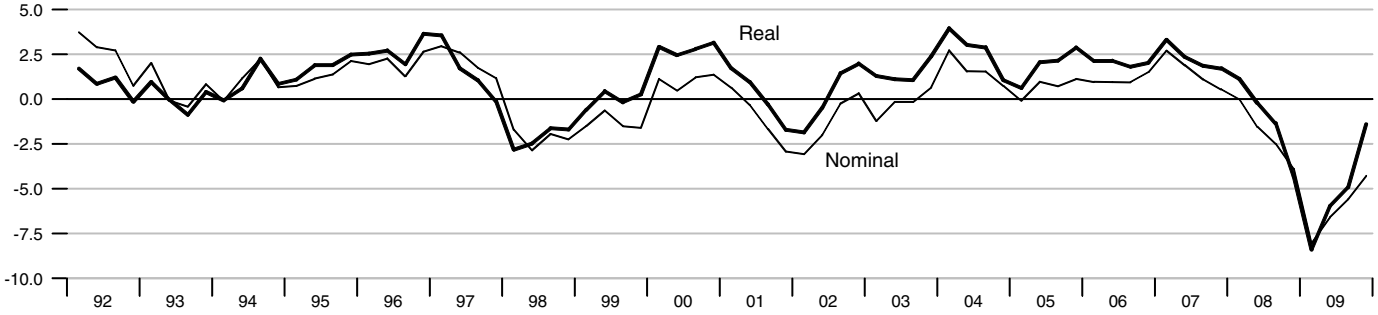


Real Effective Exchange Rate



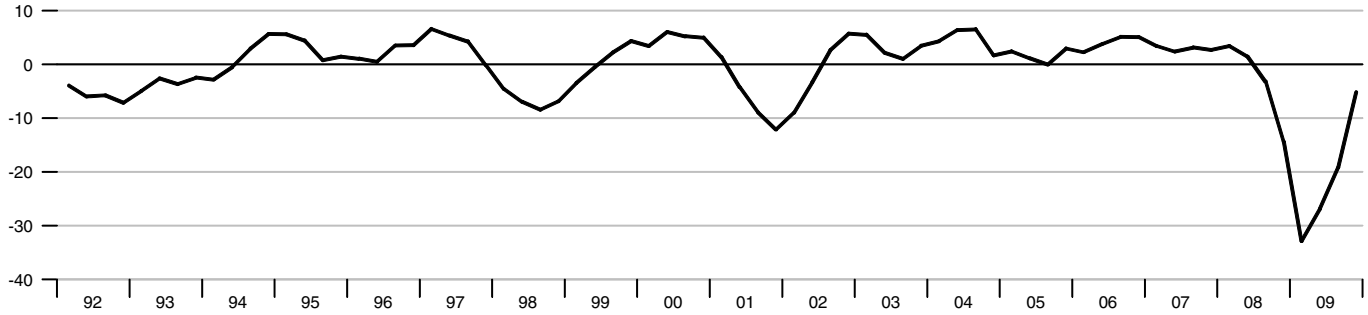
GDP

Percent change from year ago



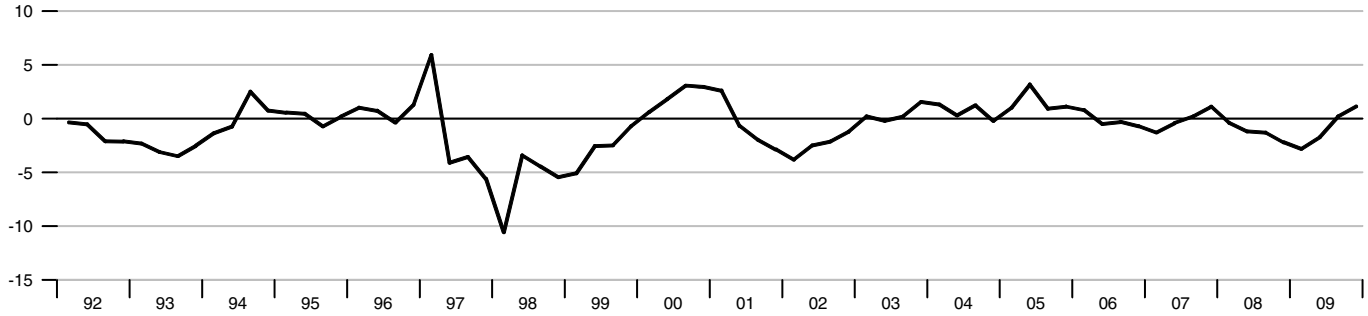
Industrial Production

Percent change from year ago



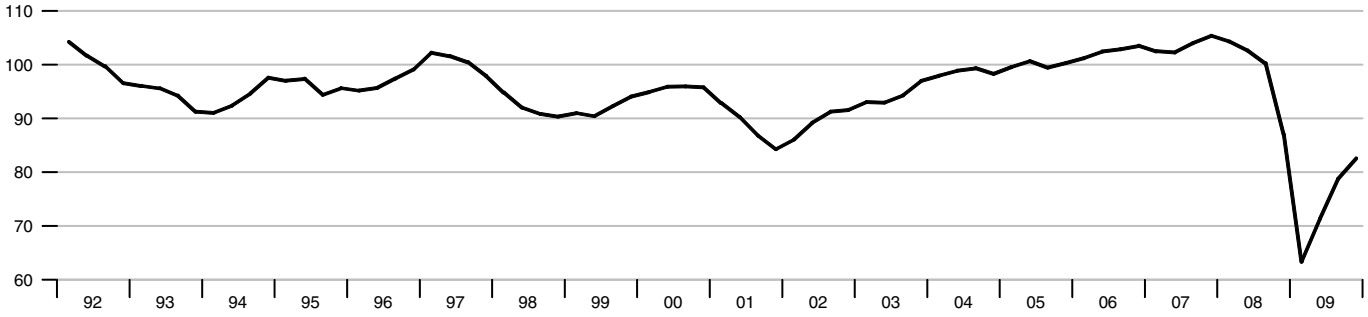
Retail Sales

Percent change from year ago



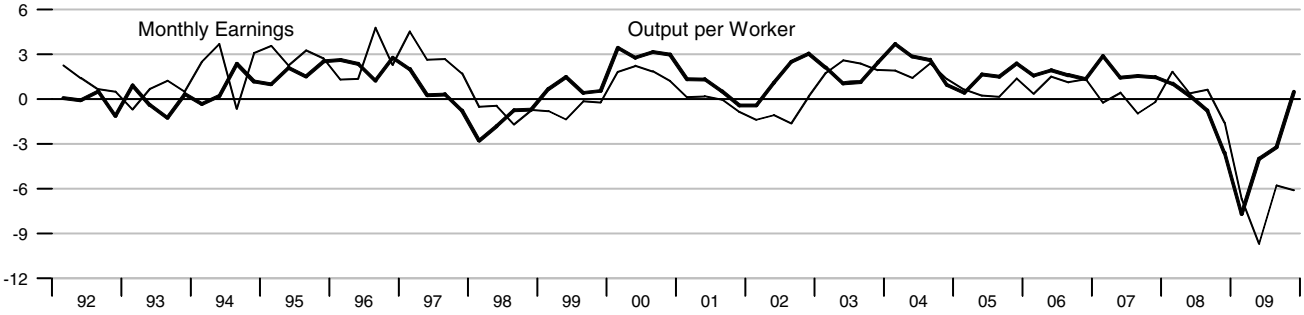
Capacity Utilization

2005 = 100



Real Monthly Earnings and Output per Worker

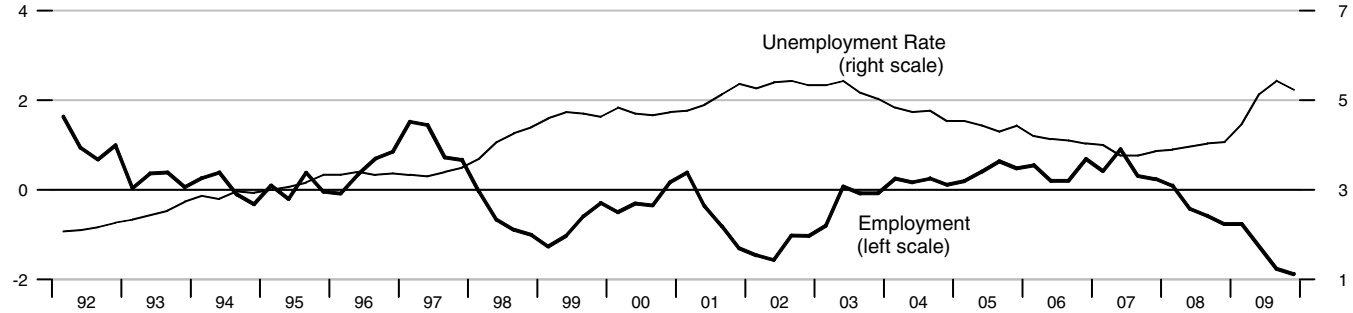
Percent change from year ago



Labor Force Indicators

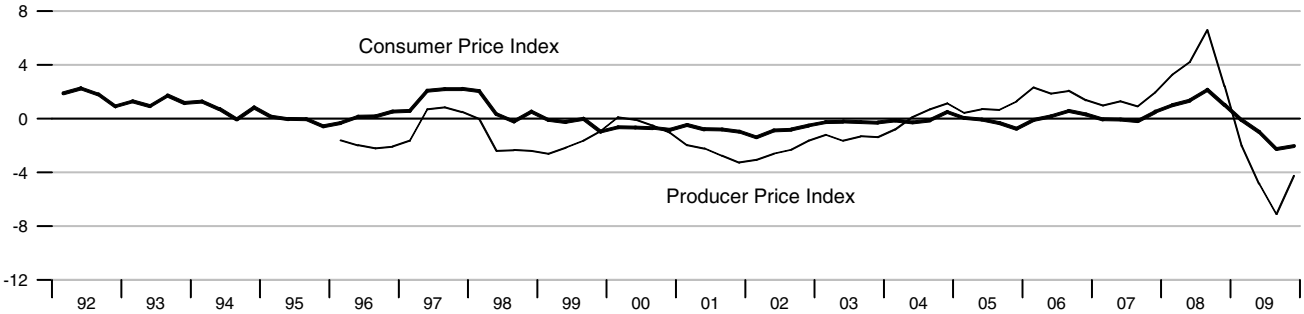
Percent change from year ago

Percent



Inflation

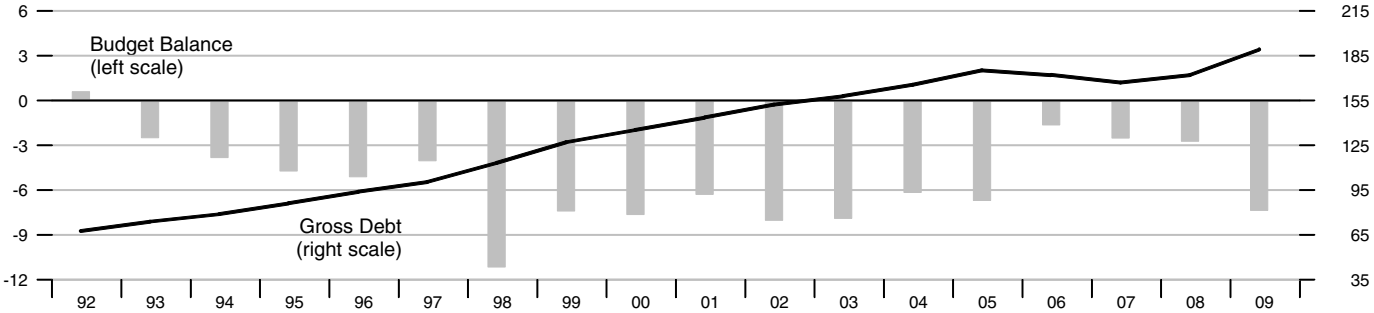
Percent change from year ago



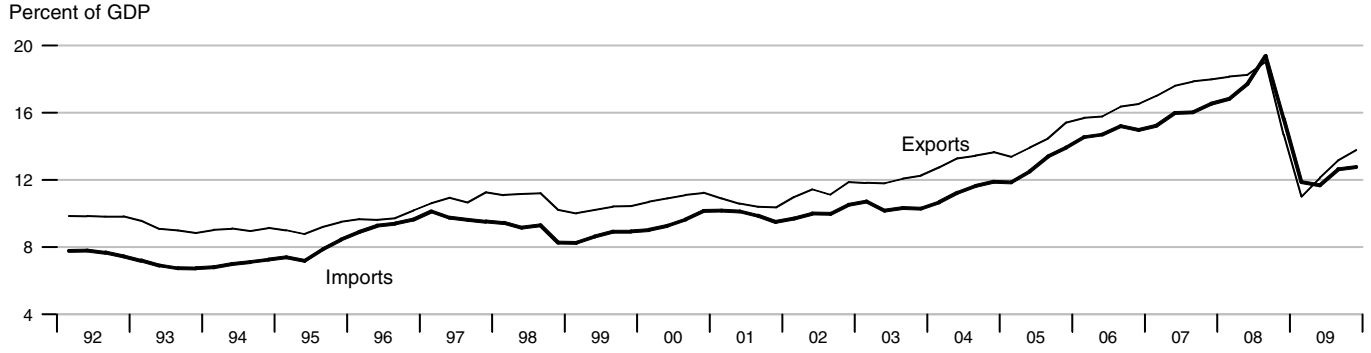
Gross Government Debt and Budget Balance

Percent of GDP, annual data

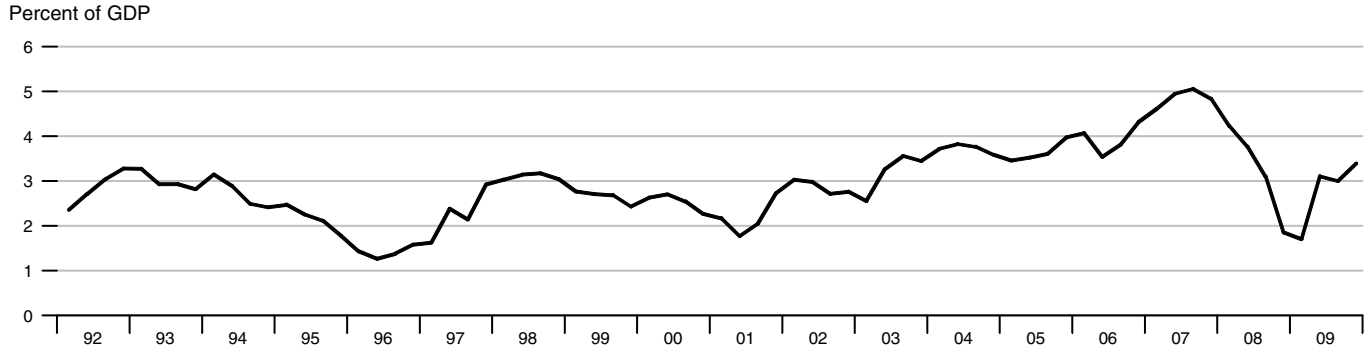
Percent of GDP, annual data



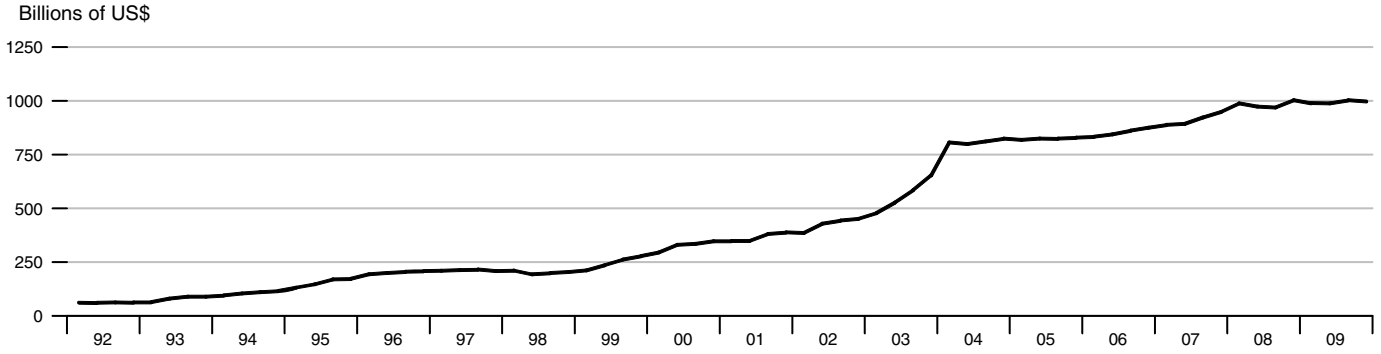
International Trade - Goods and Services



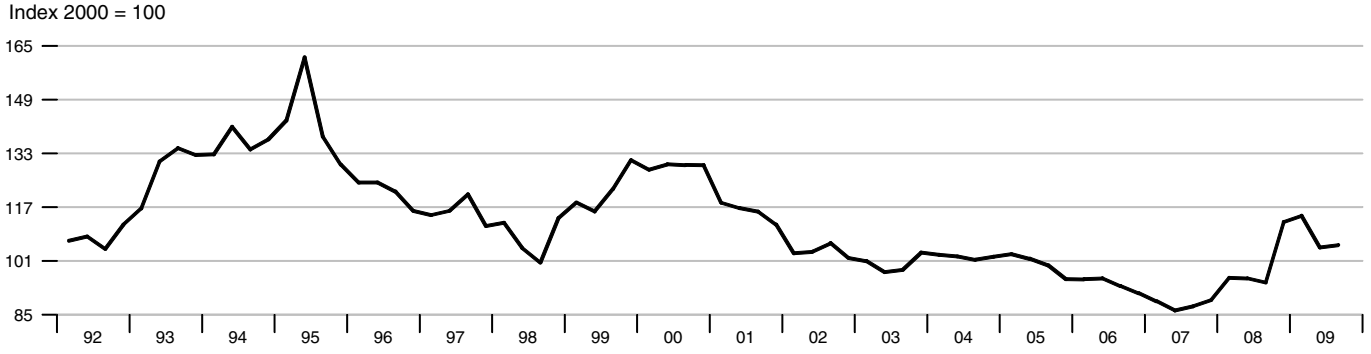
Current Account Balance



Foreign Exchange Reserves

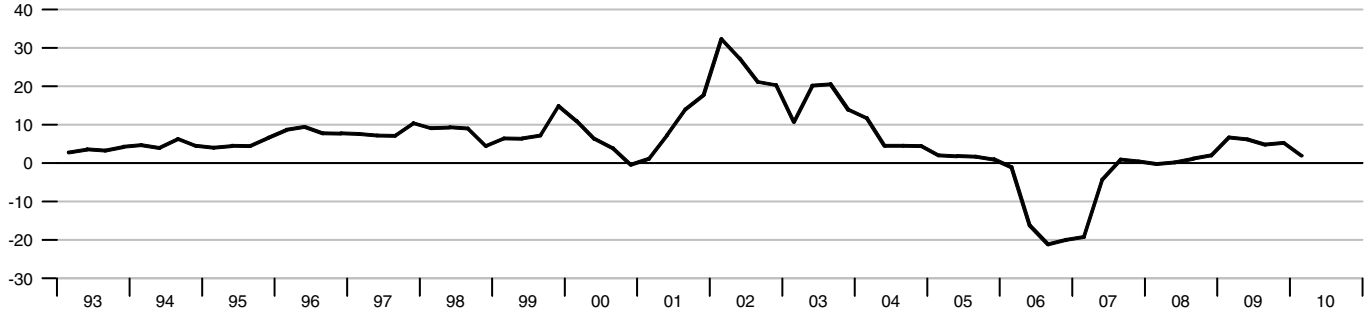


Real Effective Exchange Rate



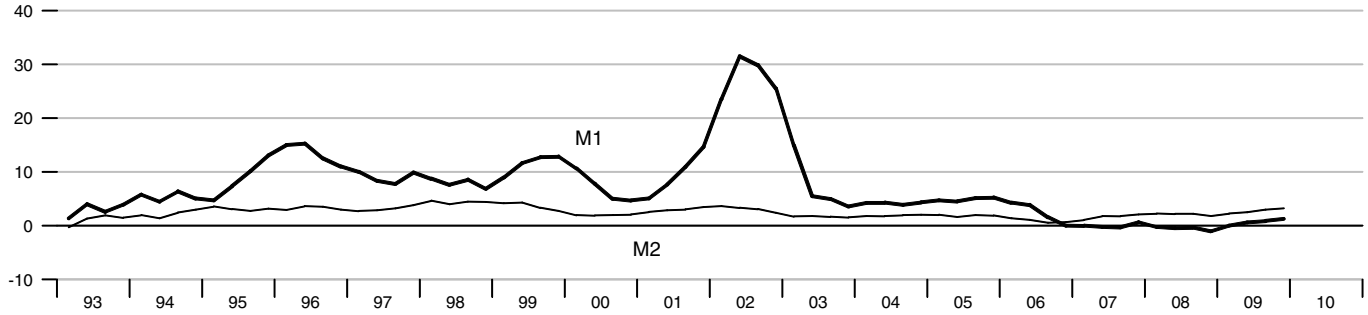
Adjusted Monetary Base

Percent change from year ago



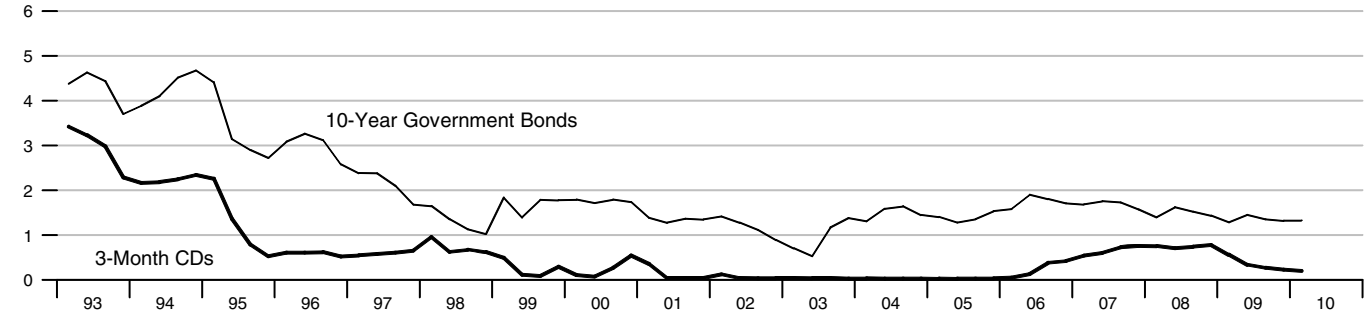
Monetary Aggregates

Percent change from year ago



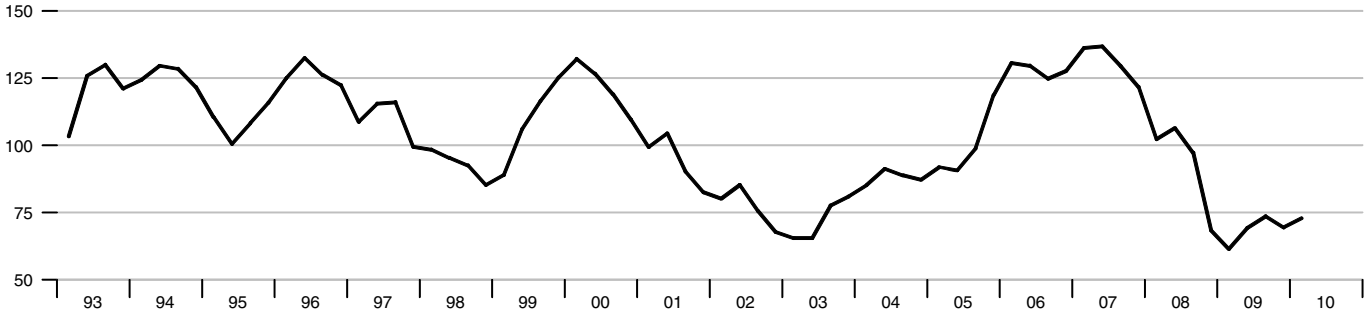
Interest Rates

Percent



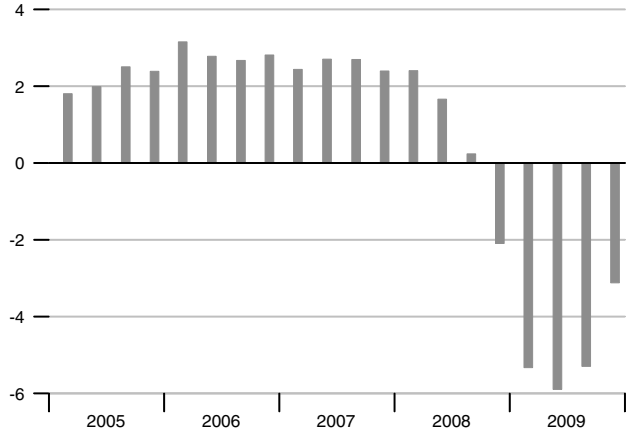
Stock Exchange Index - Tokyo Stock Exchange

2005 = 100



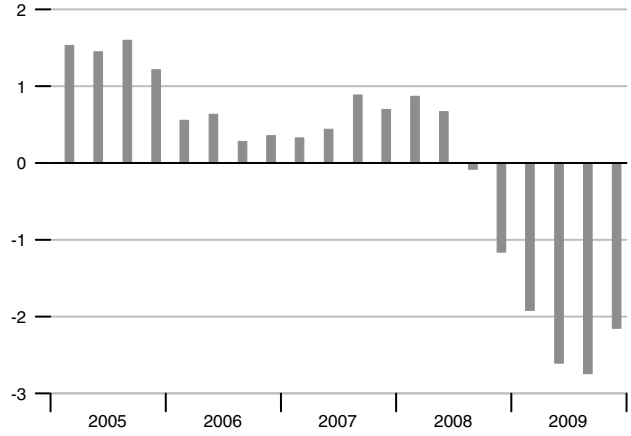
Real GDP

Percent change from year ago



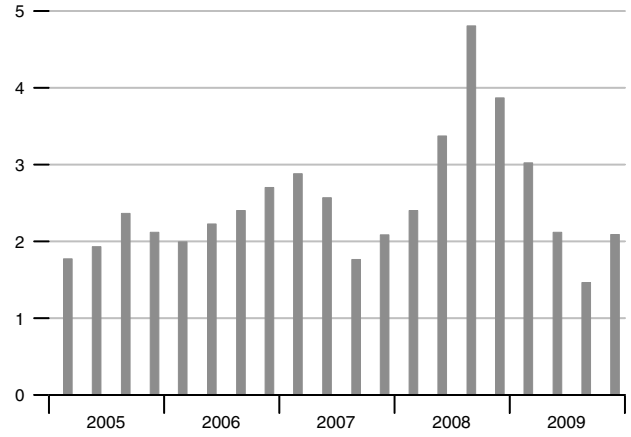
Employment

Percent change from year ago



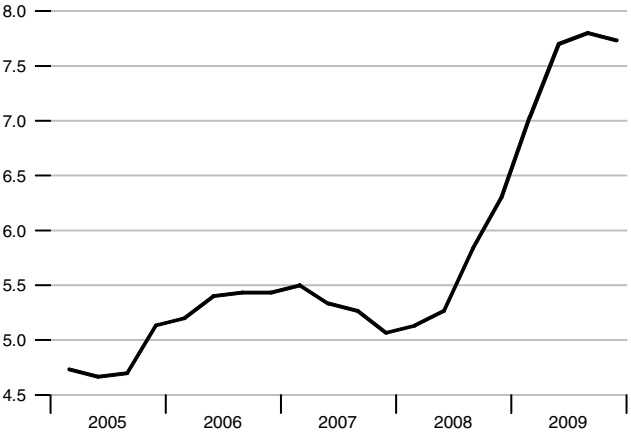
Consumer Price Index

Percent change from year ago



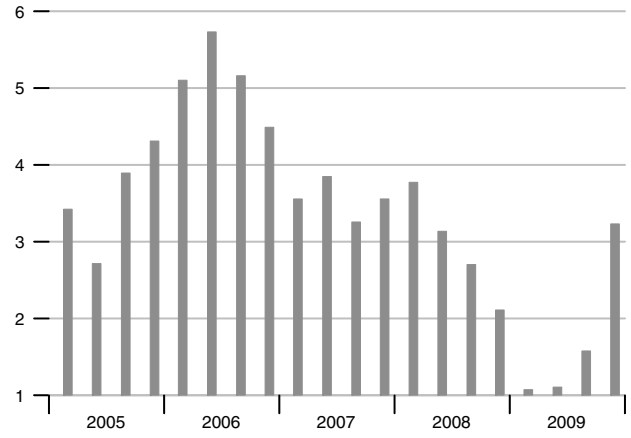
Unemployment Rate

Percent



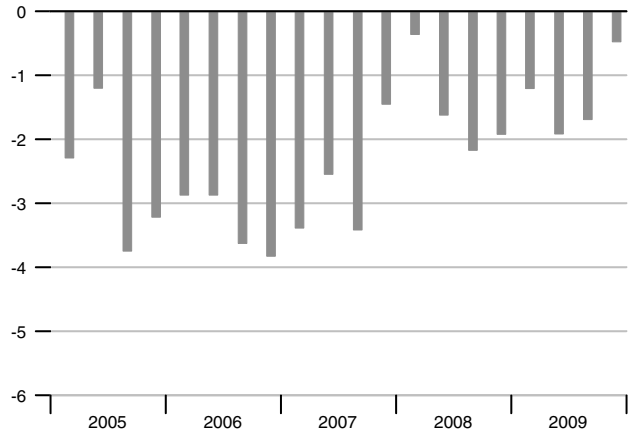
Real Weekly Earnings

Percent change from year ago

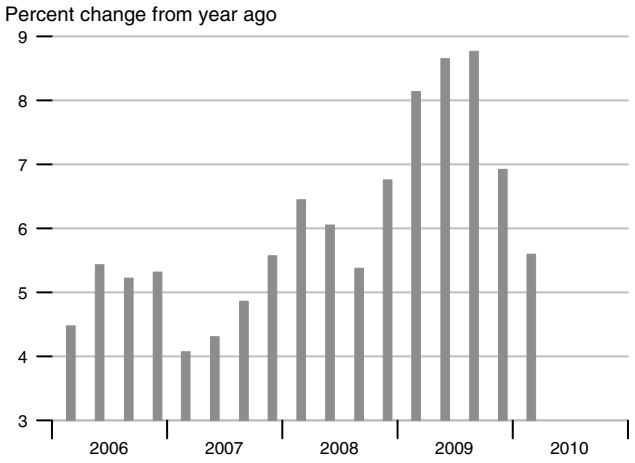


Current Account Balance

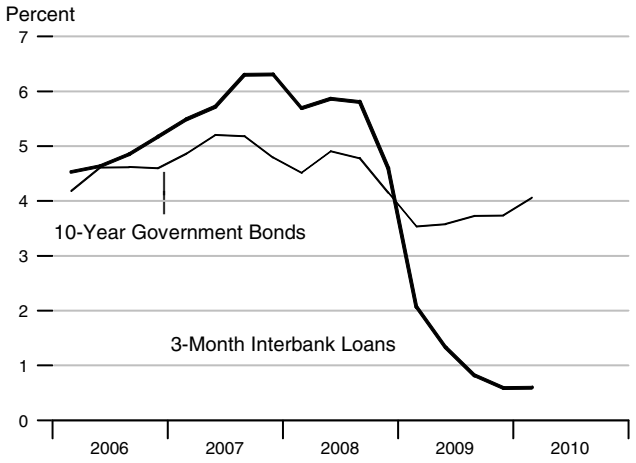
Percent of GDP



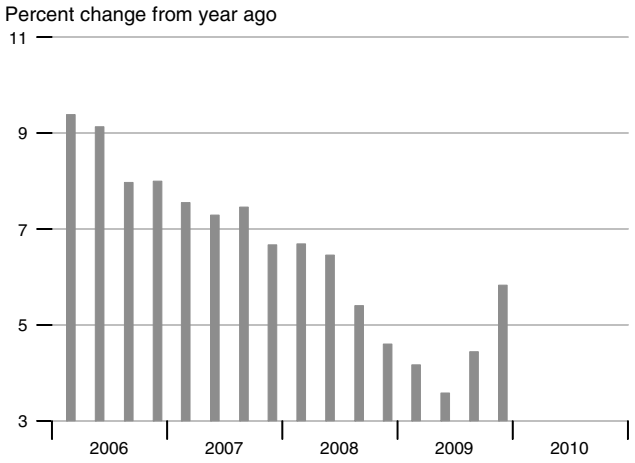
Notes and Coins in Circulation



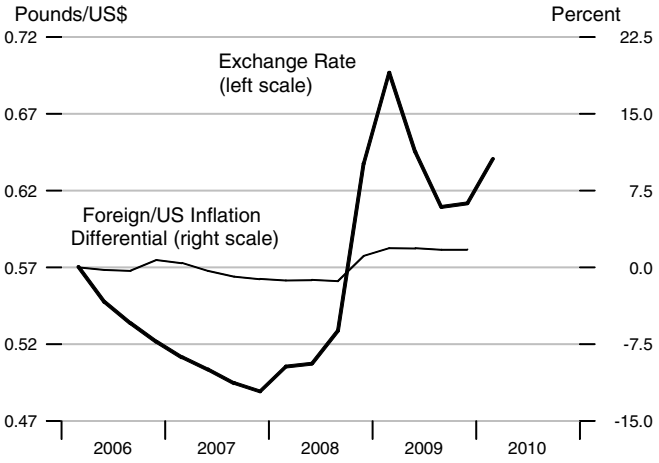
Interest Rates



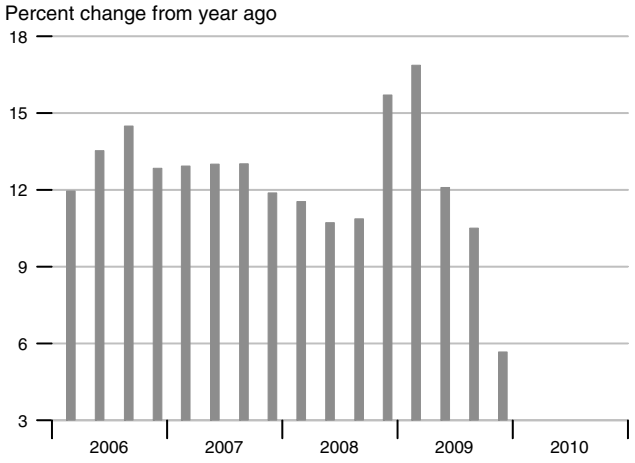
M2



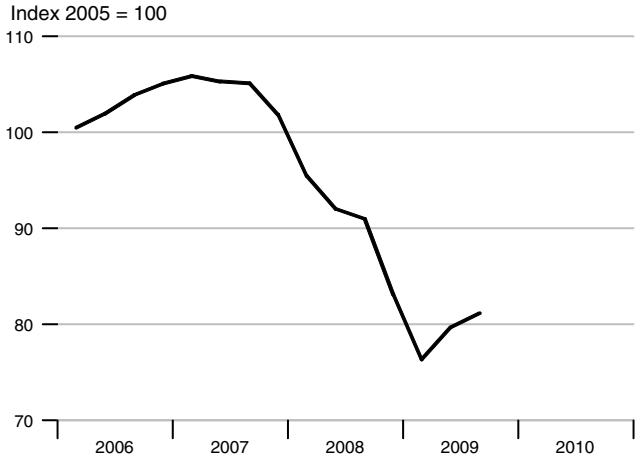
Exchange Rate and Inflation Differential



M4

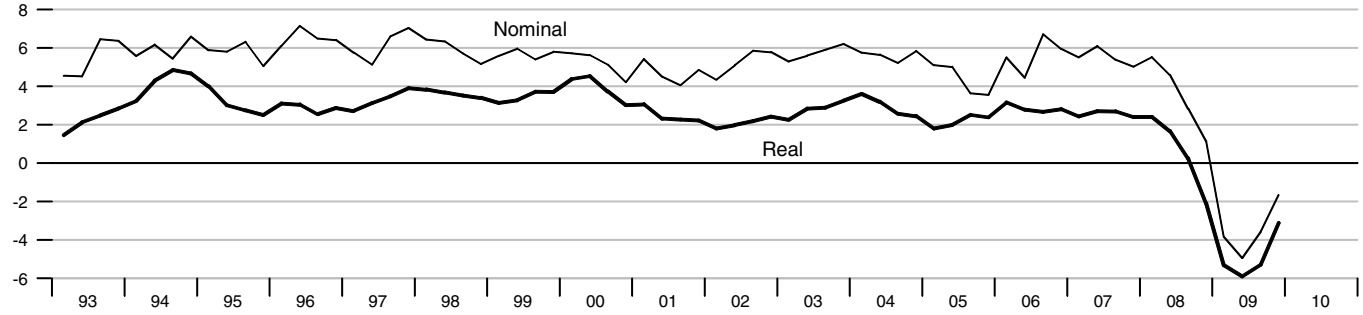


Real Effective Exchange Rate



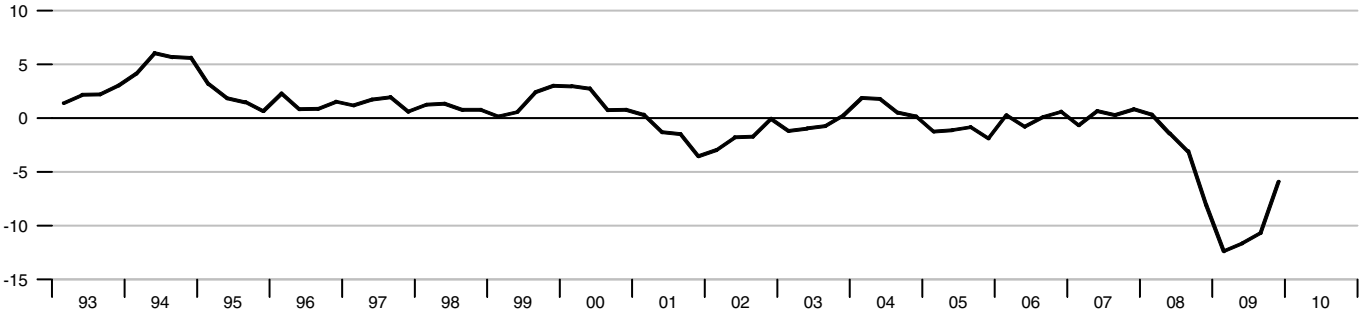
GDP

Percent change from year ago



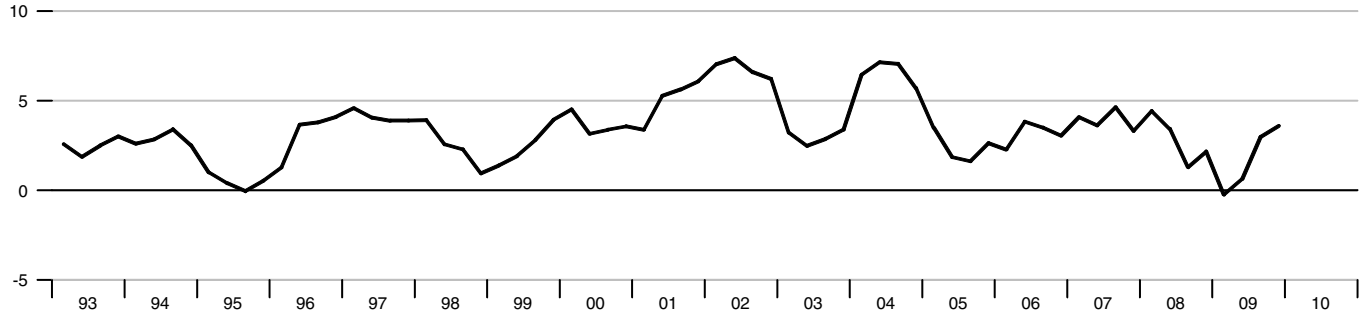
Industrial Production

Percent change from year ago



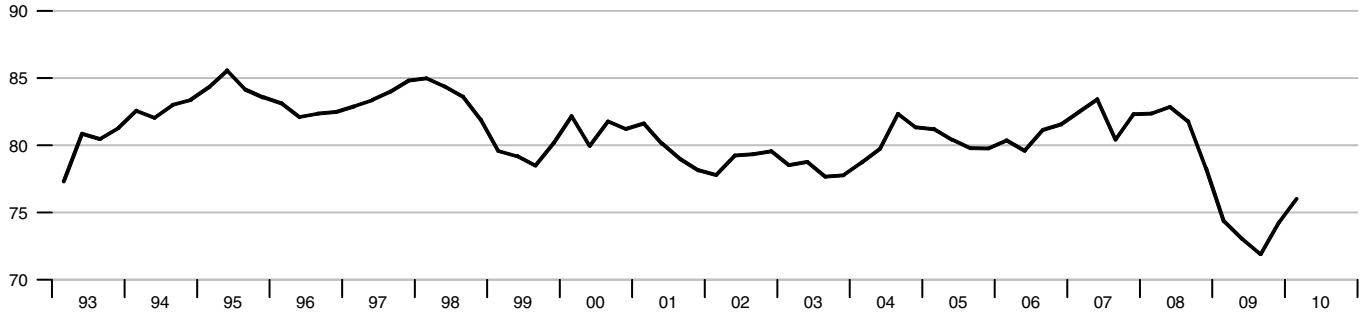
Retail Sales

Percent change from year ago



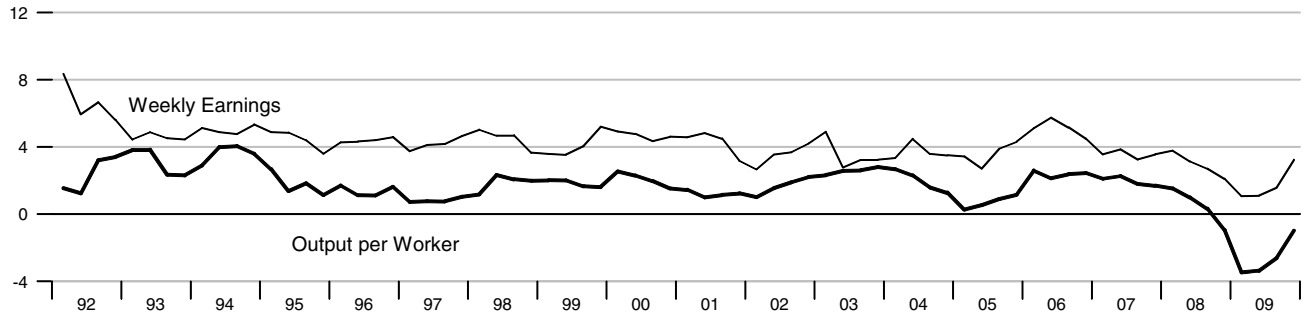
Capacity Utilization

Percent



Real Weekly Earnings and Output per Worker

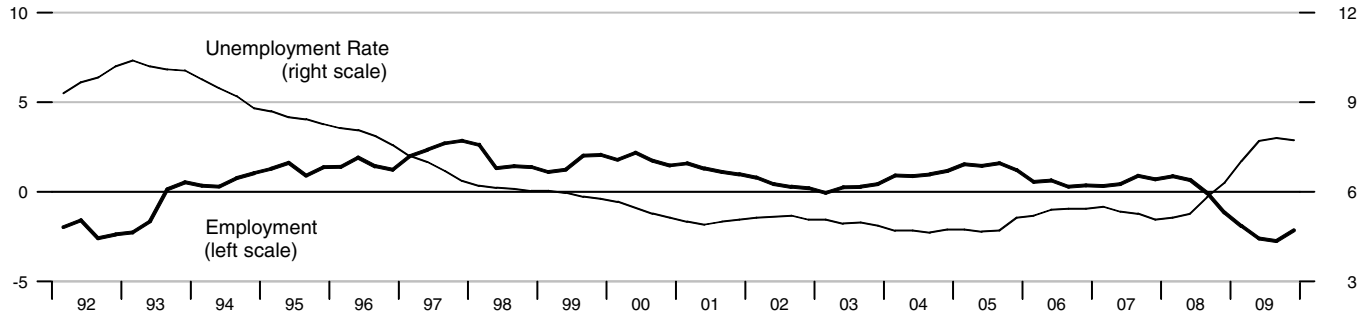
Percent change from year ago



Labor Force Indicators

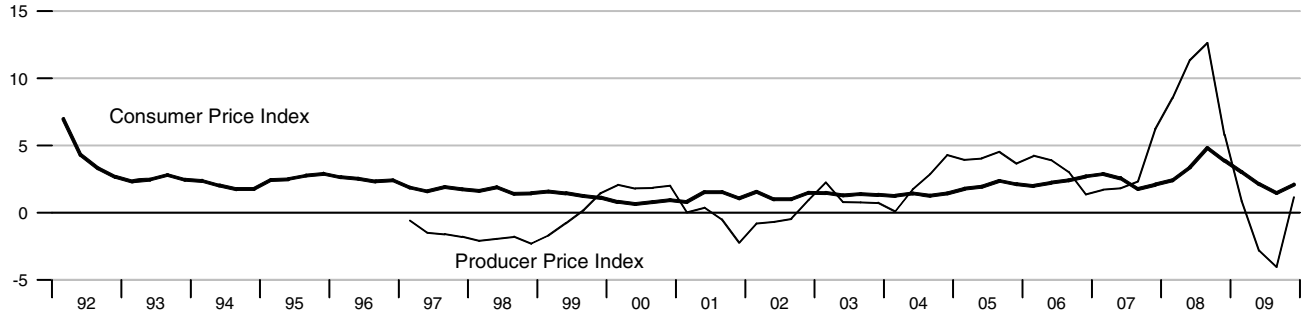
Percent change from year ago

Percent



Inflation

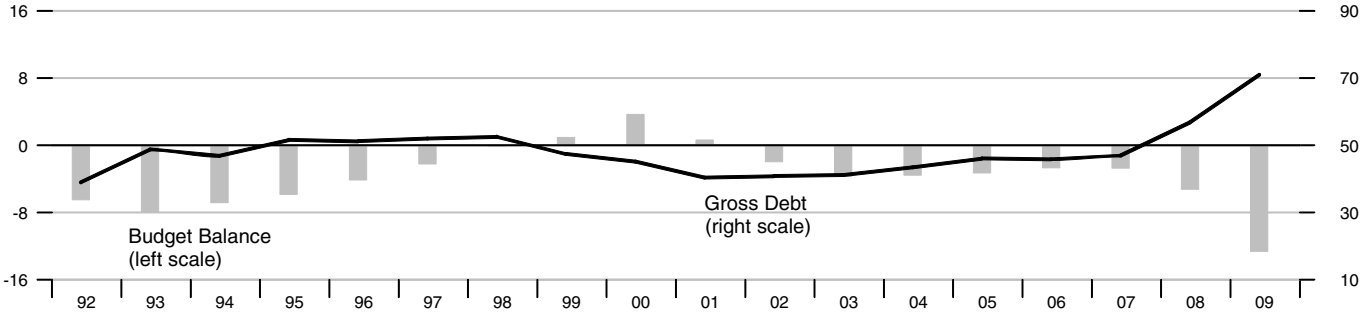
Percent change from year ago



Gross Government Debt and Budget Balance

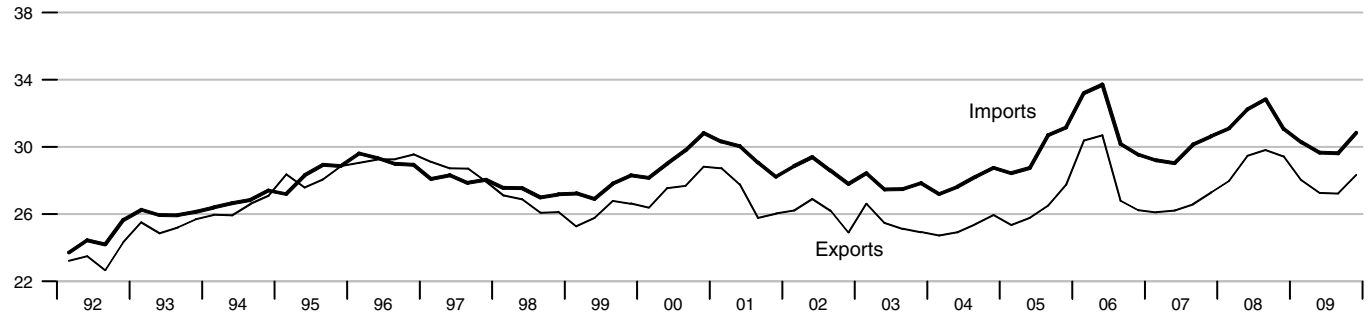
Percent of GDP, annual data

Percent of GDP, annual data



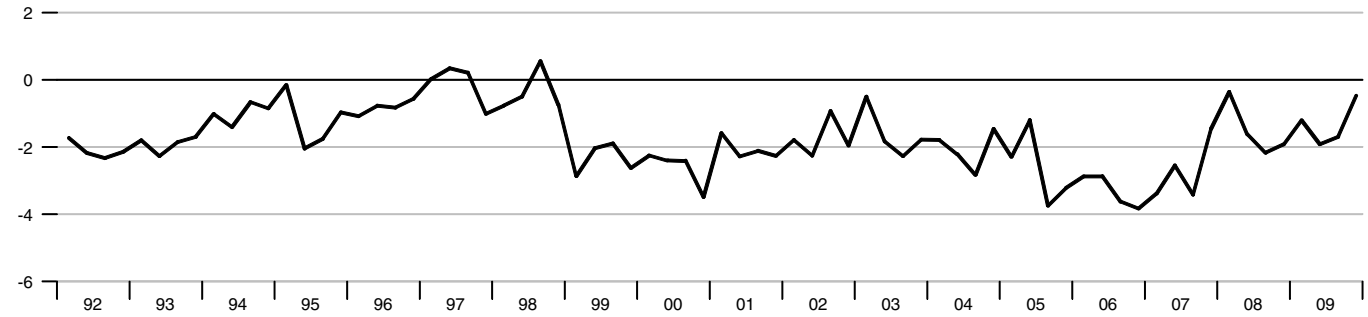
International Trade - Goods and Services

Percent of GDP



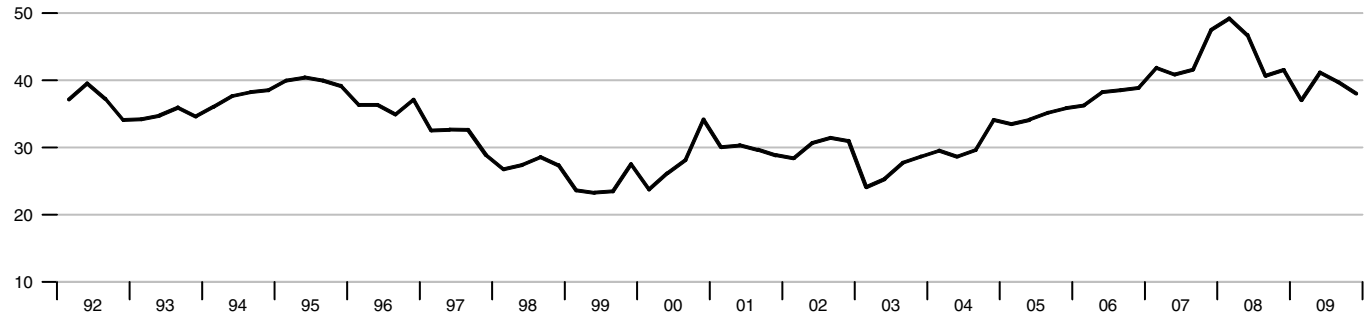
Current Account Balance

Percent of GDP



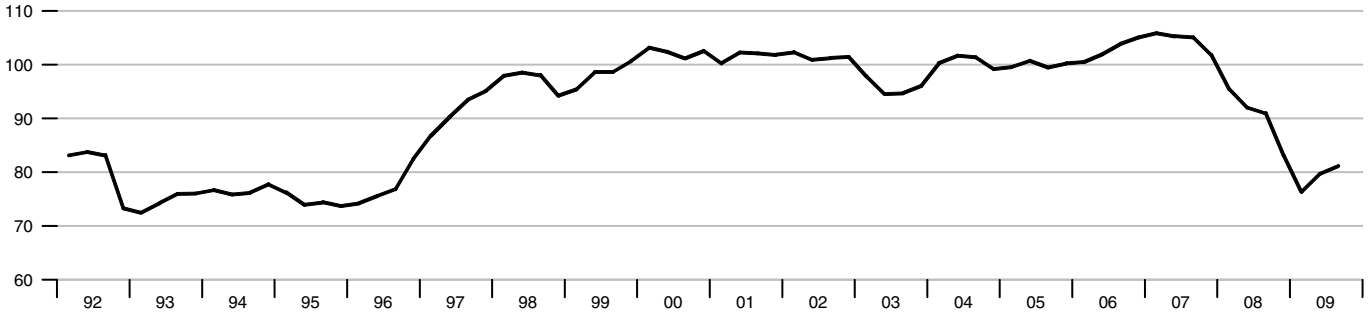
Foreign Exchange Reserves

Billions of US$



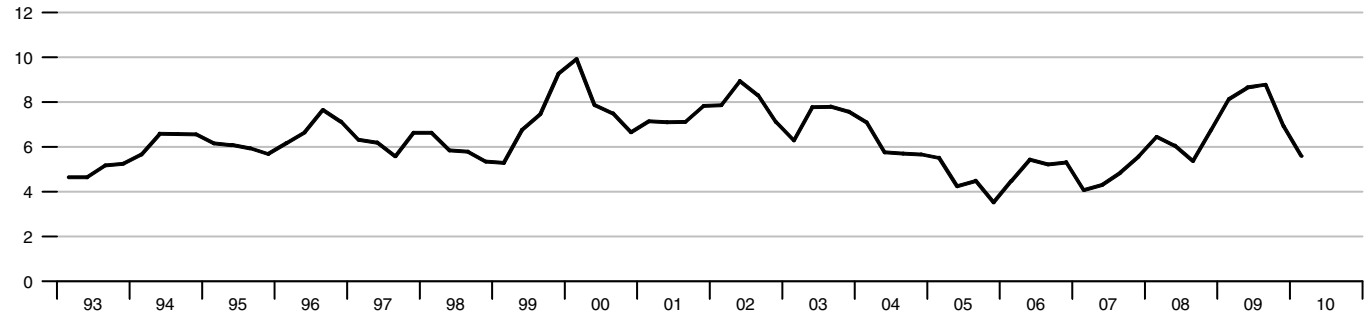
Real Effective Exchange Rate

Index 2005 = 100



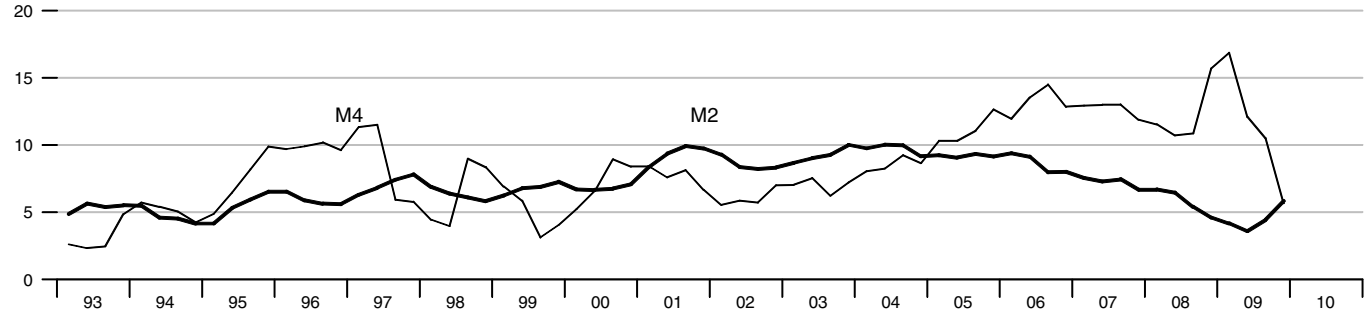
Notes and Coins in Circulation

Percent change from year ago



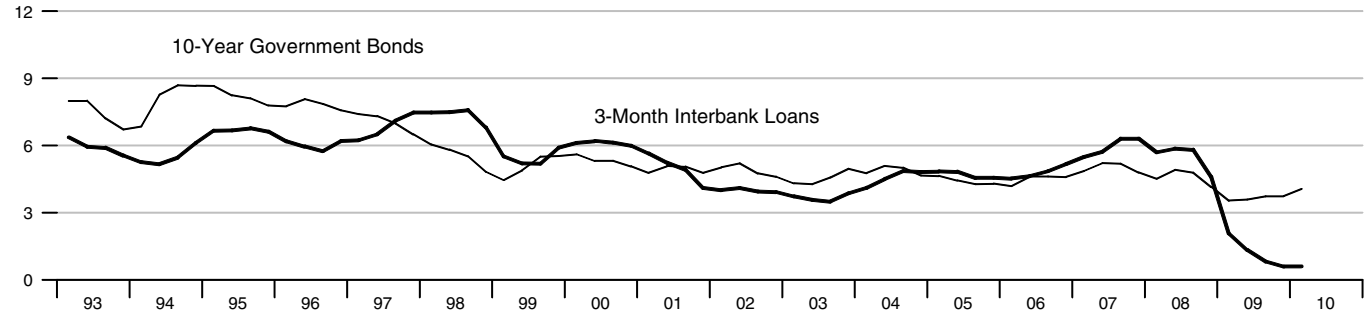
Monetary Aggregates

Percent change from year ago



Interest Rates

Percent

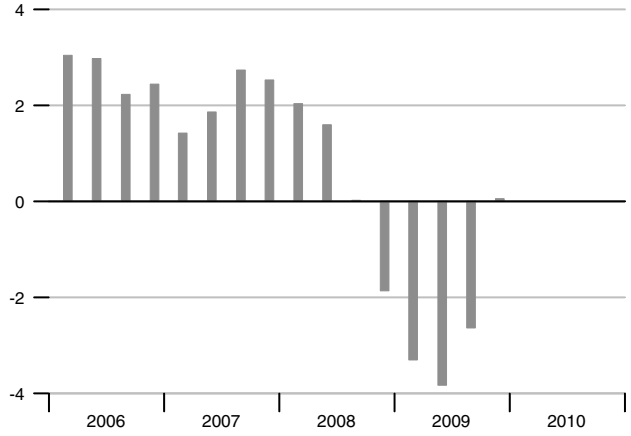


Stock Exchange Index - Financial Times Stock Exchange

2005 = 100

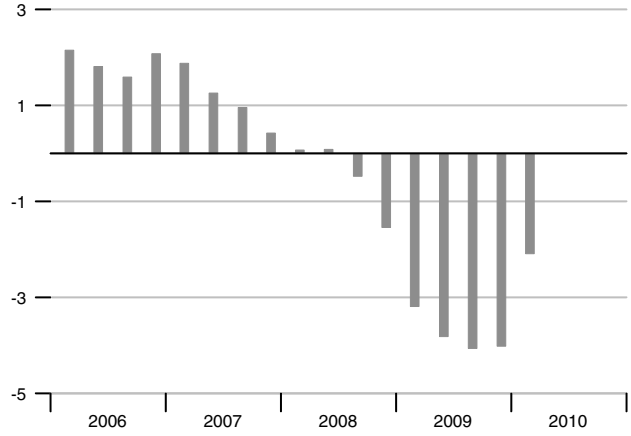
Real GDP

Percent change from year ago



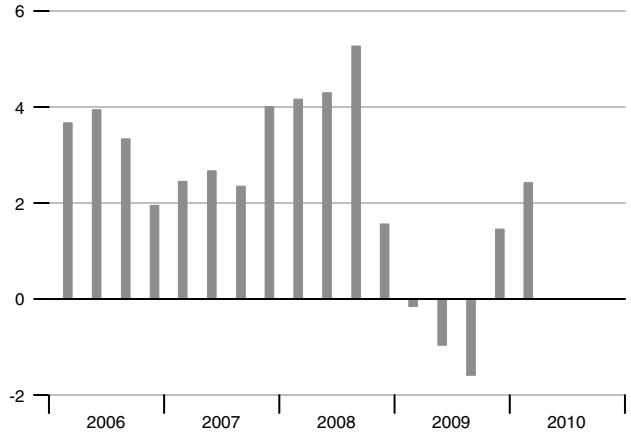
Employment

Percent change from year ago



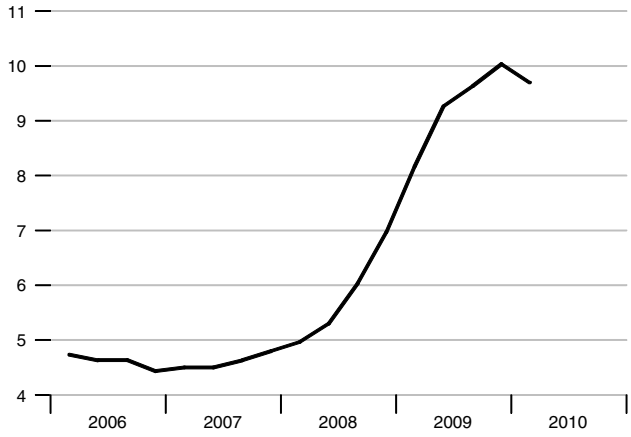
Consumer Price Index

Percent change from year ago



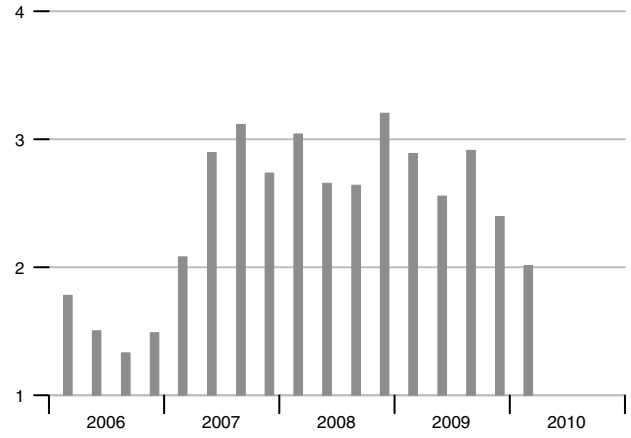
Unemployment Rate

Percent



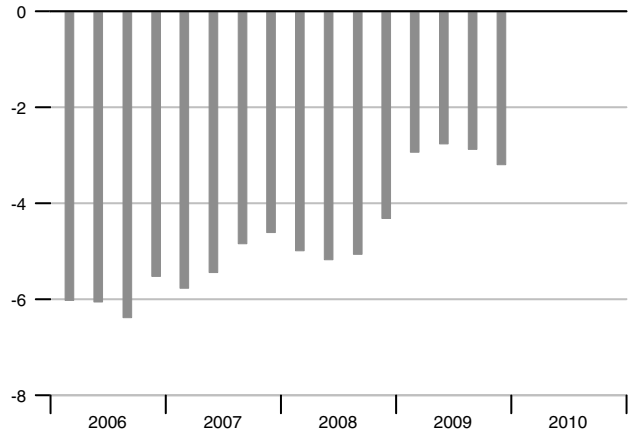
Real Hourly Earnings

Percent change from year ago

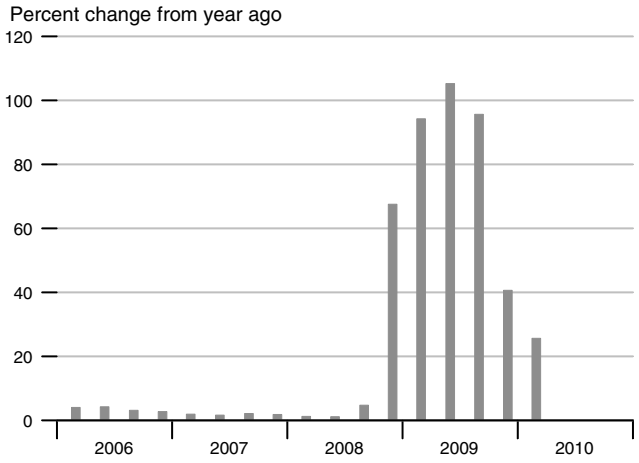


Current Account Balance

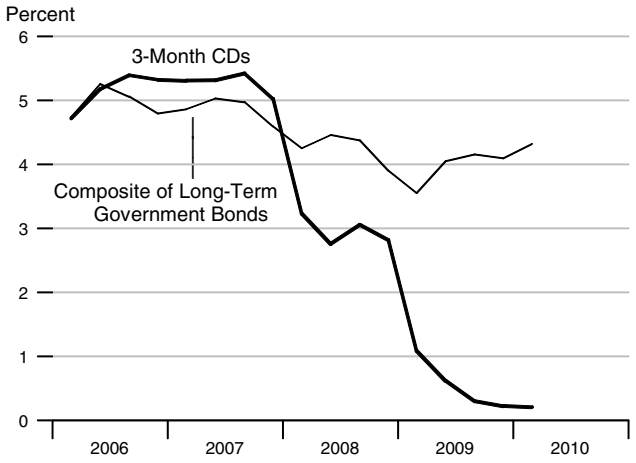
Percent of GDP



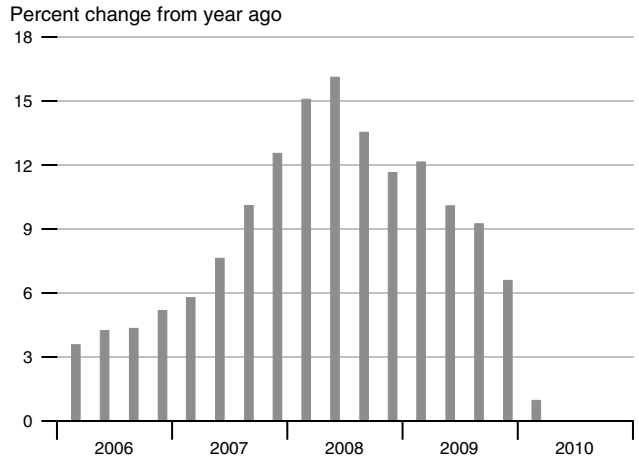
Adjusted Monetary Base



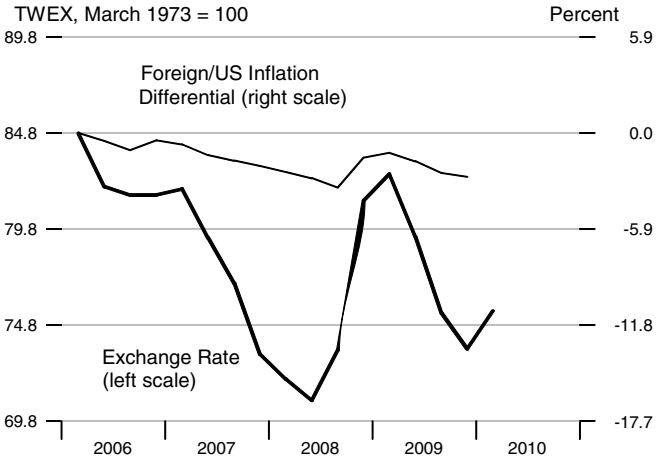
Interest Rates



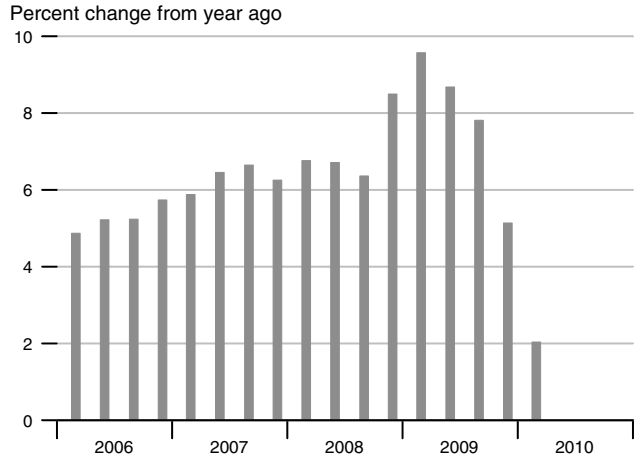
MZM



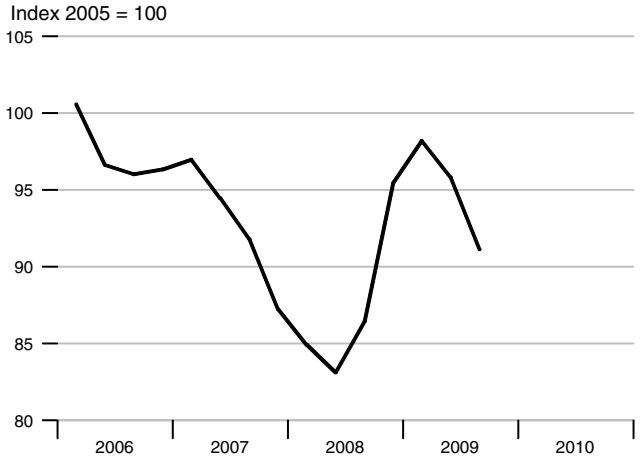
Exchange Rate and Inflation Differential



M2

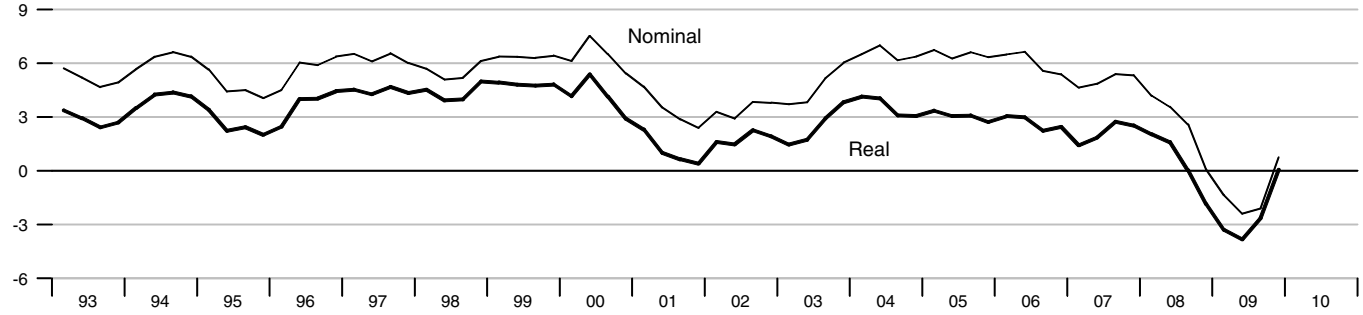


Real Effective Exchange Rate



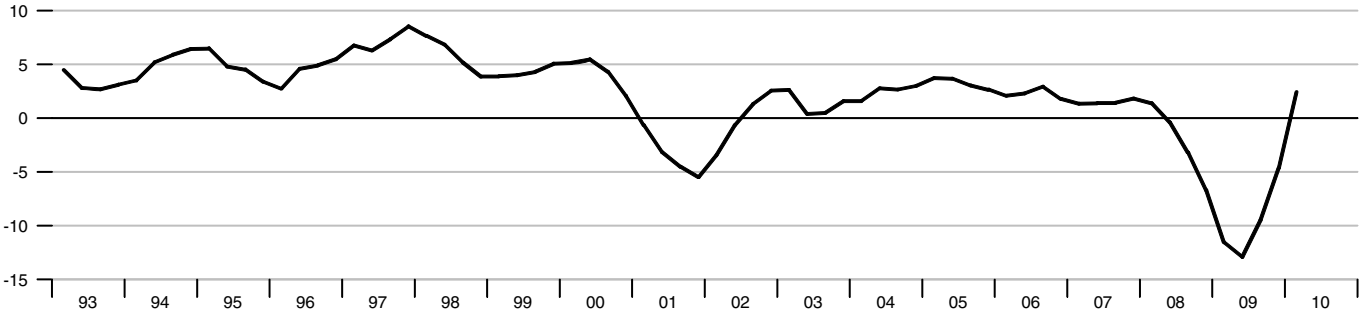
GDP

Percent change from year ago



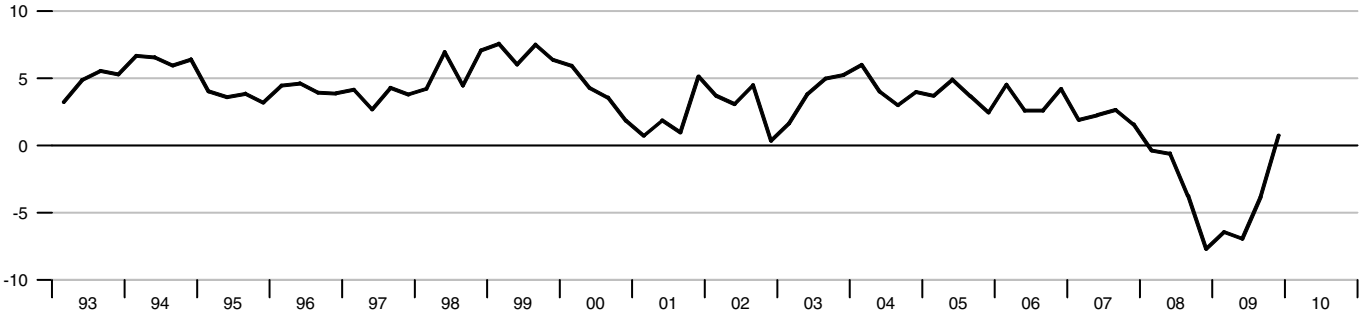
Industrial Production

Percent change from year ago



Retail Sales

Percent change from year ago

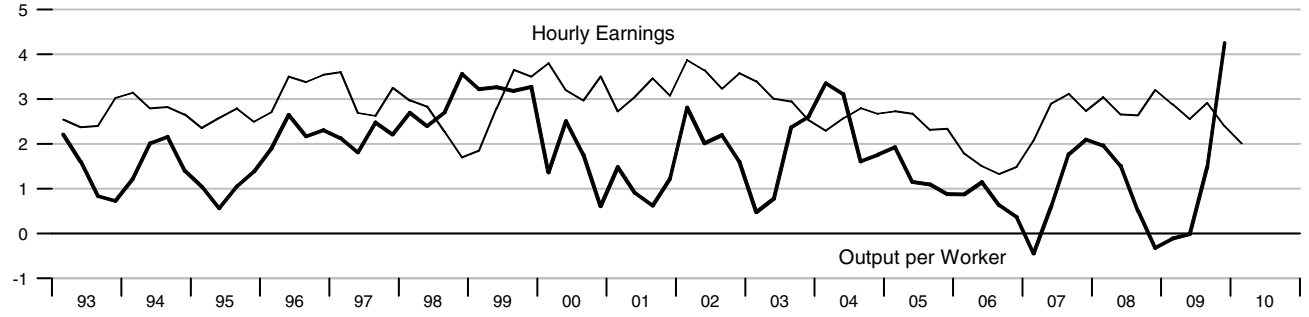


Capacity Utilization

Percent

Real Hourly Earnings and Output per Worker

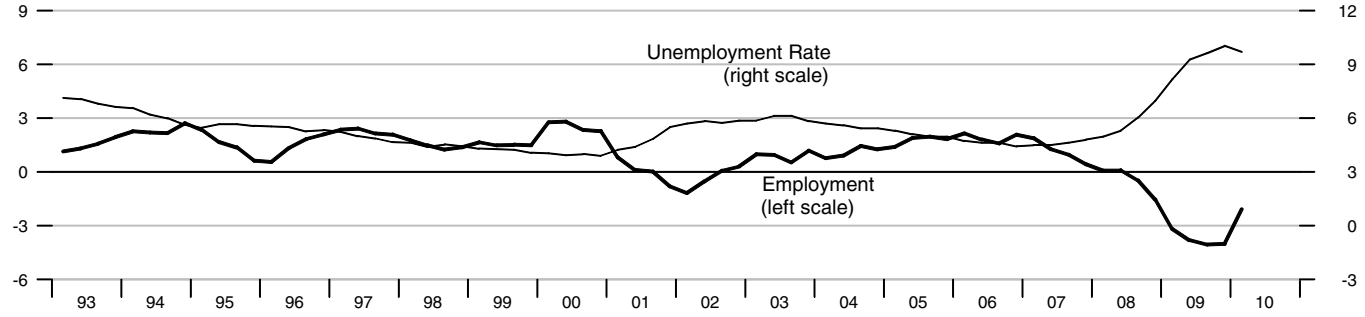
Percent change from year ago



Labor Force Indicators

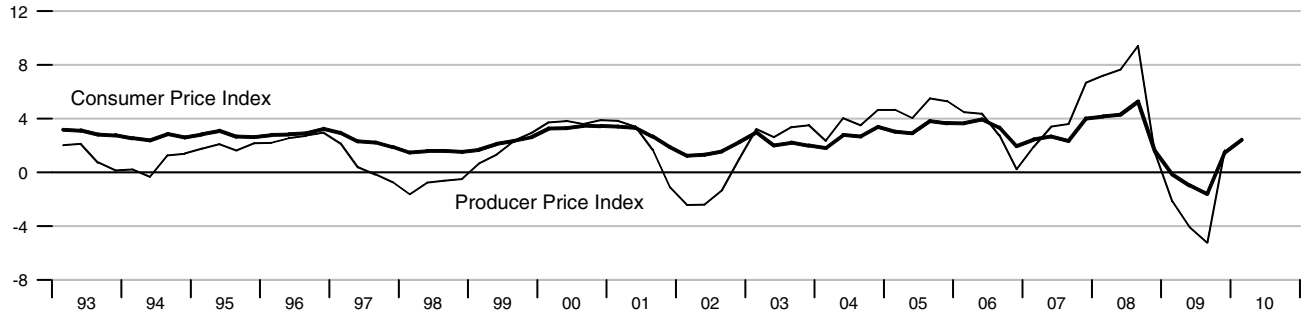
Percent change from year ago

Percent



Inflation

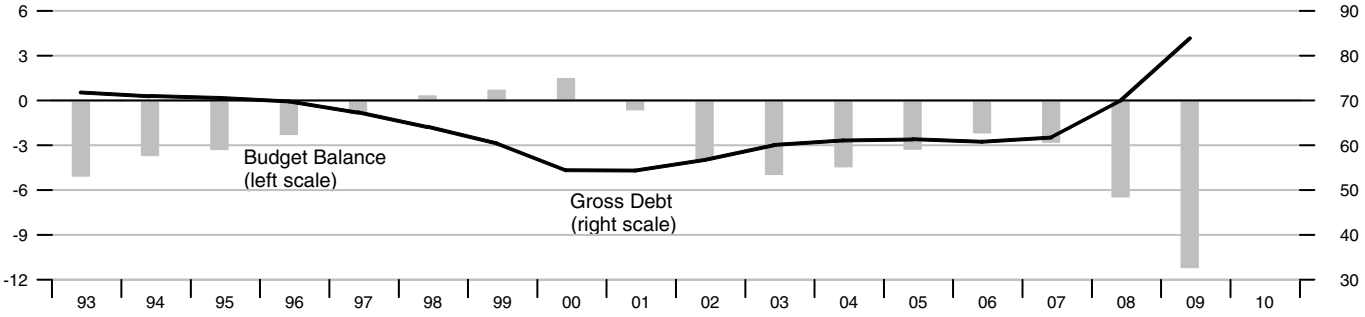
Percent change from year ago



Gross Government Debt and Budget Balance

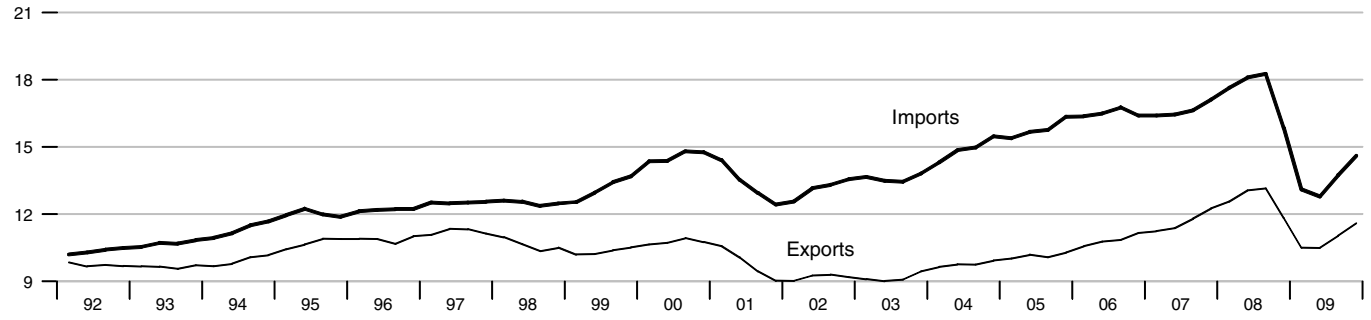
Percent of GDP, annual data

Percent of GDP, annual data



International Trade - Goods and Services

Percent of GDP

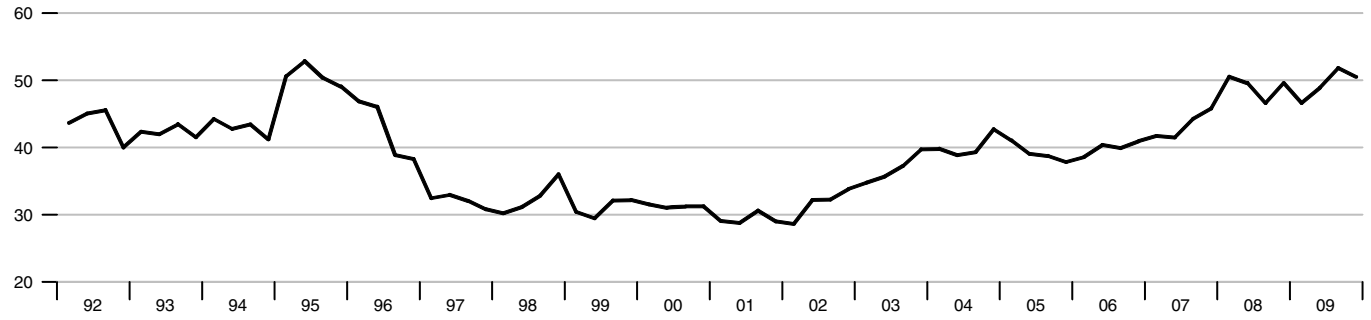


Current Account Balance

Percent of GDP

Foreign Exchange Reserves

Billions of US$

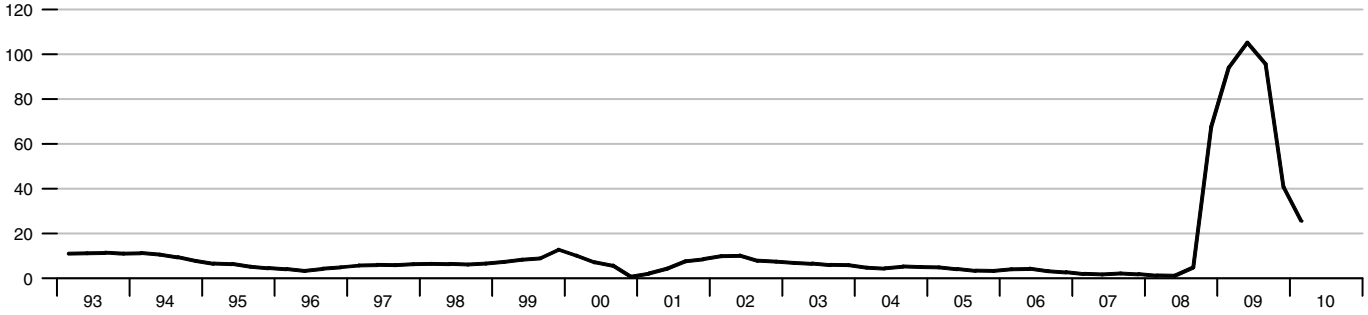


Real Effective Exchange Rate

Index 2005 = 100

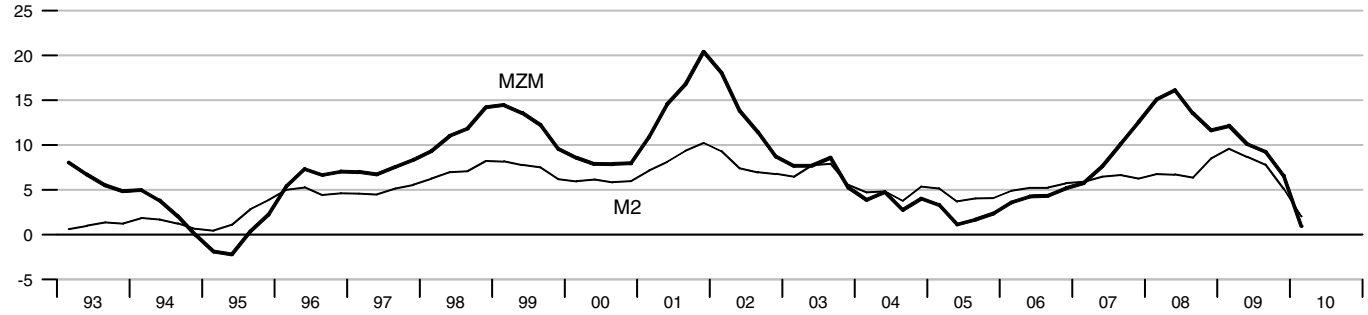
Adjusted Monetary Base

Percent change from year ago



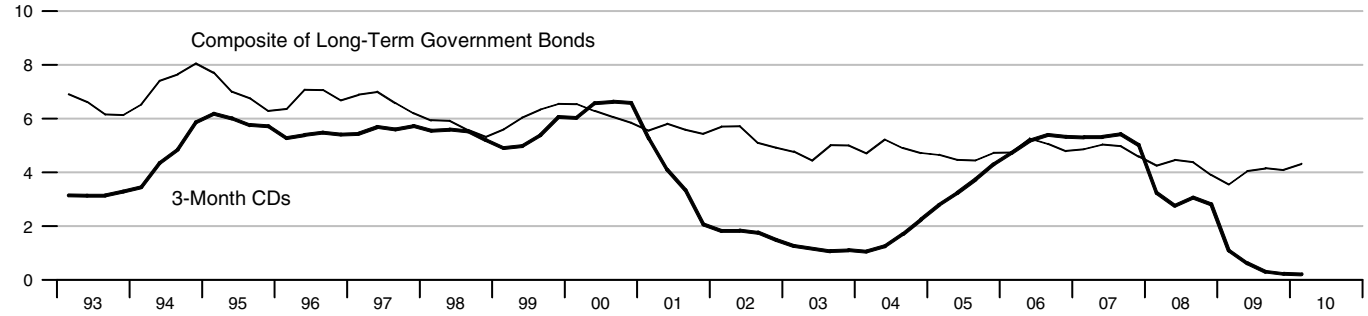
Monetary Aggregates

Percent change from year ago



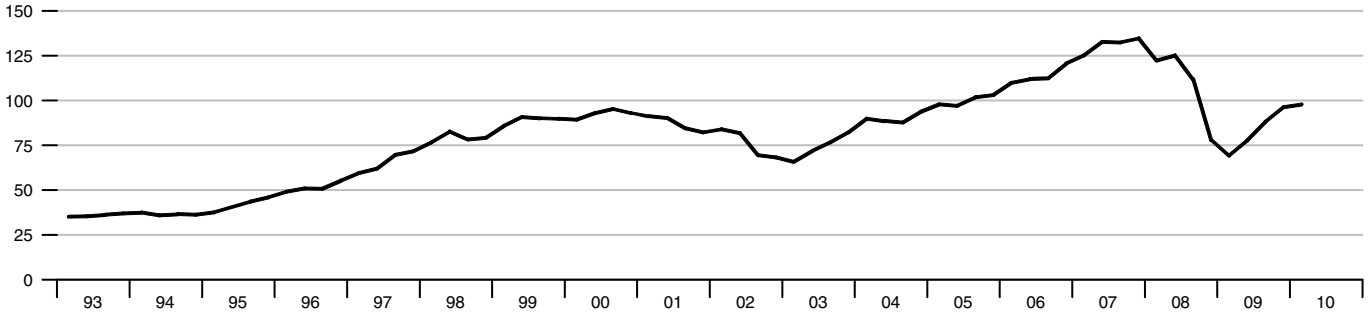
Interest Rates

Percent



Stock Exchange Index - New York Stock Exchange

2005 = 100



Notes

Euro-Area Data: Euro-area countries are Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, Slovakia, and Spain. Data series are break adjusted and include all euro area countries for the full sample, with these exceptions: Series for interest rates are not break adjusted.

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 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.

German real earnings data prior to 2007 are not strictly comparable with the new figures: Before 2007, gross hourly earnings covered full-time wage earners only. Since the first quarter of 2007, the data refer to the index of gross hourly earnings (excluding extra payments) of full-time wage earners and salaried employees.

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 2005. 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:

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

where P^{J}_{2006Q3} 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: currrent 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.
Instituto 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.