

Lecture 2:
Definitions and BoP Accounting

Spring 2008

Concepts/Definitions

- GDP
- Real versus nominal
- Price level, inflation
- Money
- Interest rates

GDP

- Sum of value of all goods and services produced within a given time period (usually a year or a quarter)
- If quarterly, usually adjusted up to yearly rates
- $GDP = C + I + G + (Ex - Im)$
- All these are “final” goods and services

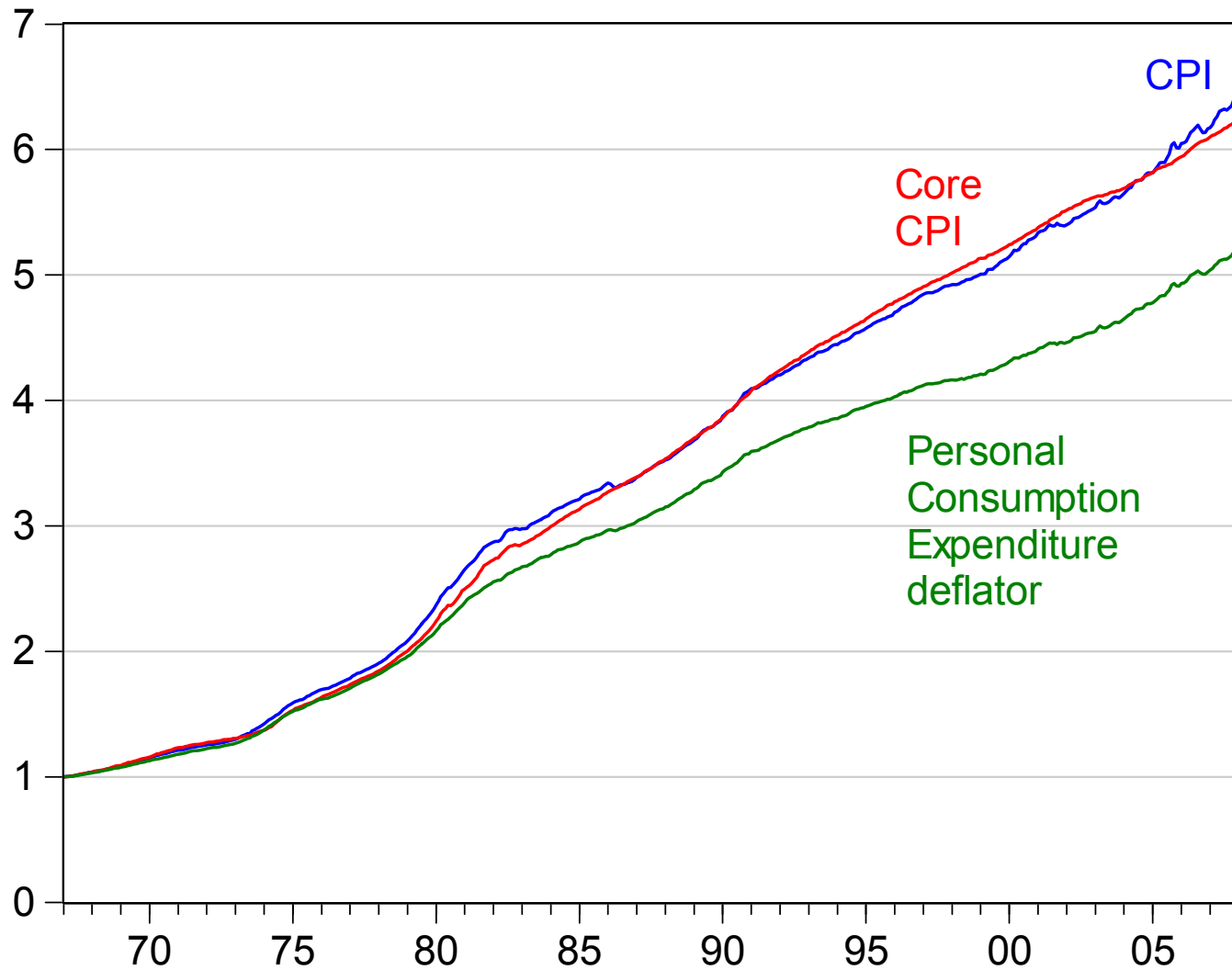
Real vs. Nominal

- Nominal values are expressed at values recorded. GDP is just all the values of items spent on, added up.
- Real values control for the general price level, to get in principle “quantities”.
- $\text{Nominal Value/Price index} = \text{Real Quantity}$
- $\text{Nominal Price/Price index} = \text{Relative Price}$

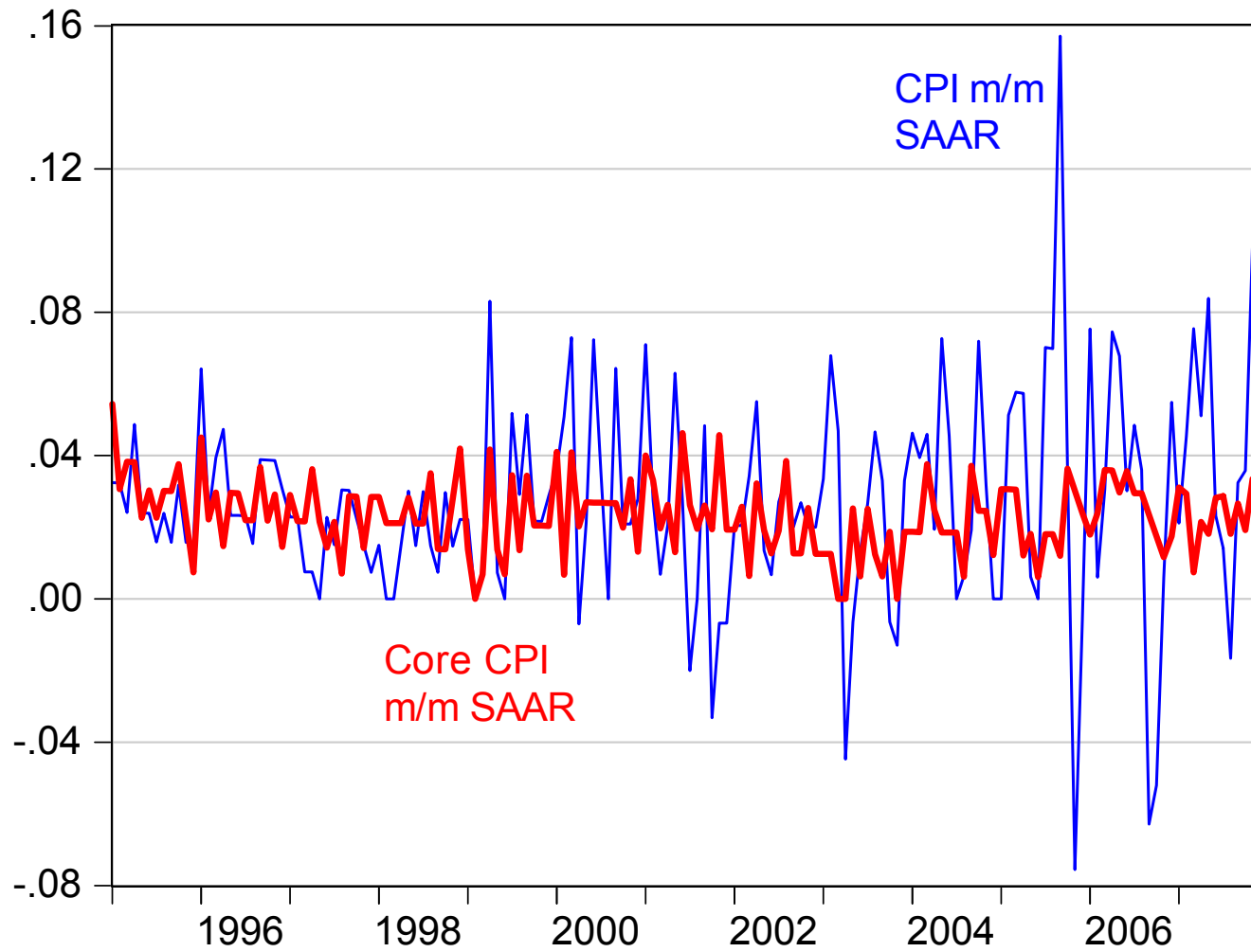
Price Level vs. Inflation

- Let P = price level
- Inflation = *percent* rate of change of price level
- Standard definition: $\pi_t = (P_t - P_{t-1})/P_{t-1}$ (on annual basis)
- Sometimes, a continuously compounded definition is used:
- $\pi_t = \ln(P_t) - \ln(P_{t-1})$
- Standard variables: CPI, core CPI, PCE

Price Levels

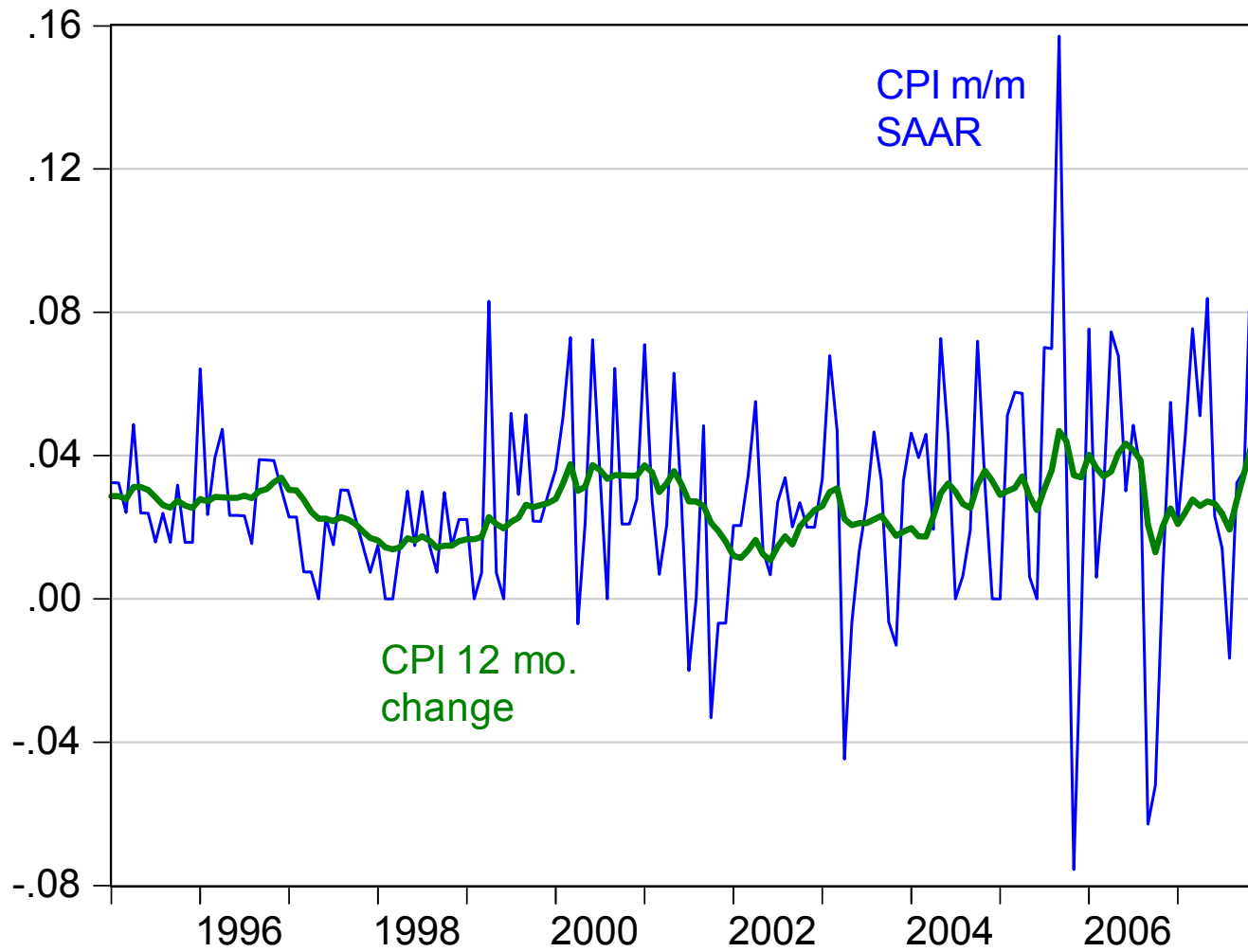


Inflation: Total vs. Core



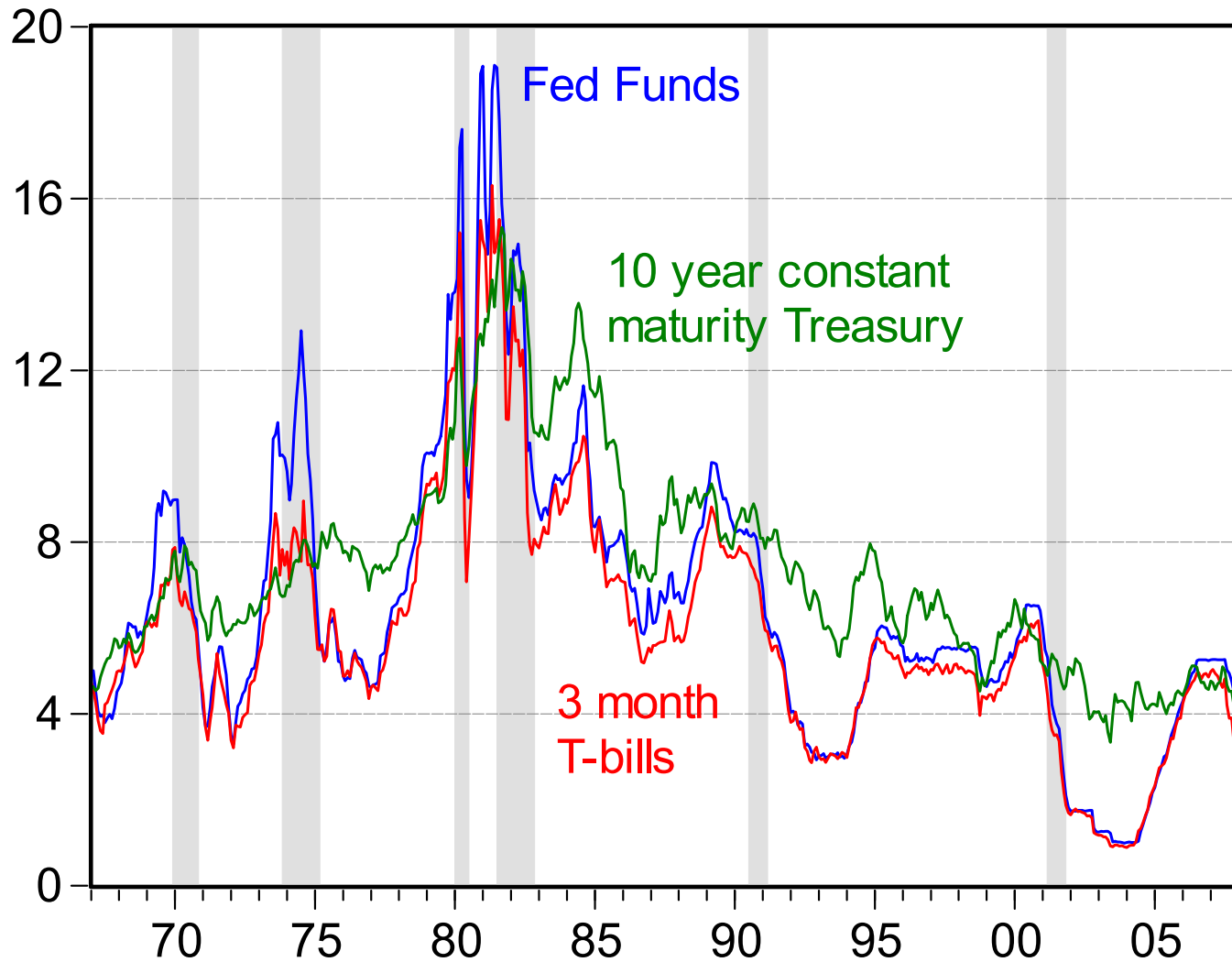
— (CPIAUCSL/CPIAUCSL(-1))^12-1
— (CPILFESL/CPILFESL(-1))^12-1

Inflation: M/M vs. Y/Y

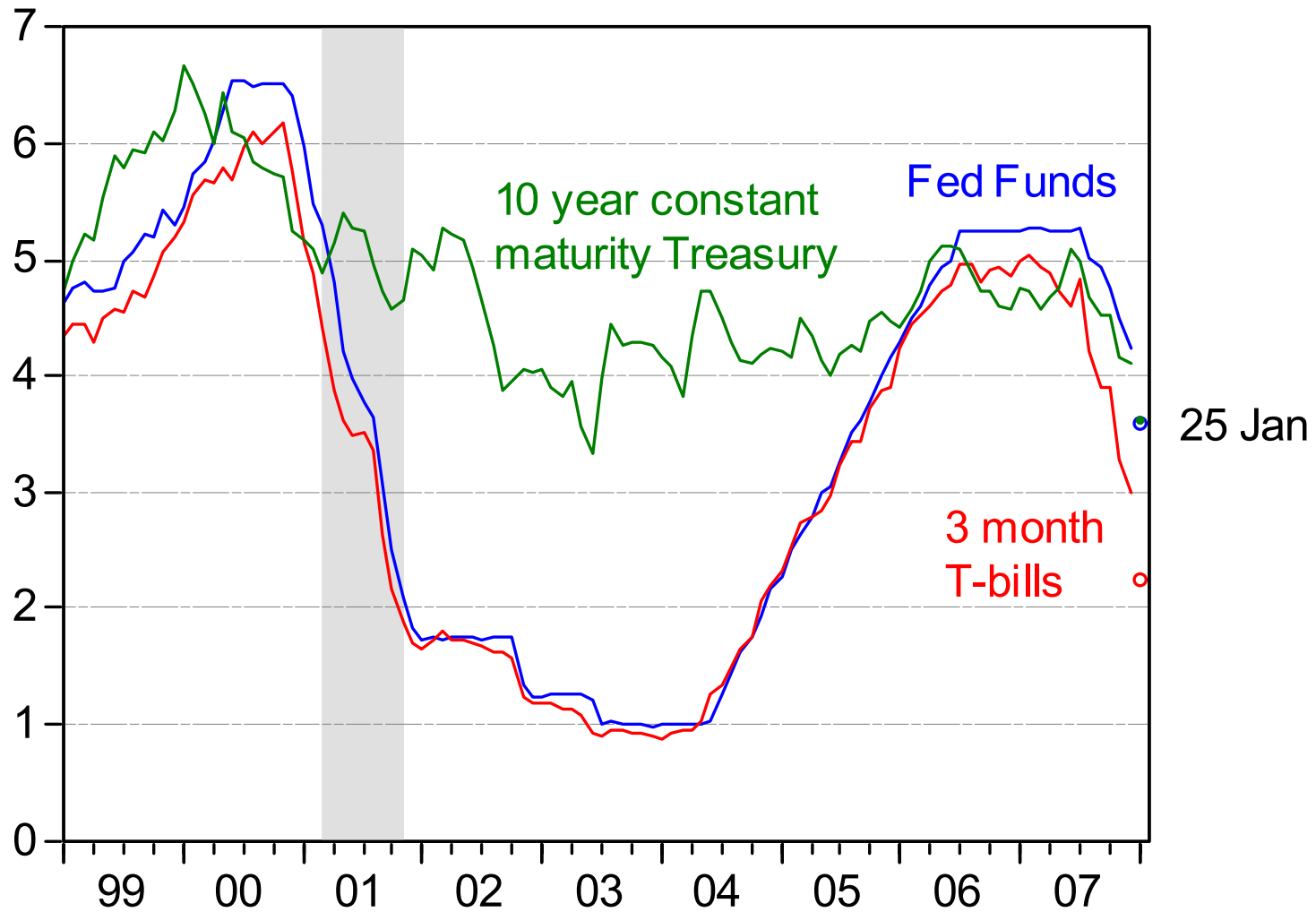


— (CPIAUCSL/CPIAUCSL(-1))^12-1
— (CPIAUCSL/CPIAUCSL(-12))^1-1

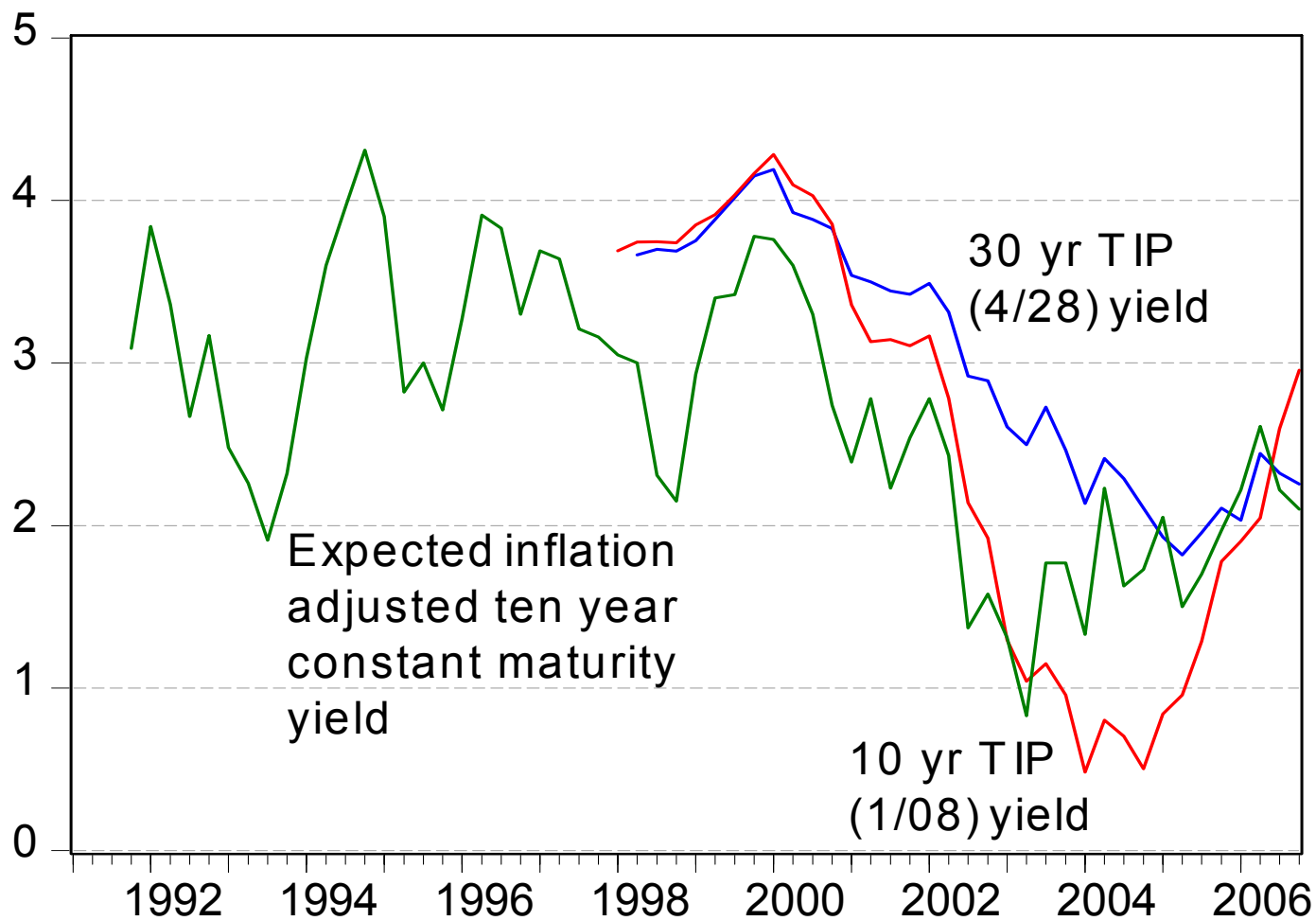
Nominal Interest Rates



Interest Rates: Close Up



Real Interest Rates



Accounting, Exchange Rates

- Balance of payments accounting
- Exchange rates
- Foreign exchange markets

Balance of Payments Accounting

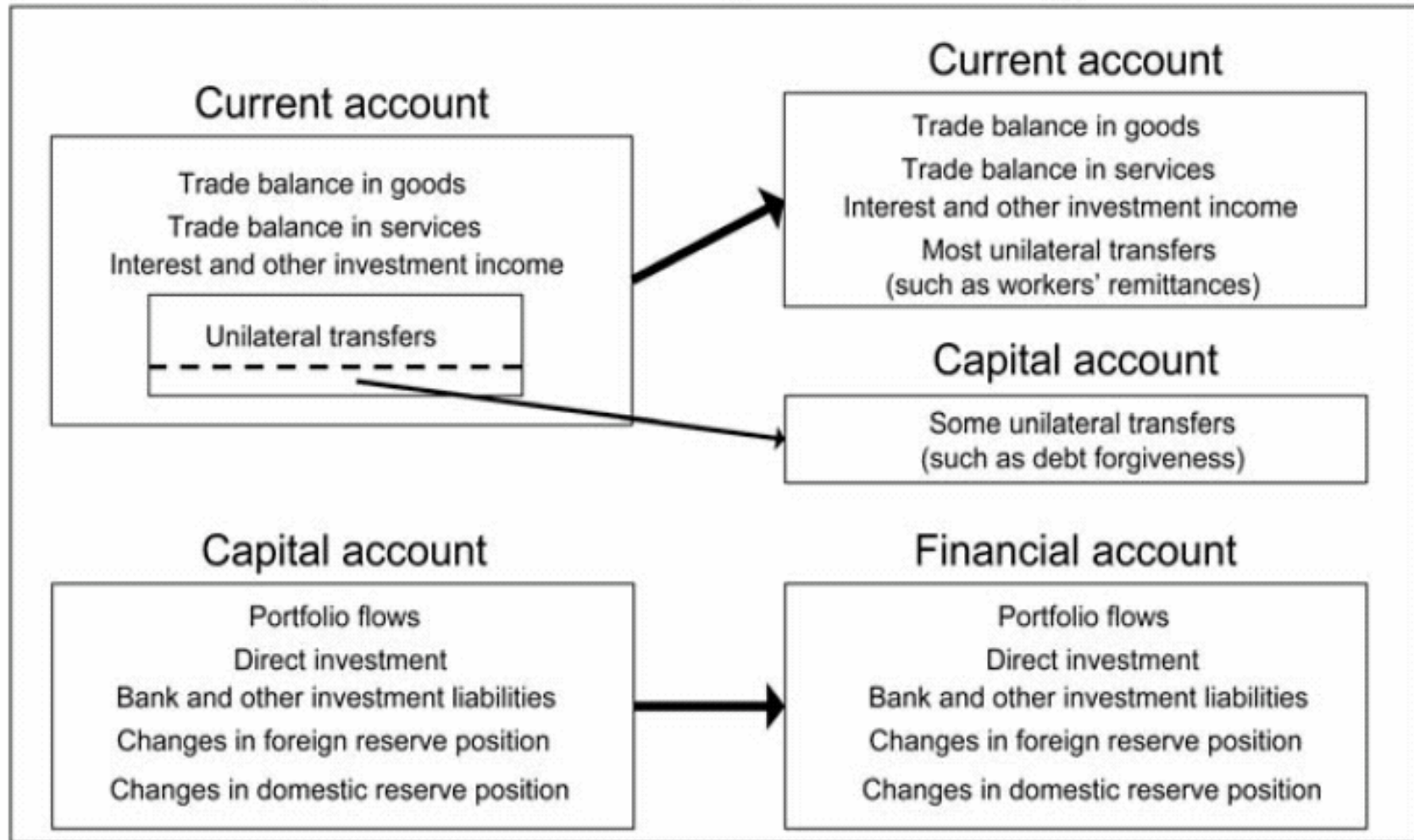
$$\begin{array}{ccccccc} \text{CA} & + & \text{KA} & + & \text{ORT} & & \equiv 0 \\ \text{"current a/c"} & & \text{"private financial a/c"} & & \text{"official financial a/c"} & & \end{array}$$

$$\text{CA} \equiv \text{TB} + \text{transfers} + \text{net income}$$

$$\text{TB} \equiv \text{EX} - \text{IM}$$

ORT is changes in holdings of central banks, monetary authorities

Chart 14-1 Changes to the Balance of Payments Terminology in 1999



Source: CEA, *ERP 2004*.

U.S. Current Account

[Millions of dollars; quarterly data seasonally adjusted. Credits (+), debits (-)]

Period	Goods ¹			Services			Balance on goods and services	Income receipts and payments			Unilateral current transfers, net ³	Balance on current account
	Exports	Imports	Balance on goods	Net military transactions ²	Net travel and transportation	Other services, net		Receipts	Payments	Balance on income		
1997	678,366	- 876,794	- 198,428	4,968	22,152	63,035	- 108,273	256,804	- 244,195	12,609	- 45,062	- 140,726
1998	670,416	- 918,637	- 248,221	5,220	10,210	66,651	- 166,140	261,819	- 257,554	4,265	- 53,187	- 215,062
1999	683,965	- 1,031,784	- 347,819	2,593	7,085	73,051	- 265,090	293,925	- 280,037	13,888	- 50,428	- 301,630
2000	771,994	- 1,226,684	- 454,690	317	2,486	72,052	- 379,835	350,918	- 329,864	21,054	- 58,645	- 417,426
2001	718,712	- 1,148,231	- 429,519	- 2,296	- 3,254	69,943	- 365,126	290,797	- 259,075	31,722	- 51,295	- 384,699
2002	682,422	- 1,167,377	- 484,955	- 7,158	- 4,245	72,633	- 423,725	281,215	- 253,544	27,671	- 63,587	- 459,641
2003	713,415	- 1,264,307	- 550,892	- 11,981	- 11,475	77,433	- 496,915	320,568	- 275,147	45,421	- 70,607	- 522,101
2004	807,516	- 1,477,094	- 669,578	- 13,518	- 14,275	85,279	- 612,092	401,942	- 345,585	56,357	- 84,414	- 640,148
2005	894,631	- 1,681,780	- 787,149	- 10,536	- 12,945	96,259	- 714,371	505,488	- 457,430	48,058	- 88,535	- 754,848
2006	1,023,109	- 1,861,380	- 838,271	- 13,942	- 10,636	104,327	- 758,522	650,462	- 613,823	36,640	- 89,595	- 811,477
2005: I	214,391	- 398,781	- 184,390	- 2,724	- 4,140	24,612	- 166,641	115,351	- 102,877	12,474	- 28,225	- 182,392
II	223,068	- 411,592	- 188,524	- 2,699	- 2,769	23,321	- 170,670	121,333	- 109,529	11,804	- 24,372	- 183,238
III	224,320	- 423,638	- 199,318	- 2,211	- 2,858	23,436	- 180,952	129,873	- 113,308	16,565	- 9,019	- 173,406
IV	232,852	- 447,769	- 214,917	- 2,902	- 3,179	24,889	- 196,109	138,931	- 131,716	7,215	- 26,915	- 215,809
2006: I	243,880	- 451,637	- 207,757	- 3,195	- 3,075	24,315	- 189,712	148,391	- 137,929	10,462	- 21,360	- 200,611
II	252,458	- 463,734	- 211,276	- 3,549	- 3,111	25,359	- 192,577	162,020	- 151,352	10,668	- 23,686	- 205,595
III	260,285	- 479,184	- 218,899	- 3,888	- 2,456	25,936	- 199,307	167,026	- 161,177	5,850	- 23,877	- 217,334
IV	266,486	- 466,825	- 200,339	- 3,310	- 1,995	28,718	- 176,926	173,025	- 163,365	9,661	- 20,673	- 187,938
2007: I	270,116	- 470,983	- 200,867	- 3,665	- 1,711	28,662	- 177,581	176,213	- 168,735	7,478	- 26,994	- 197,097
II ^p	279,339	- 483,552	- 204,213	- 4,141	- 59	29,983	- 178,431	195,460	- 182,791	12,669	- 23,157	- 188,919
III ^p	279,946	- 497,646	- 199,700	- 4,278	1,042	29,783	- 173,152	205,624	- 185,168	20,456	- 25,760	- 178,456

¹ Adjusted from Census data for differences in timing and coverage; excludes military.

² Transfers under U.S. military agency sales contracts (exports) minus direct defense expenditures (imports).

³ Includes transfers of goods and services under U.S. military grant programs.

See p. 37 for continuation of table.

Source: *Economic Indicators*, Dec. 2007

Financial Account

[Millions of dollars; quarterly data seasonally adjusted. Credits (+), debits (-)]

Period	Capital account transactions, net	Financial account							Statistical discrepancy		U.S. official reserve assets, net ⁴ (unadjusted, end of period)
		U.S.-owned assets abroad, net [increase/financial outflow (-)]				Foreign-owned assets in the U.S., net [increase/financial inflow (+)]			Total (sum of the items with sign reversed)	Of which: Seasonal adjustment discrepancy	
		Total	U.S. official reserve assets ⁴	Other U.S. Government assets	U.S. private assets	Total	Foreign official assets	Other foreign assets			
1997	-1,027	-485,475	-1,010	68	-484,533	706,809	19,036	687,773	-79,581		69,954
1998	-766	-353,829	-6,783	-422	-346,624	423,569	-19,903	443,472	146,088		81,761
1999	-4,939	-504,062	8,747	2,750	-515,559	740,210	43,543	696,667	70,421		71,516
2000	-1,010	-560,523	-290	-941	-559,292	1,046,896	42,758	1,004,138	-67,937		67,647
2001	-1,270	-382,616	-4,911	-486	-377,219	782,859	28,059	754,800	-14,274		68,654
2002	-1,470	-294,646	-3,681	345	-291,310	797,813	115,945	681,868	-42,056		79,006
2003	-3,480	-325,424	1,523	537	-327,484	864,352	278,069	586,283	-13,348		85,938
2004	-2,369	-905,024	2,805	1,710	-909,539	1,461,766	397,755	1,064,011	85,775		86,824
2005	-4,054	-426,875	14,096	5,539	-446,510	1,204,231	259,268	944,963	-18,454		65,127
2006	-3,913	-1,055,176	2,374	5,346	-1,062,896	1,859,597	440,264	1,419,333	-17,794		65,895
2005: I	-2,598	-86,619	5,331	2,591	-94,541	232,614	25,052	207,562	38,995	12,335	78,942
2005: II	-512	-213,305	-797	989	-213,497	310,822	81,292	229,530	86,234	-3,620	76,594
2005: III	-473	-141,628	4,766	1,501	-147,894	383,808	54,736	329,072	-68,302	-18,362	71,273
2005: IV	-472	14,678	4,796	459	9,423	276,987	98,188	178,799	-75,384	9,644	65,127
2006: I	-1,724	-344,032	513	1,049	-345,594	538,140	125,257	412,883	6,593	9,958	65,354
2006: II	-1,008	-212,218	-560	1,765	-213,423	355,442	120,861	234,581	49,378	-252	67,935
2006: III	-545	-209,898	1,006	1,570	-212,474	449,987	108,799	341,188	-37,121	-15,973	66,217
2006: IV	-637	-289,028	1,415	962	-291,405	516,029	85,347	430,682	-36,643	6,267	65,895
2007: I	-559	-449,454	-72	445	-449,827	616,602	152,193	464,409	15,708	11,335	66,551
2007: II ^P	-598	-465,466	26	-369	-465,123	619,272	70,464	548,808	36,718	-2,782	66,127
2007: III ^P	-554	-155,739	-54	422	-156,107	249,126	39,016	210,110	85,622	-18,584	69,070

⁴Consists of gold, special drawing rights (SDRs), foreign currencies, and the U.S. reserve position in the International Monetary Fund (IMF).

Sources: Department of Commerce (Bureau of Economic Analysis) and Department of the Treasury.

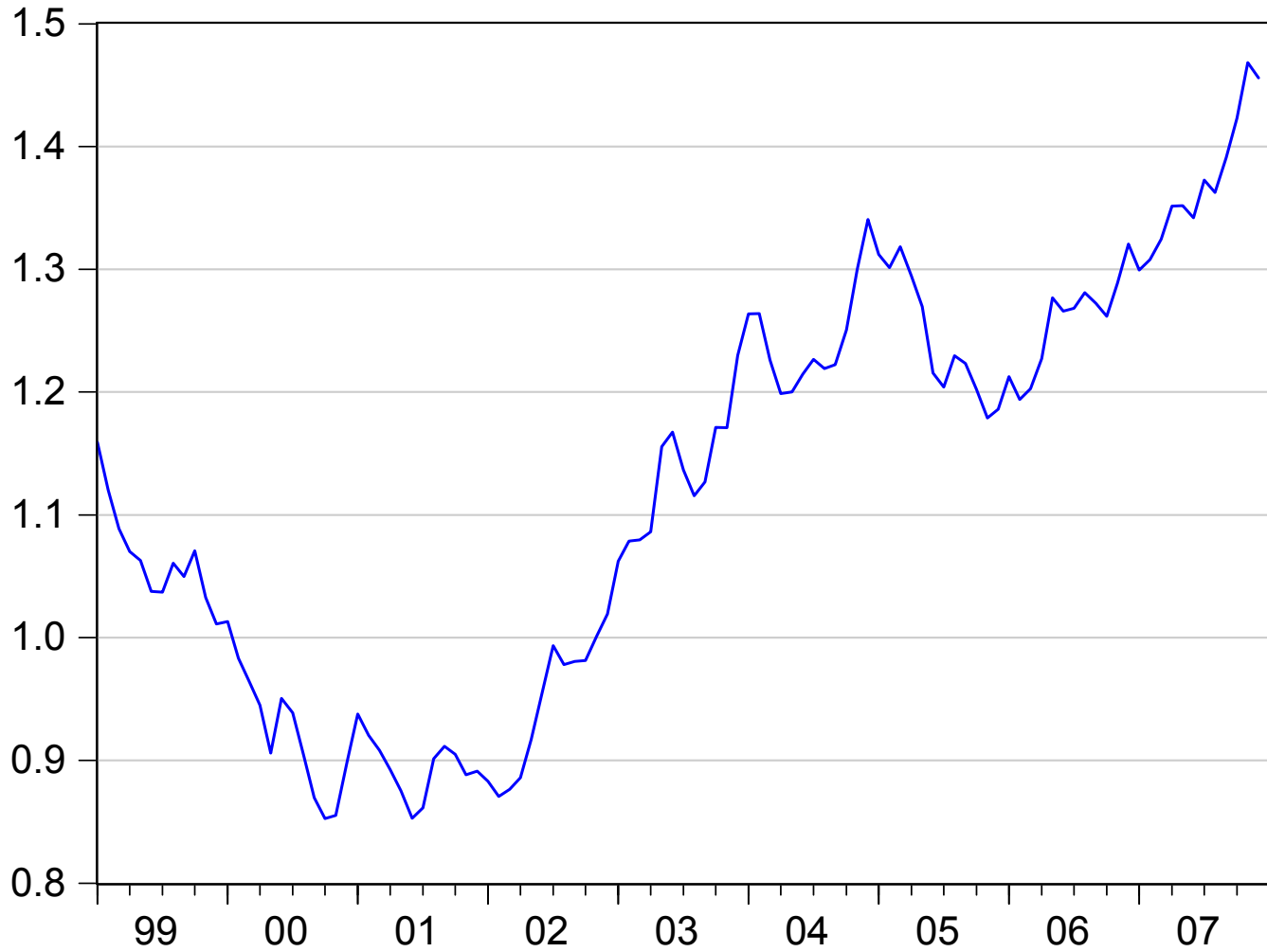
Source: *Economic Indicators*, Dec. 2007

Definitions

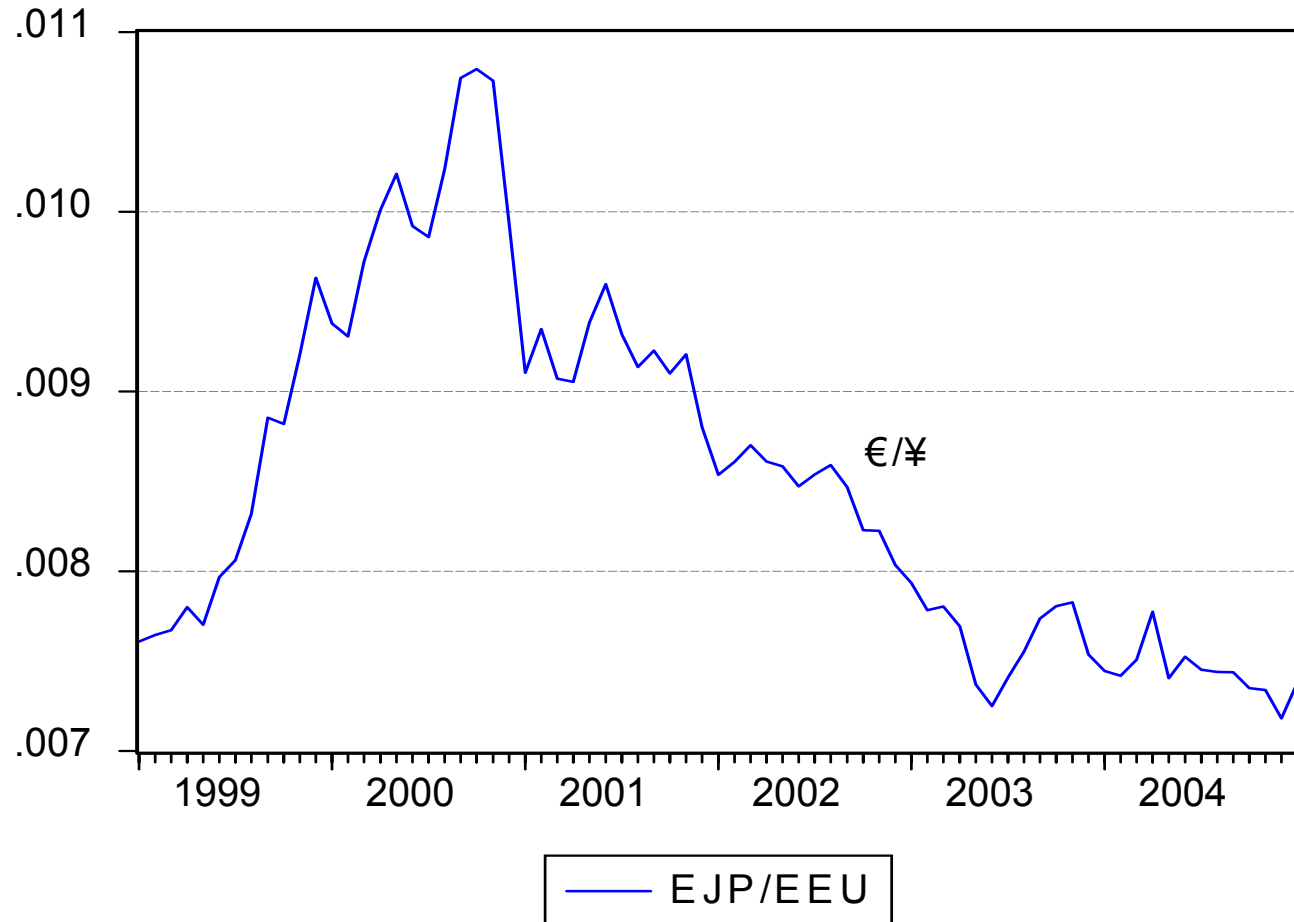
- Exchange rates: number of home currency units required to purchase one unit of foreign currency; also price of foreign currency.
- E.g., from EU resident perspective: $\text{€}/\text{\$}$, $\text{€}/\text{¥}$
- E.g., from Chinese resident perspective: $\text{¥}/\text{\$}$

Example: \$/€

XEU

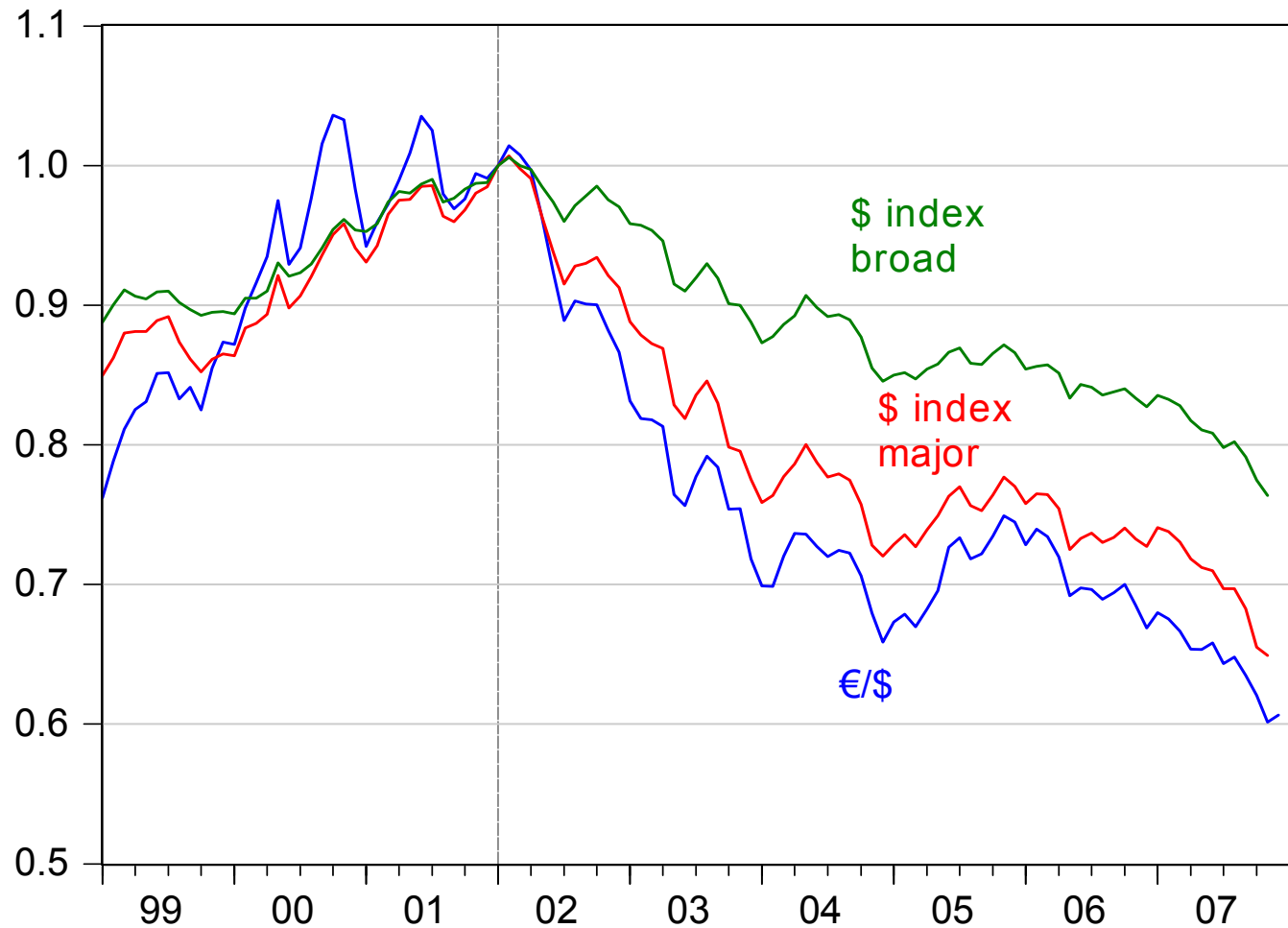


Example: €/¥



The *Value* of the Dollar

(vs. Euro, Trade Weighted basket [major, broad])



Source: Federal Reserve Board via FRED II

The institutional features of the forex market

- Average turnover in April 2007 = USD3.2 trillion per day
- Most trading volume between dealers, next most with financial institutions, next most with non-financials.
- USD, EUR, JPY, GBP, SFR most important in turnover.
- AUD moving up quickly.

Trends in FX Turnover

Global foreign exchange market turnover ¹						
Daily averages in April, in billions of US dollars						
	1992	1995	1998	2001	2004	2007
Spot transactions	394	494	568	387	621	1,005
Outright forwards	58	97	128	131	208	362
Up to 7 days	...	50	65	51	92	154
Over 7 days	...	46	62	80	116	208
Foreign exchange swaps	324	546	734	656	944	1,714
Up to 7 days	...	382	528	451	692	1,329
Over 7 days	...	162	202	204	250	382
Estimated gaps in reporting	44	53	61	26	107	129
Total "traditional" turnover	820	1,190	1,490	1,200	1,880	3,210
<i>Memo: Turnover at April 2007 exchange rates²</i>	<i>880</i>	<i>1,150</i>	<i>1,650</i>	<i>1,420</i>	<i>1,950</i>	<i>3,210</i>

¹ Adjusted for local and cross-border double-counting. Due to incomplete maturity breakdown, components do not always sum to totals. ² Non-US dollar legs of foreign currency transactions were converted from current US dollar amounts into original currency amounts at average exchange rates for April of each survey year and then reconverted into US dollar amounts at average April 2007 exchange rates.

Table B.1

Definitions of Terms

Spot transaction: single outright transaction involving the exchange of two currencies at a rate agreed on the date of the contract for value or delivery.

Outright forward: transaction involving the exchange of two currencies at a rate agreed on the date of the contract for value or delivery at some time in the future

Foreign exchange swap: transaction which involves the actual exchange of two currencies (principal amount only) on a specific date at a rate agreed at the time of the conclusion of the contract, and a reverse exchange of the same two currencies at a date further in the future at a rate agreed at the time of the contract.

Definition of Terms (cont'd)

Currency swap: contract which commits two counterparties to exchange streams of interest payments in different currencies for an agreed period of time and to exchange principal amounts in different currencies at a previously agreed exchange rate at maturity.

Currency option: Option contract that gives the right to buy or sell a currency with another currency at a specified exchange rate during a specified period.

Forward rate agreement (FRA): interest rate forward contract in which the rate to be paid or received on a specific obligation for a set period of time, beginning at some time in the future, is determined at contract initiation.

Definition of Terms (cont'd)

Interest rate swap: agreement to exchange periodic payments related to interest rates on a single currency.

Interest rate option: option contract that gives the right to pay or receive a specific interest rate on a predetermined principal for a set period of time.

Reported foreign exchange market turnover by currency pair¹

Daily averages in April, in billions of US dollars and per cent

	2001		2004		2007	
	Amount	% share	Amount	% share	Amount	% share
US dollar/euro	354	30	501	28	840	27
US dollar/yen	231	20	296	17	397	13
US dollar/sterling	125	11	245	14	361	12
US dollar/Australian dollar	47	4	90	5	175	6
US dollar/Swiss franc	57	5	78	4	143	5
US dollar/Canadian dollar	50	4	71	4	115	4
US dollar/Swedish krona ²	...	...	...	...	56	2
US dollar/other	195	17	292	16	572	19
Euro/yen	30	3	51	3	70	2
Euro/sterling	24	2	43	2	64	2
Euro/Swiss franc	12	1	26	1	54	2
Euro/other	21	2	39	2	112	4
Other currency pairs	26	2	42	2	122	4
All currency pairs	1,173	100	1,773	100	3,081	100

¹ Adjusted for local and cross-border double-counting.
2007, and is included in "other".

² The US dollar/Swedish krona pair could not be separately identified before

FX Trading Centers

Geographical distribution of reported foreign exchange market turnover ¹								
Daily averages in April, in billions of US dollars and per cent								
	1998		2001		2004		2007	
	Amount	% share	Amount	% share	Amount	% share	Amount	% share
Argentina	2	0.1	...	...	1	0.0	1	0.0
Australia	47	2.4	52	3.2	81	3.4	170	4.3
Austria	11	0.6	8	0.5	13	0.6	18	0.4
Bahrain	2	0.1	3	0.2	3	0.1	3	0.1
Belgium	27	1.4	10	0.6	20	0.8	48	1.2
Brazil ²	5	0.3	5	0.3	3	0.1	5	0.1
Bulgaria	...	...	...	...	...	...	1	0.0
Canada	37	1.9	42	2.6	54	2.2	60	1.5
Chile	1	0.1	2	0.1	2	0.1	4	0.1
China ³	0	0.0	0	0.0	1	0.0	9	0.2
Colombia	...	...	0	0.0	1	0.0	2	0.0
Czech Republic	5	0.3	2	0.1	2	0.1	5	0.1
Denmark	27	1.4	23	1.4	41	1.7	86	2.2
Estonia	...	...	...	...	0	0.0	1	0.0
Finland	4	0.2	2	0.1	2	0.1	8	0.2
France	72	3.7	48	3.0	63	2.6	120	3.0
Germany	94	4.8	88	5.5	118	4.9	99	2.5
Greece	7	0.4	5	0.3	4	0.2	5	0.1
Hong Kong SAR	79	4.0	67	4.1	102	4.2	175	4.4

Geographical distribution of reported foreign exchange market turnover¹ (cont)

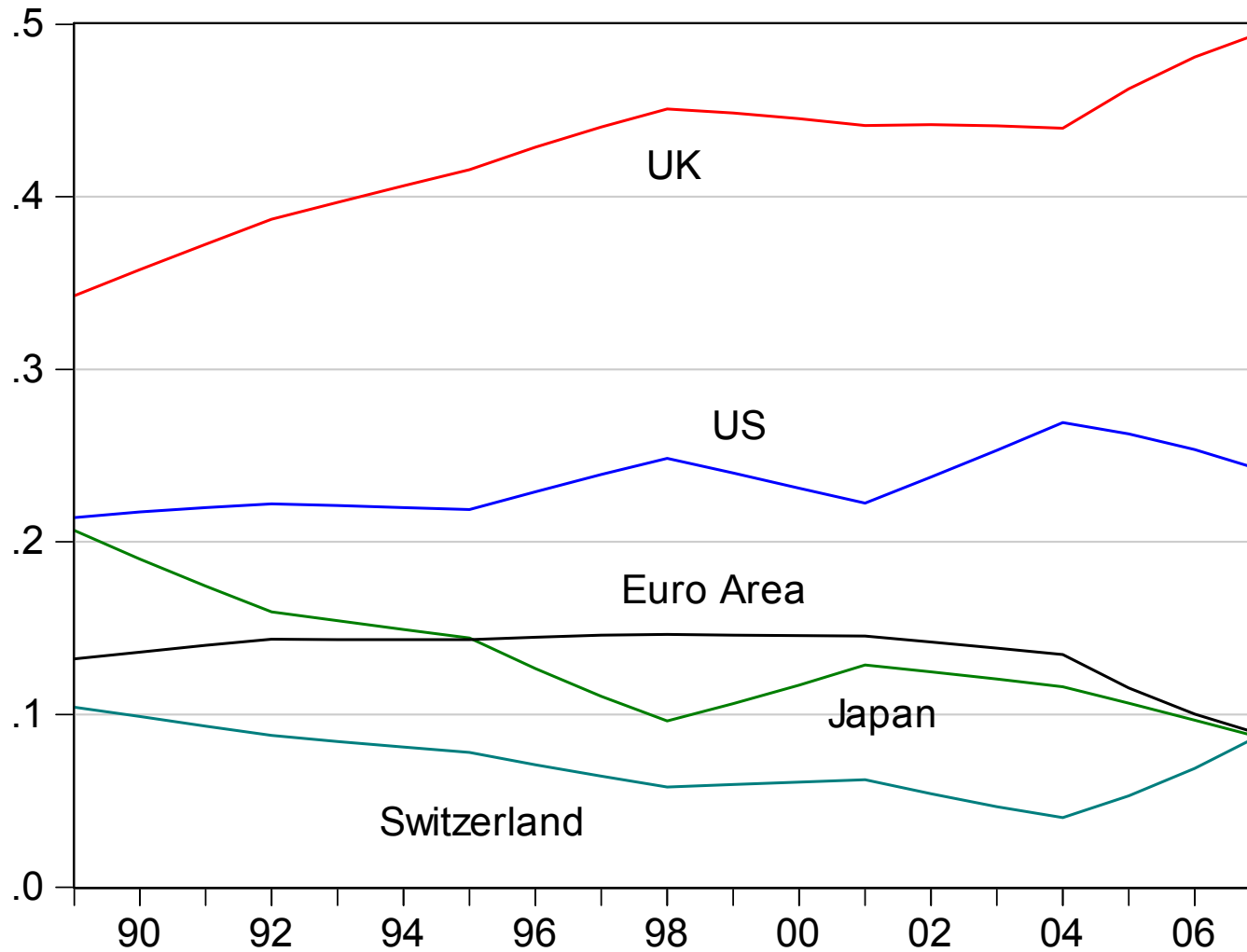
Daily averages in April, in billions of US dollars and per cent

	1998		2001		2004		2007	
	Amount	% share	Amount	% share	Amount	% share	Amount	% share
Singapore	139	7.1	101	6.2	125	5.2	231	5.8
Slovakia	...	...	1	0.0	2	0.1	3	0.1
Slovenia	...	...	0	0.0	0	0.0	0	0.0
South Africa	9	0.5	10	0.6	10	0.4	14	0.3
Spain	19	1.0	8	0.5	14	0.6	16	0.4
Sweden	15	0.8	24	1.5	31	1.3	42	1.1
Switzerland	82	4.2	71	4.4	79	3.3	242	6.1
Taiwan, China	5	0.3	4	0.3	8	0.3	15	0.4
Thailand	3	0.2	2	0.1	3	0.1	6	0.2
Turkey	...	...	1	0.1	3	0.1	3	0.1
United Kingdom	637	32.5	504	31.2	753	31.3	1,359	34.1
United States	351	17.9	254	15.7	461	19.2	664	16.6
Total	1,969	100	1,616	100	2,408	100	3,988	100

¹ Adjusted for local double-counting ("net-gross"). ² For 1998, spot transactions only. ³ For 1998, 2001 and 2004, spot transactions only.

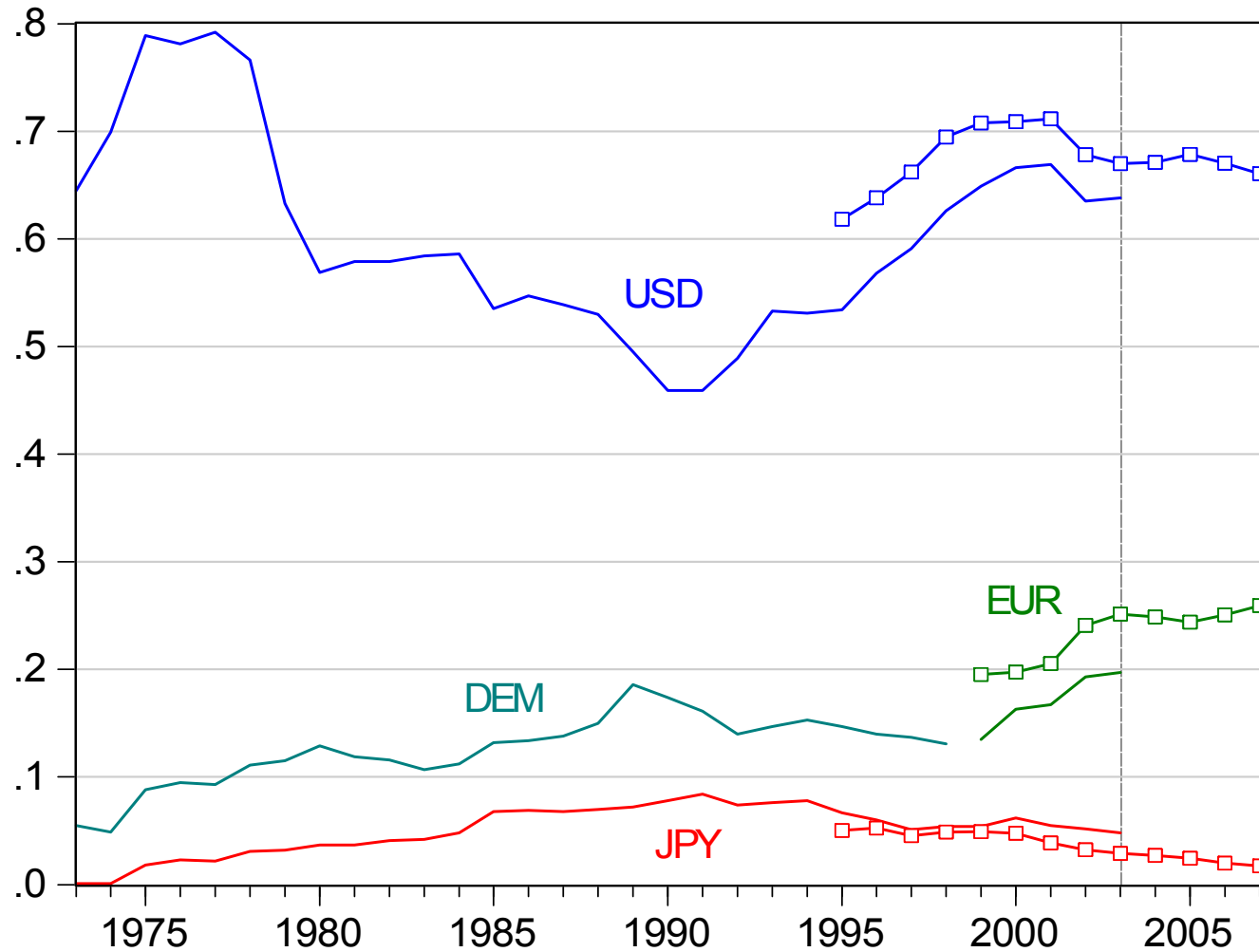
Table B.2

Time series: geographical dist'n



Source: BIS, *Triennial Surveys*, various issues and author's calculations

Central bank holdings of reserve currencies



Source: Chinn and Frankel, forthcoming, *International Finance*