

Lecture 2:
Definitions and BoP Accounting

Spring 2009

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

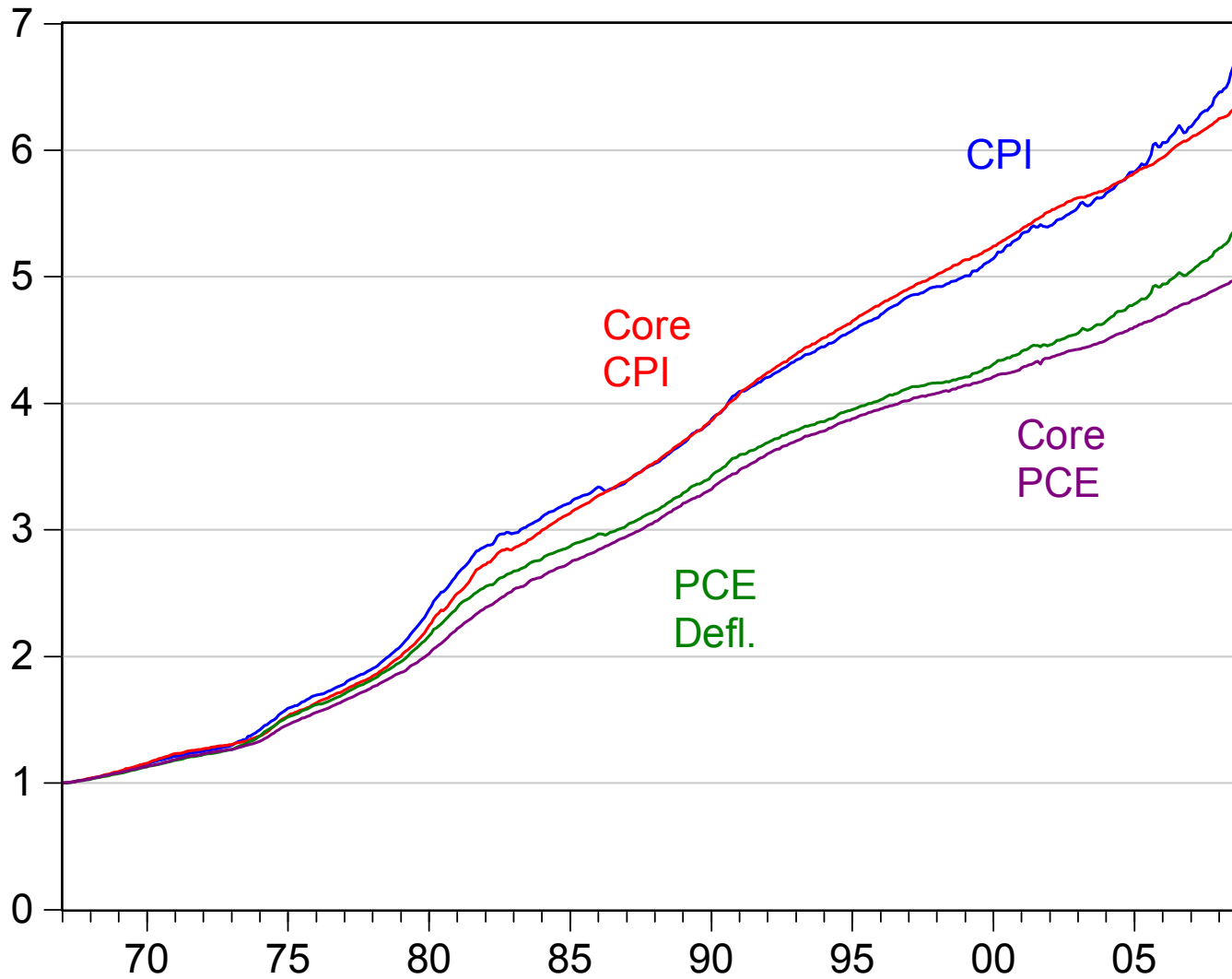
Real vs. Nominal

- 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”.
- $\text{Nominal Value/Price index} = \text{Real Quantity}$
- $\text{Nominal Price/Price index} = \text{Relative Price}$

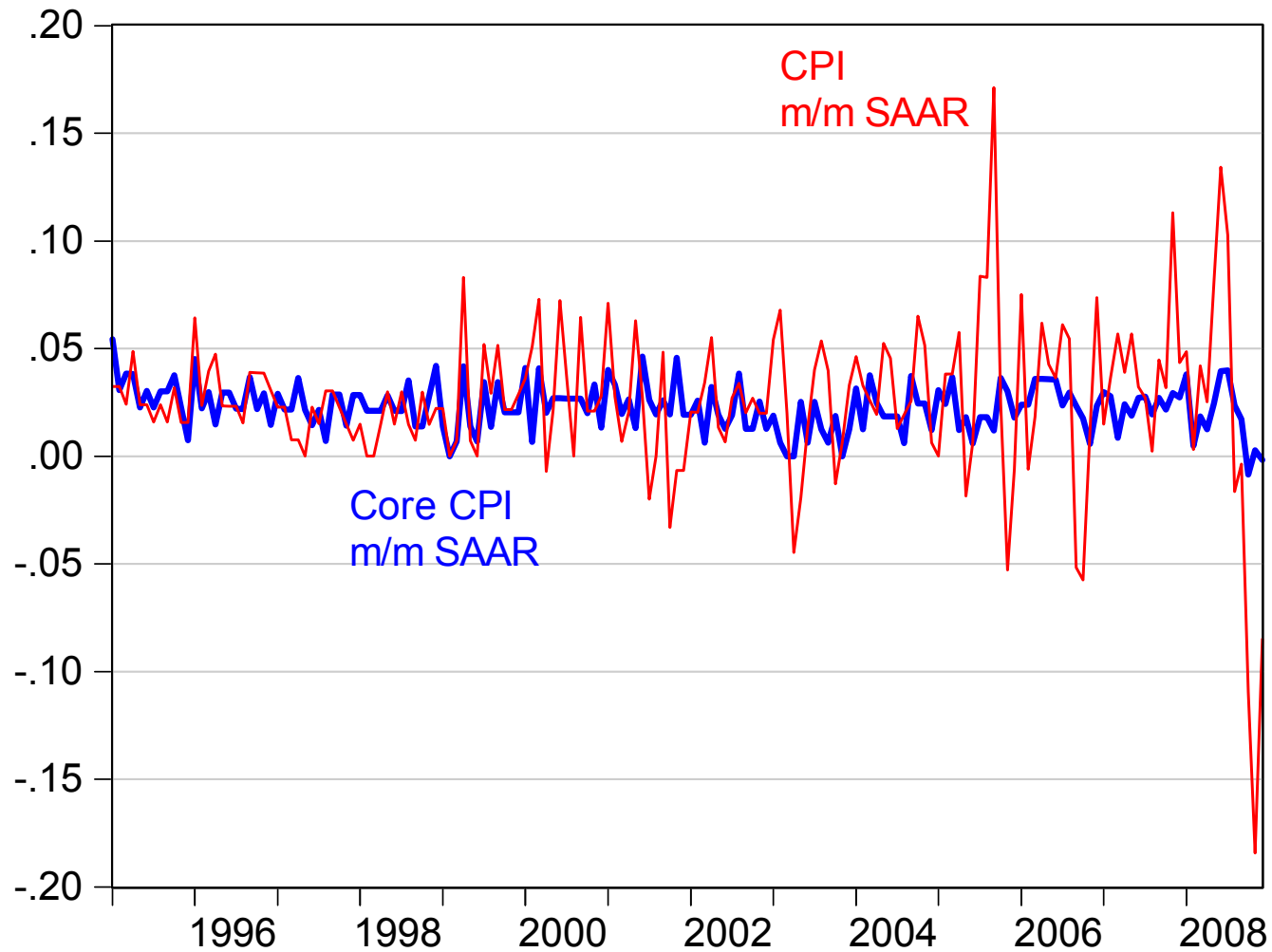
Price Level vs. Inflation

- 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

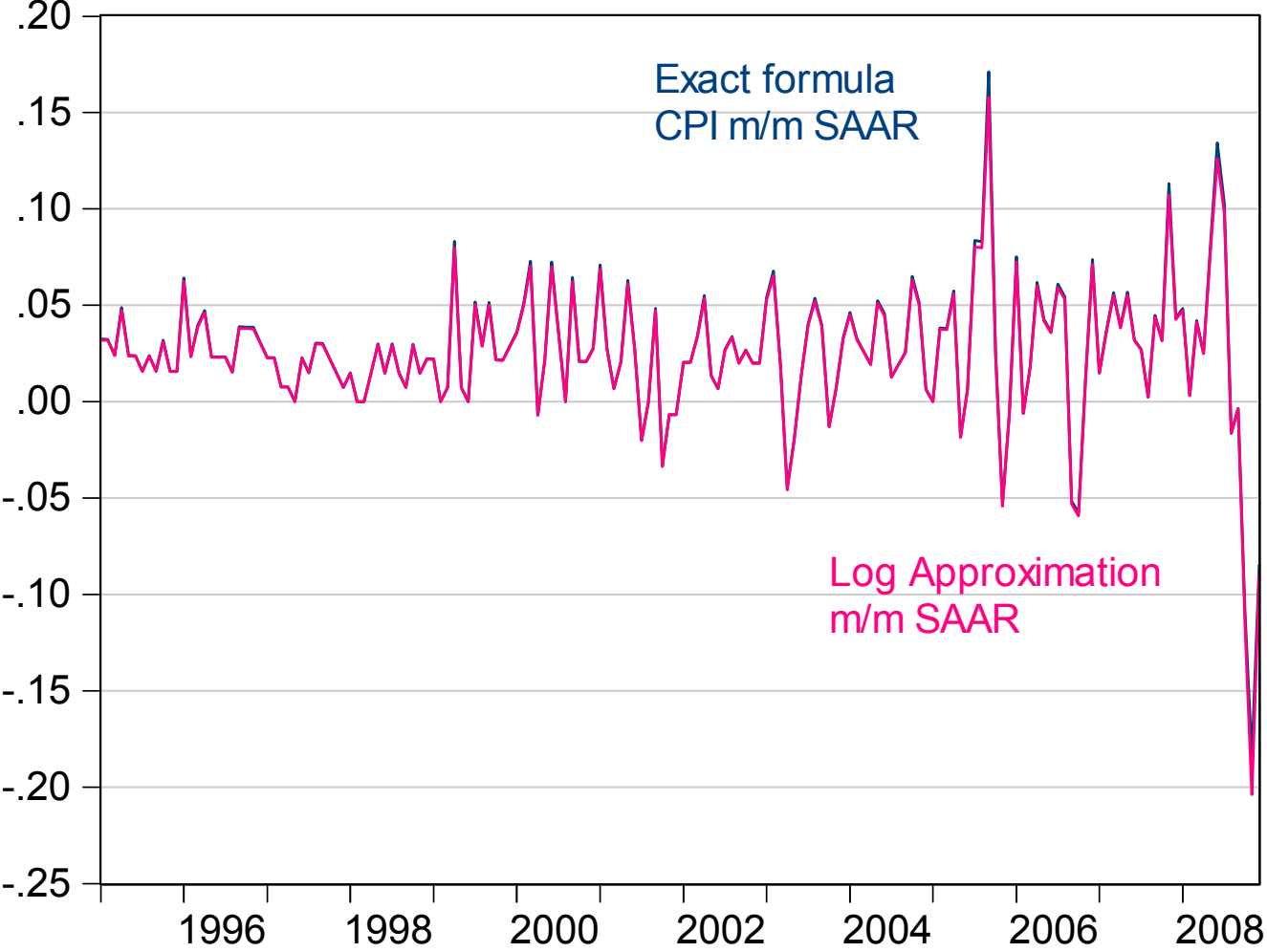


Inflation: Total vs. Core



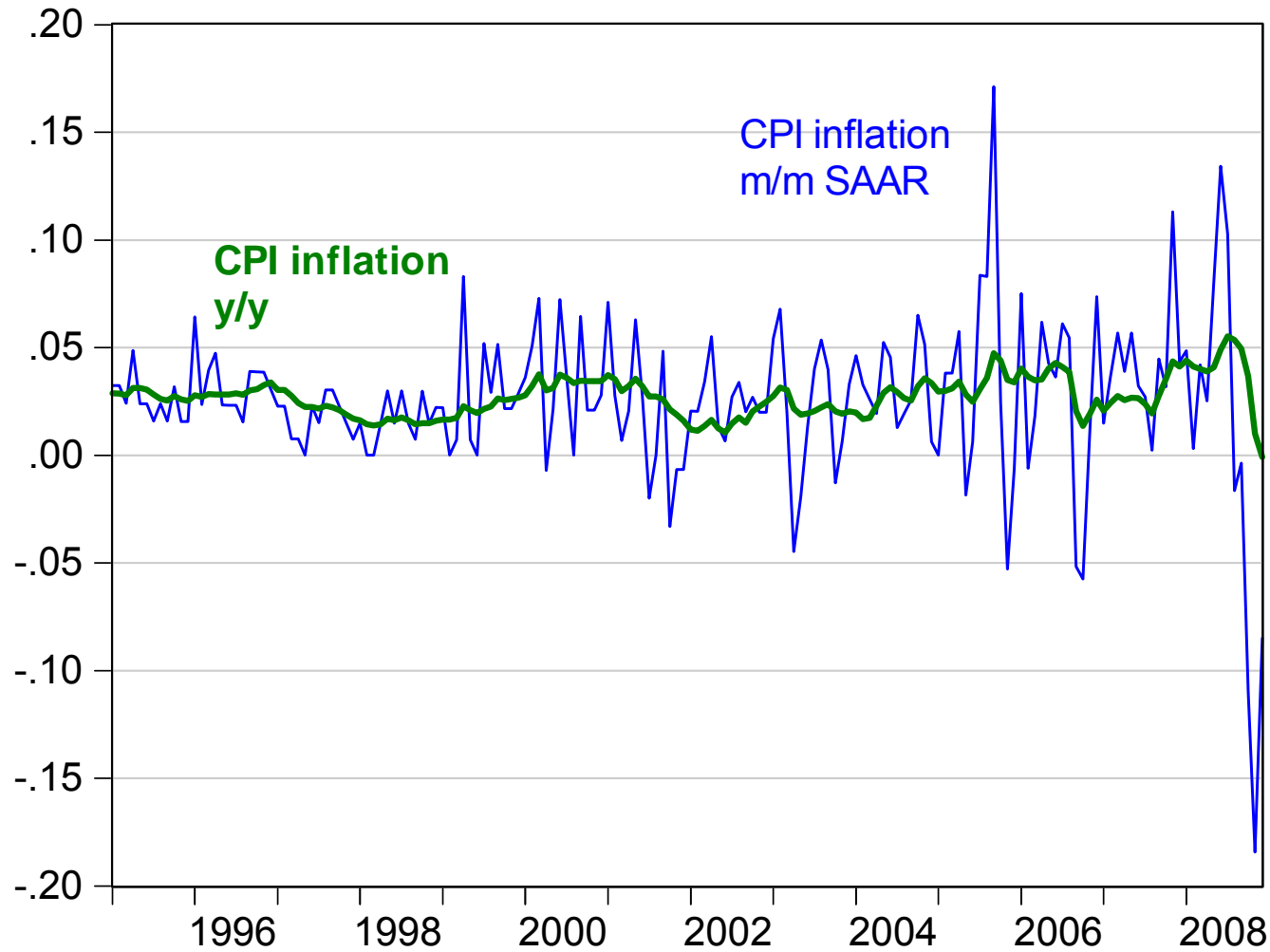
— (CPILFESL/CPILFESL(-1))^12-1
— (CPIAUCSL/CPIAUCSL(-1))^12-1

Inflation: Exact vs. Log Approx.



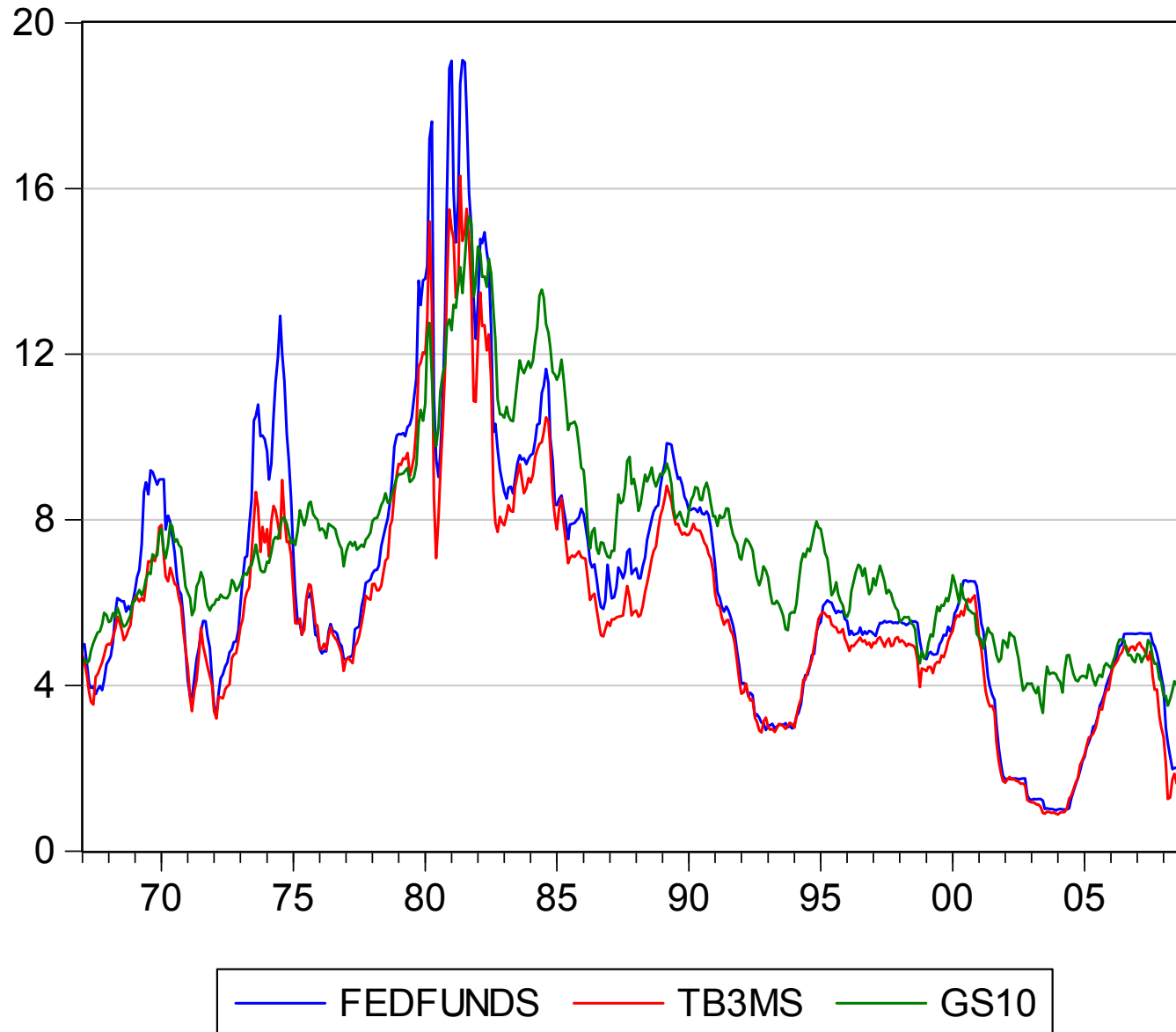
— (CPIAUCSL/CPIAUCSL(-1))^12-1
— D(LOG(CPIAUCSL))*12

Inflation: M/M vs. Y/Y

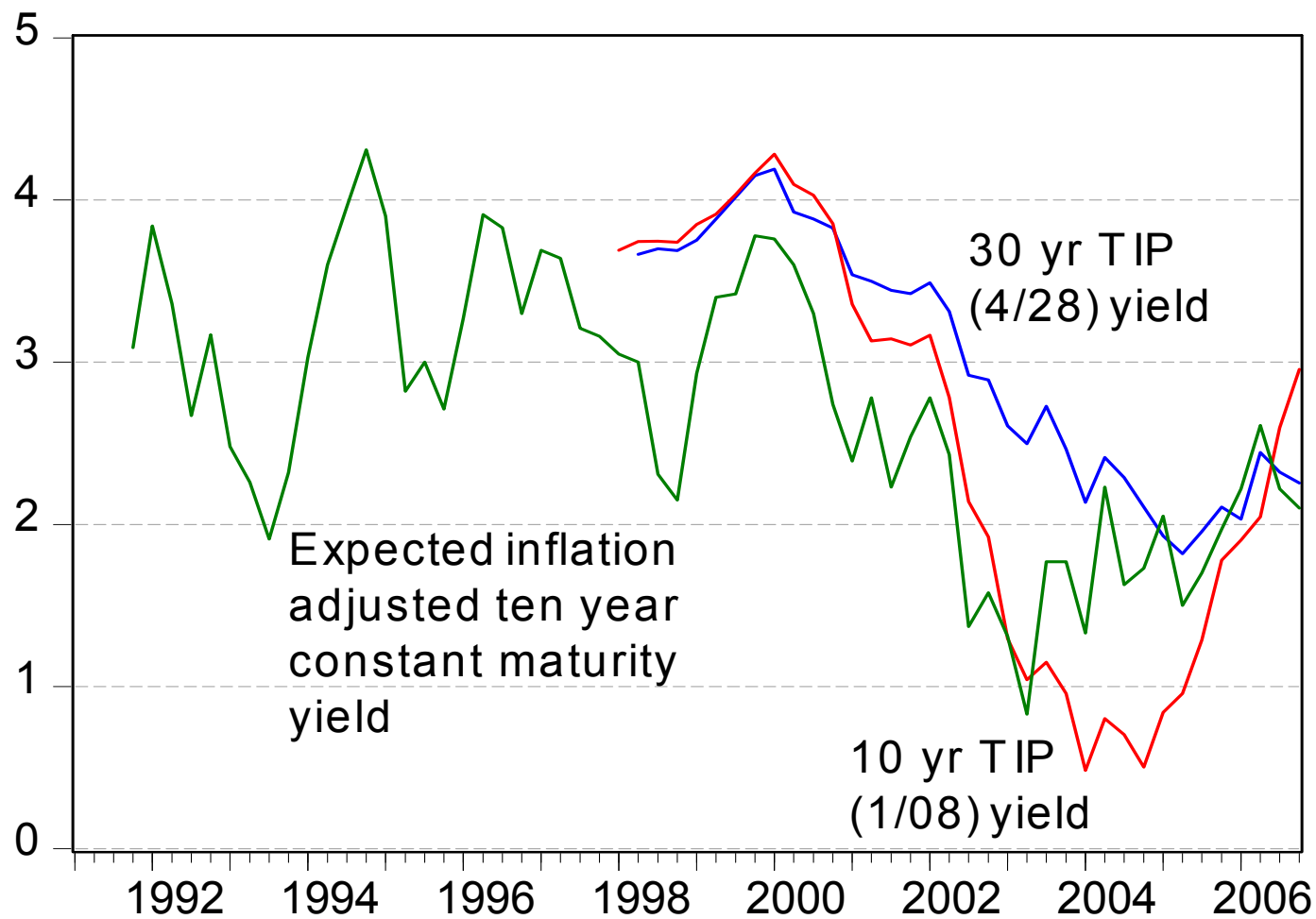


— (CPIAUCSL/CPIAUCSL(-1))^12-1
— (CPIAUCSL/CPIAUCSL(-12))-1

Nominal Interest Rates



Real Interest Rates



Accounting, Exchange Rates

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

Balance of Payments Accounting

$$\text{CA} + \text{KA} + \text{ORT} \equiv 0$$

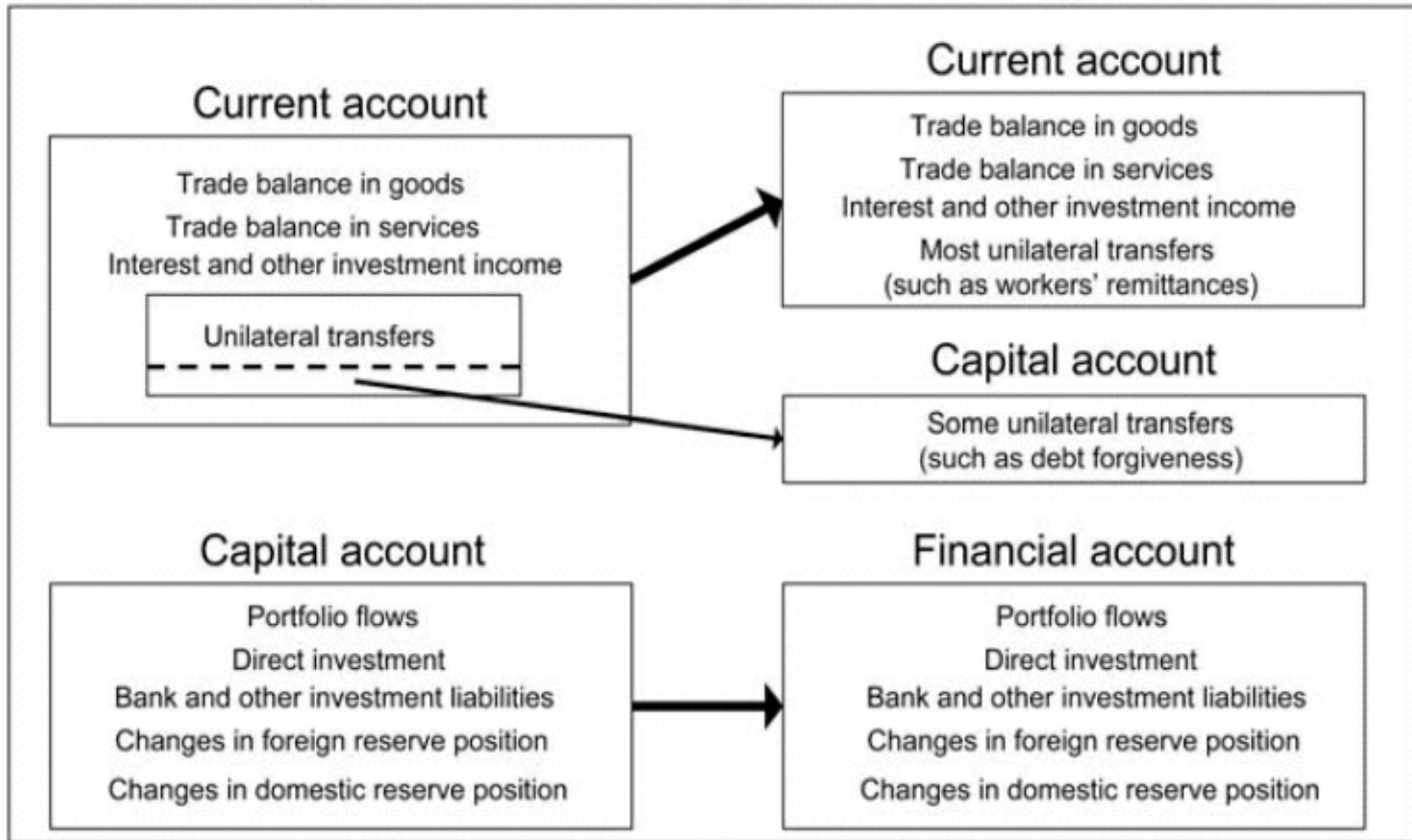
“current a/c” “private financial a/c” “official financial a/c”

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

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

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

INTERNATIONAL STATISTICS

TABLE B-103.—U.S. international transactions, 1946–2008

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

Year or quarter	Goods ¹			Services			Balance on goods and services	Income receipts and payments			Unilateral current transfers, net ²	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		
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	280,942	-253,544	27,398	-64,948	-461,275
2003	713,415	-1,264,307	-550,892	-11,981	-11,475	77,433	-496,915	320,456	-275,147	45,309	-71,794	-523,400
2004	807,516	-1,477,094	-669,578	-13,518	-14,275	89,640	-607,730	413,739	-346,519	67,219	-84,482	-624,993
2005	894,631	-1,681,780	-787,149	-10,536	-13,006	99,124	-711,567	535,263	-462,905	72,358	-89,784	-728,993
2006	1,023,109	-1,861,380	-838,270	-13,602	-10,788	109,377	-753,283	685,150	-627,956	57,194	-92,027	-788,116
2007	1,148,481	-1,967,853	-819,373	-16,768	2,181	133,702	-700,258	817,779	-736,030	81,749	-112,705	-731,214
2007: I	270,318	-473,681	-203,363	-3,286	-1,587	28,692	-179,543	186,746	-173,959	12,787	-30,174	-196,930
II	279,488	-485,375	-205,887	-4,085	-806	31,960	-178,819	202,171	-192,492	9,679	-24,953	-194,093
III	295,494	-496,698	-201,204	-4,251	1,064	36,276	-168,114	213,520	-190,562	22,958	-27,796	-172,952
IV	303,180	-512,099	-208,919	-5,146	3,509	36,773	-173,783	215,343	-179,016	36,327	-29,784	-167,241
2008: I	317,813	-528,845	-211,032	-4,398	3,115	35,205	-177,110	199,827	-166,615	33,212	-31,742	-175,640
II ^p	337,312	-553,641	-216,328	-5,340	4,471	36,646	-180,551	194,873	-167,529	27,344	-29,941	-183,147

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

² Includes transfers of goods and services under U.S. military grant programs.

See next page for continuation of table.

Source: ERP, Jan. 2009

Financial Account

TABLE B-103.—*U.S. international transactions, 1946–2008*—Continued

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

Year or quarter	Capital account transactions, net	Financial account							Statistical discrepancy		
		U.S.-owned assets abroad, excluding financial derivatives [increase/financial outflow (–)]			Foreign-owned assets in the U.S., excluding financial derivatives [increase/financial inflow (+)]			Financial derivatives, net	Total (sum of the items with sign reversed)	Of which: Seasonal adjustment discrepancy	
		Total	U.S. official reserve assets ³	Other U.S. Government assets	U.S. private assets	Total	Foreign official assets				Other foreign assets
2000	–1,010	–560,523	–290	–941	–559,292	1,038,224	42,758	995,466	.....	–59,265	.....
2001	–1,270	–382,616	–4,911	–486	–377,219	782,870	28,059	754,811	.....	–14,285	.....
2002	–1,470	–294,646	–3,681	345	–291,310	795,161	115,945	679,216	.....	–37,770	.....
2003	–3,480	–325,424	1,523	537	–327,484	858,303	278,069	580,234	.....	–6,000	.....
2004	–2,369	–1,000,870	2,805	1,710	–1,005,385	1,533,201	397,755	1,135,446	.....	95,030	.....
2005	–4,036	–546,631	14,096	5,539	–566,266	1,247,347	259,268	988,079	.....	32,313	.....
2006	–3,880	–1,251,749	2,374	5,346	–1,259,469	2,061,113	487,939	1,573,174	29,710	–47,078	.....
2007	–1,843	–1,289,854	–122	–22,273	–1,267,459	2,057,703	411,058	1,646,645	6,496	–41,287	.....
2007: I	–543	–442,065	–72	445	–442,438	692,713	163,270	529,443	14,795	–67,970	12,192
II	–112	–523,556	26	–596	–522,985	718,112	88,822	629,290	–1,007	656	722
III	–617	–170,476	–54	623	–171,045	266,476	13,469	253,007	5,942	71,627	–21,805
IV	–571	–153,757	–22	–22,744	–130,990	380,402	145,497	234,905	–13,234	–45,600	8,892
2008: I	–600	–260,644	–276	3,265	–263,634	459,017	173,533	285,484	–8,001	–14,131	9,271
II ^p	–652	110,431	–1,267	–41,265	152,963	26,301	144,417	–118,116	.....	47,067	–3,464

³ Consists of gold, special drawing rights, foreign currencies, and the U.S. reserve position in the International Monetary Fund (IMF).

Source: Department of Commerce (Bureau of Economic Analysis).

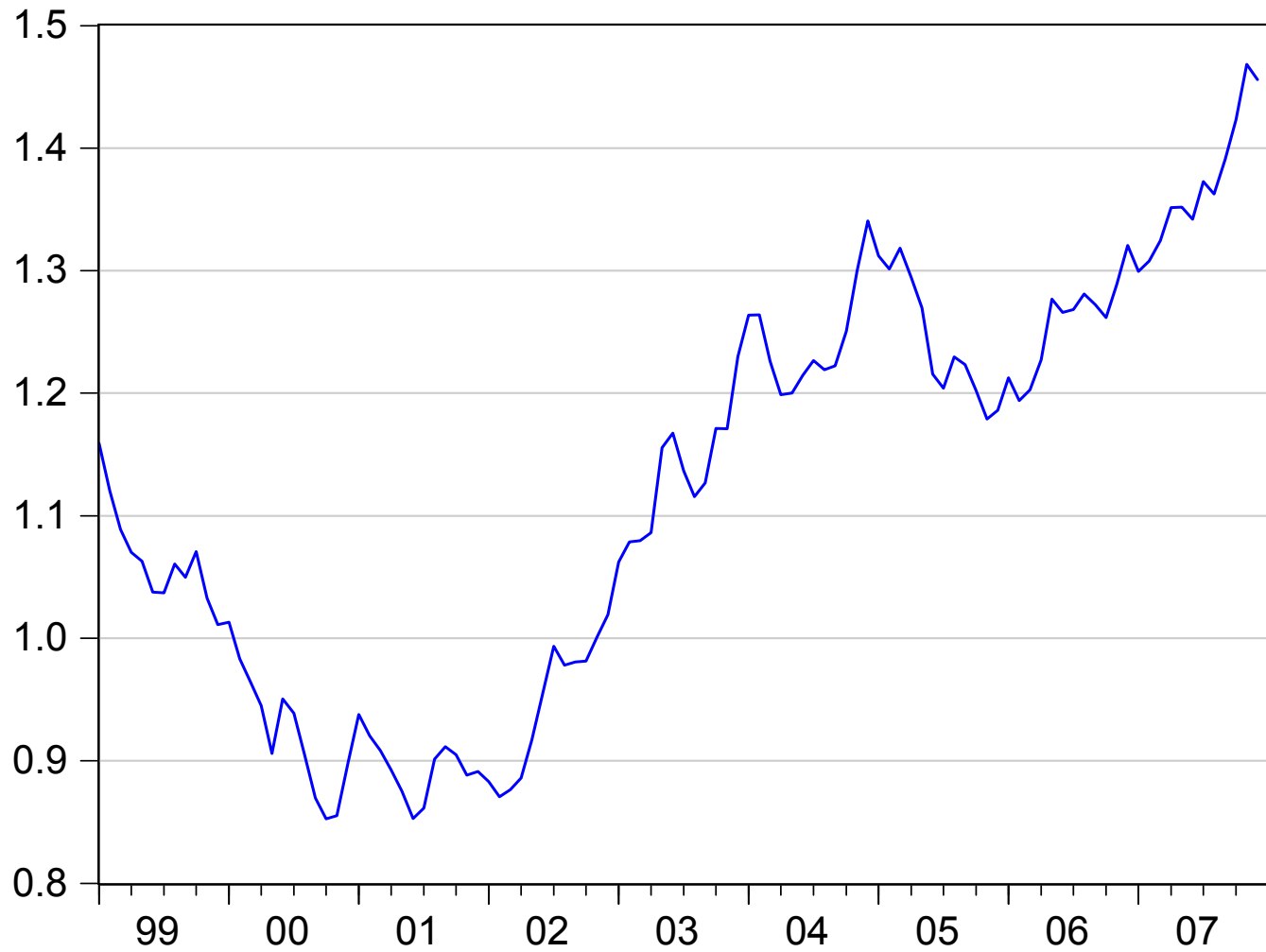
Source: *ERP*, Jan. 2009

Definitions

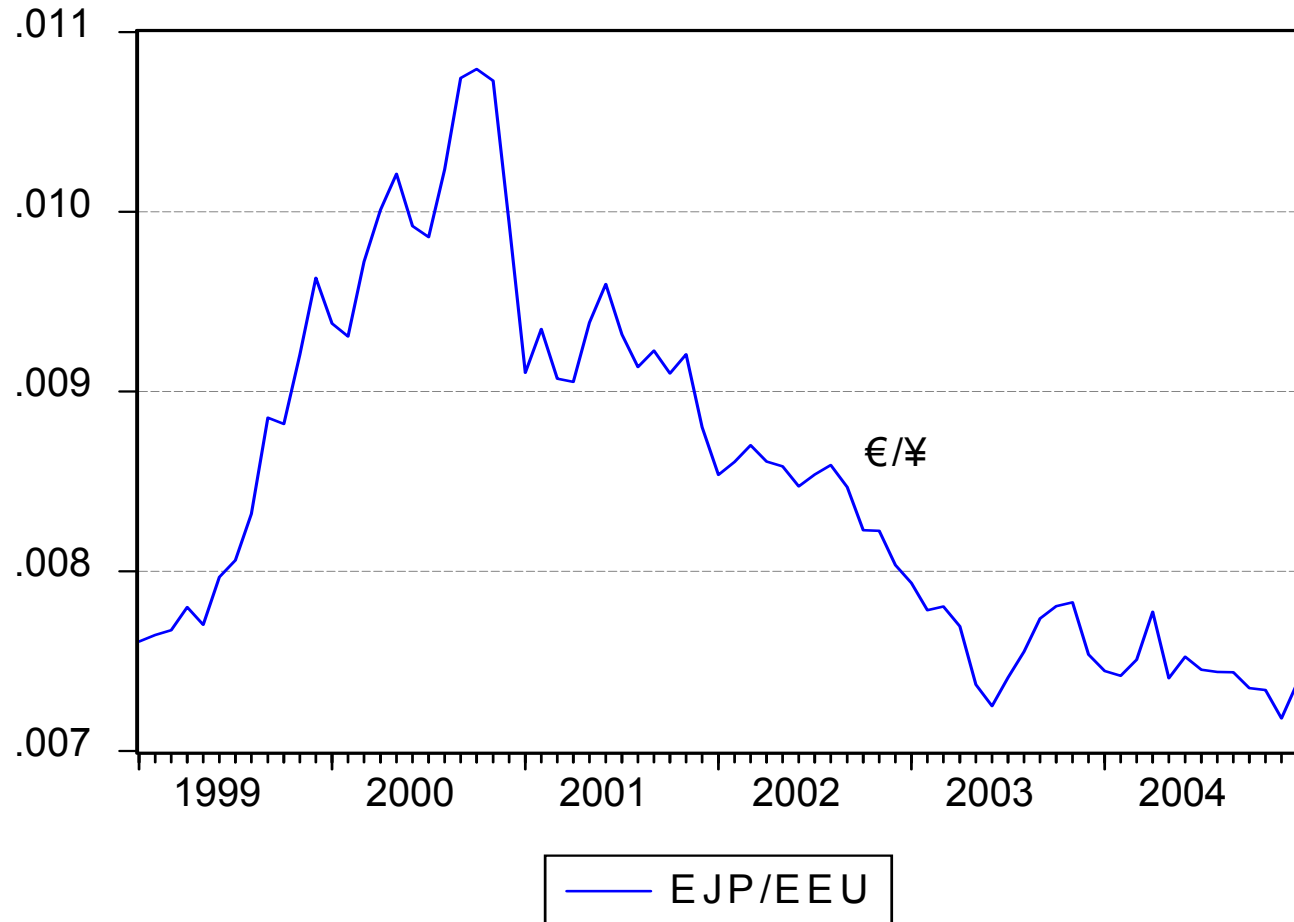
- Exchange rates: number of home currency units required to purchase one unit of foreign currency; also price of foreign currency.
- E.g., from EU resident perspective: $\text{€}/\text{\$}$, $\text{€}/\text{¥}$
- E.g., from Chinese resident perspective: $\text{¥}/\text{\$}$

Example: \$/€

XEU

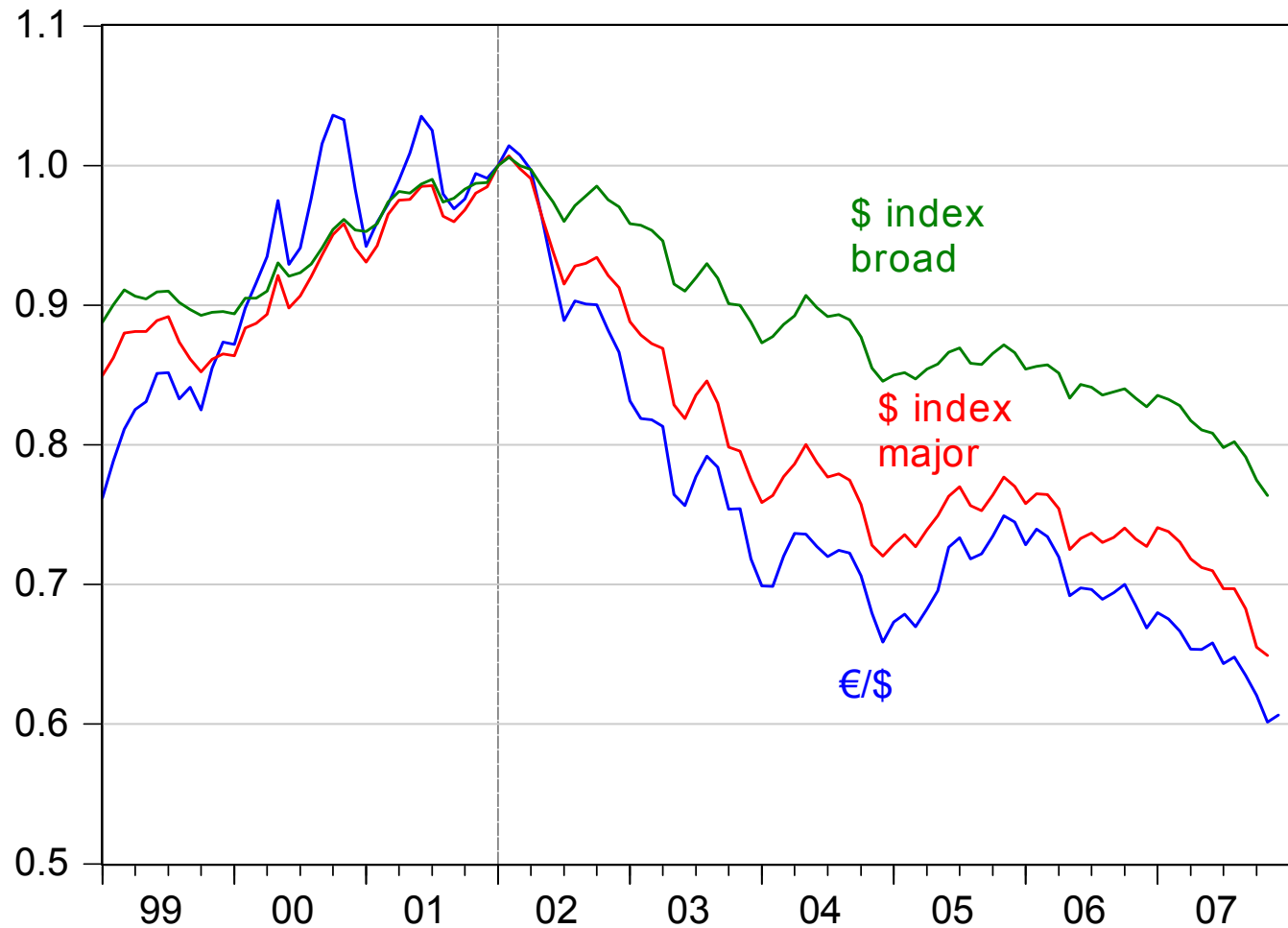


Example: €/¥



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)

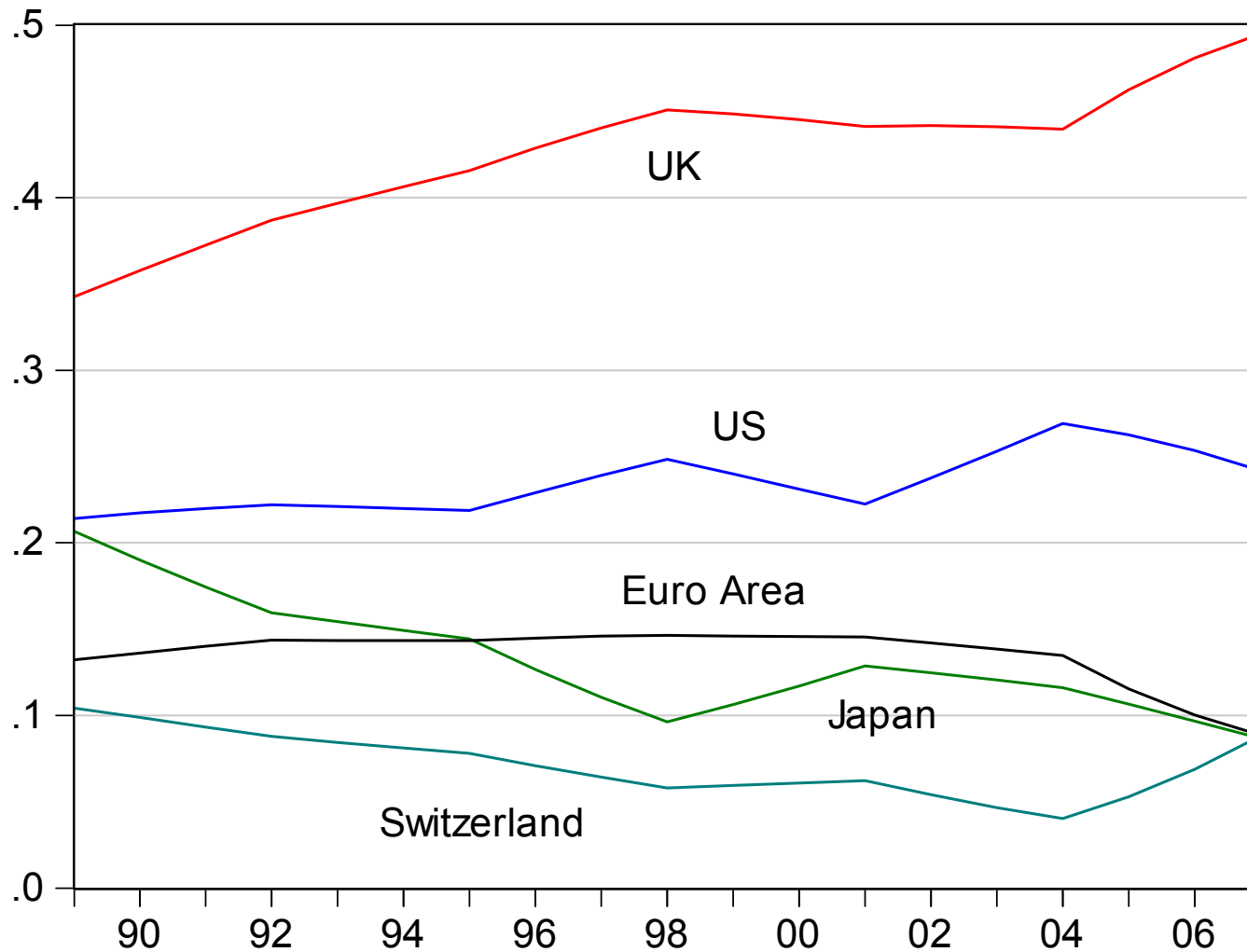
Daily averages in April, in billions of US dollars and per cent

	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.

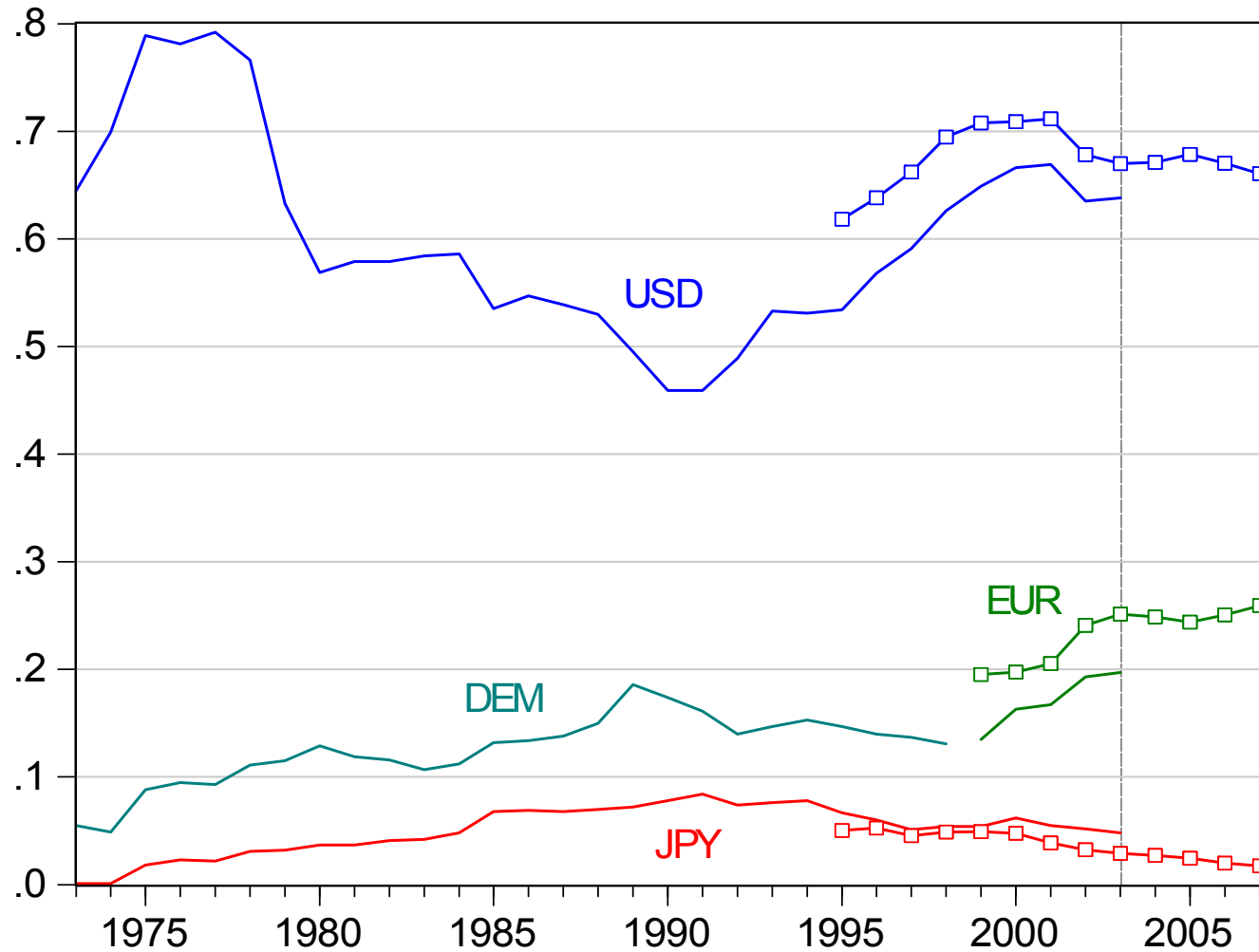
Table B.2

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*