

Foreign Exchange (FX)

M+B 32.33

UK Pound Sterling
(Librum)

£

Japan Yen

¥

Switzerland Franc

SF

Mexico Peso

\$ (= ₱)

Argentina Peso

\$

Brazil Real

R

Euroland Euro

€ "Euroglyph"

Germany ~~Deutsche~~ Mark

~~DM~~

France ~~Franc~~

~~FF~~

Belgium, ~~Franc~~

~~BF~~

Luxembourg

Netherlands ~~Guilder~~

~~G~~

Italy ~~Lira~~

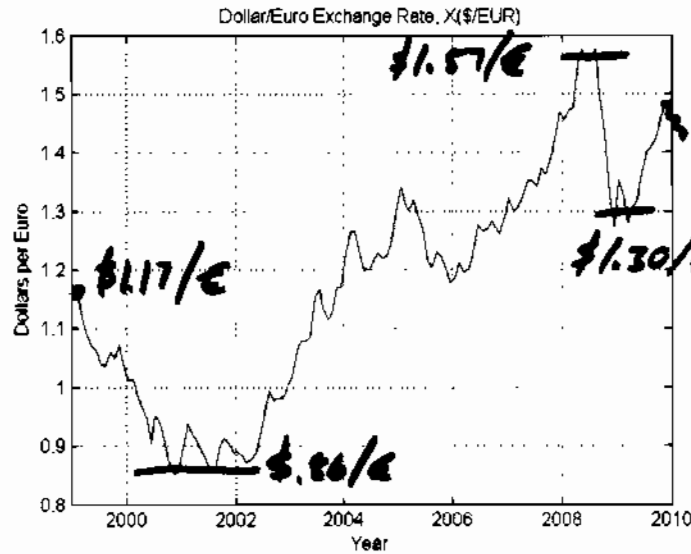
~~L~~

2002

\$-Euro Exchange Rate

Euro started at \$1.17/€ in 1999, fell to \$.86/€ in 2001, then rose to \$1.57/€ in 2008, fell back to \$1.30/€ in 2009, but has rebounded since. Was \$1.41/€ on 5/24/11.

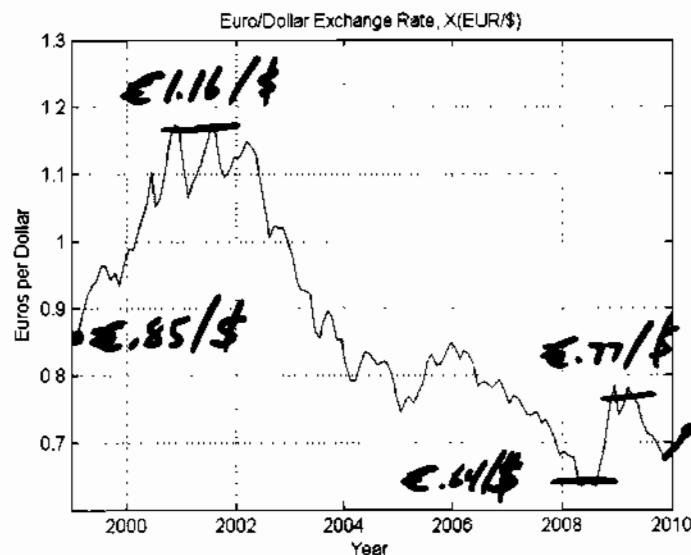
$X(\$/\text{€})$



Equivalently, Dollar was €0.85/\$ in 1999, rose to €1.16/\$ in 2001, fell to €0.64 in 2009, rose back to €0.77/\$ in 2009, but has fallen since. Was €0.71/\$ on 5/24/11. €0.01 = 1 "cent" or "euro cent".

$X(\text{€}/\$)$

$= \frac{1}{X(\$/\text{€})}$



Generally,

$$\underline{X(\text{Cur 1}/\text{Cur 2}) = \frac{1}{X(\text{Cur 2}/\text{Cur 1})}}$$

Spot FX Rate

immediate delivery, payment

- $X(\text{Cur 2} / \text{Cur 1}) \uparrow$
Cur 1 "appreciates"
- $X(\text{Cur 2} / \text{Cur 1}) \downarrow$
Cur 1 "depreciates"
(i.t.o. Cur 2)

€ vs \$:

11/30/2007

• \$ 1.4812 / €

• \$ 0.6751 / €

11/30/2008

• \$ 1.2474 / €

• € 0.8017 / \$

$\Rightarrow$ € depreciated (rel to \$),

\$ appreciated (rel to €).

$$X(\text{Cur 1} / \text{Cur 2})$$

$$= \frac{1}{X(\text{Cur 2} / \text{Cur 1})}$$

Forward FX Rates

future delivery, payment.

11/20/08

\$/¥

¥/\$

Spot	\$.010622 / ¥	¥ 94.14 / \$
30 day Fwd	.010631	94.06
60 day Fwd	.010666	93.76
90 day Fwd	.010705	93.41

⇒ ¥ at Fwd Premium
(rel. to \$)

\$ at Fwd Discount
(rel. to ¥)

I.e. market is betting that ¥ will appreciate in near future.

Hedging vs Speculation in Forward Exchange Market

Hedging

Reduces risk that otherwise exists

Eg US Exporter to Europe sells Euros forward to eliminate FX risk on future Euro payments

Speculation

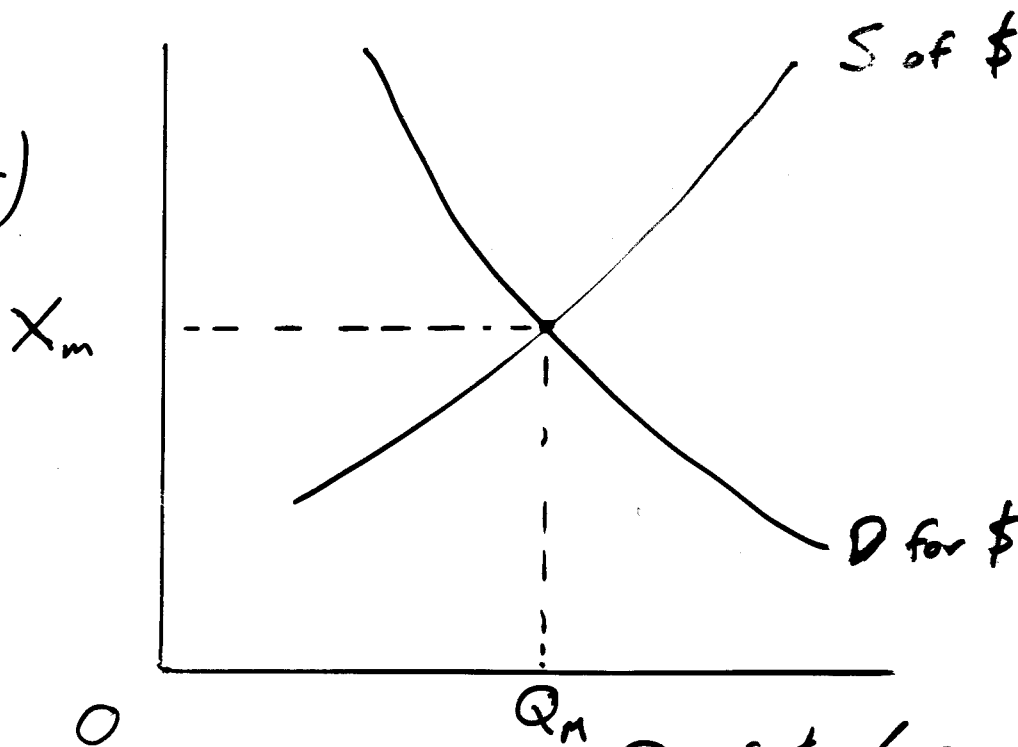
Takes on risk in hope of profit

Eg Speculator might buy Euros forward if he/she believes future spot price will exceed current forward price.

FX Markets

Value of \$
(in £)

$$X\left(\frac{£}{\$}\right)$$



FX market for \$ (vs £)

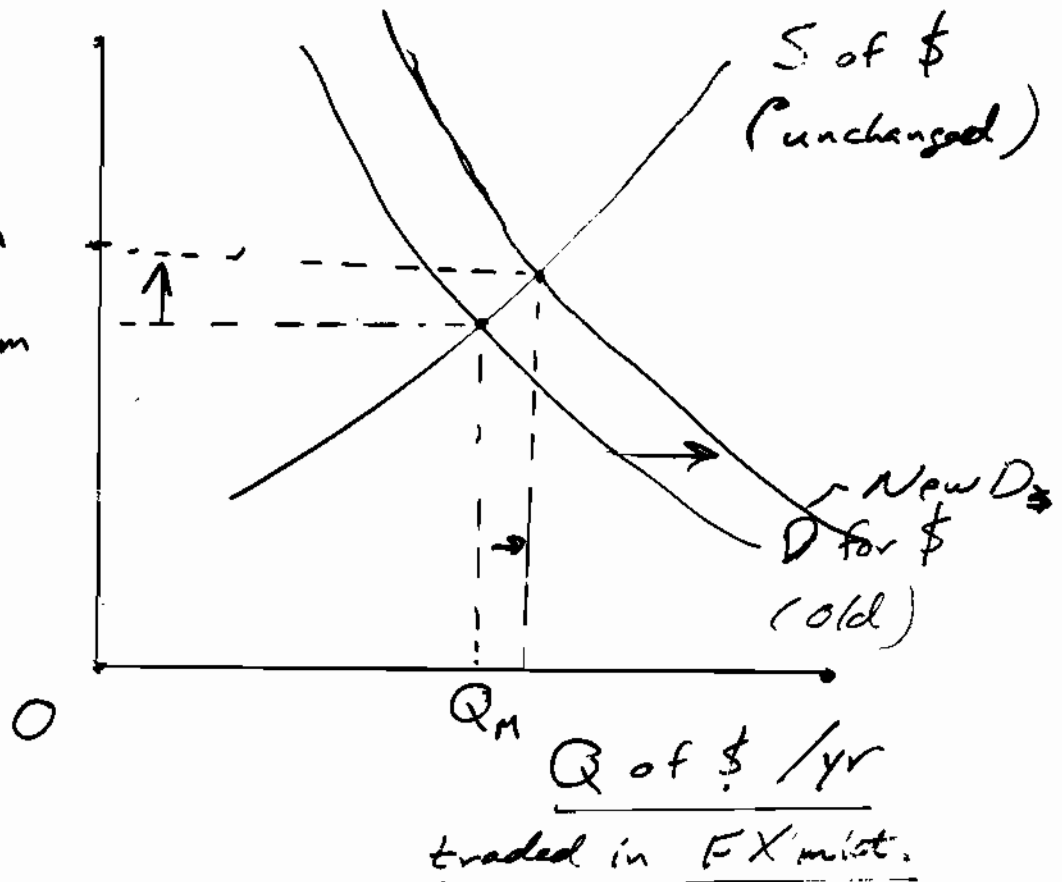
Increase in Market D for \$ (Rightward shift)

$$\Rightarrow \underline{X_m \left(\frac{\text{€}}{\text{\$}} \right)} \uparrow \quad (\text{\$ App.})$$

FX Markets

Value of \$
(to €)

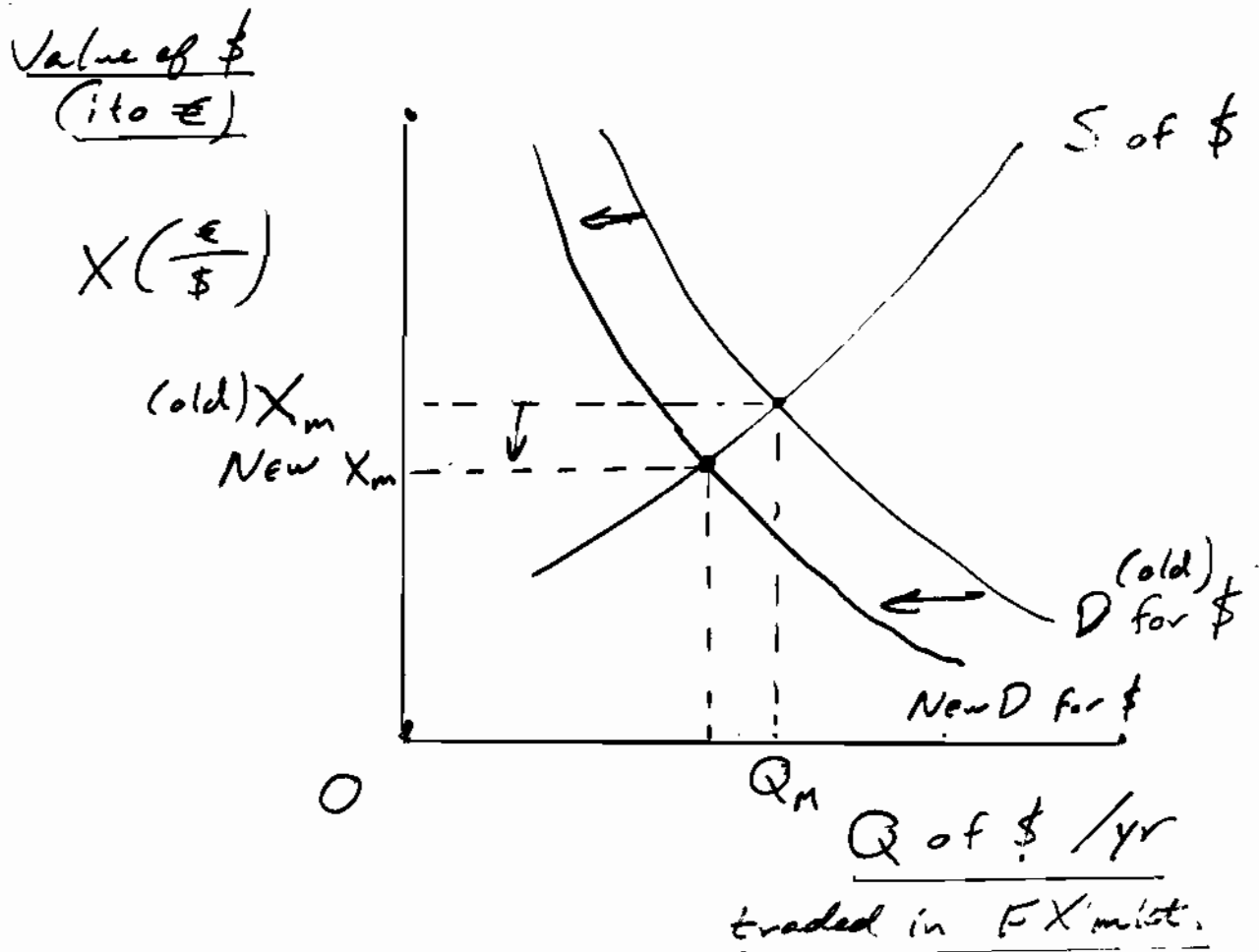
$X \left(\frac{\text{€}}{\text{\$}} \right)$
New X_m
Old X_m



FX market for \$ (vs €)

Decrease in Market D for \$ (leftward shift)
 $\Rightarrow X_m \left(\frac{\pounds}{\$} \right) \downarrow$ (\$ Depreciates)

FX Markets



FX market for \$ (vs ~~£~~)

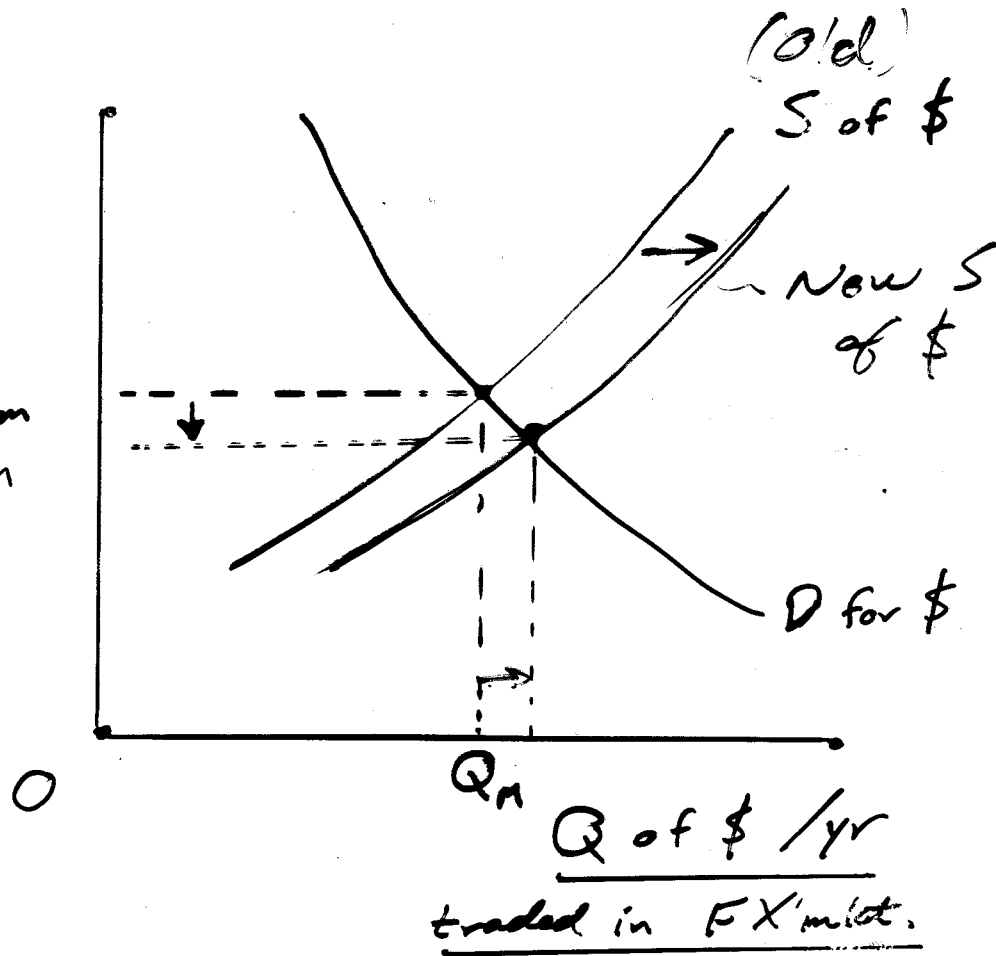
Increase in Market S of \$ (Right)
 $\Rightarrow X_m \left(\frac{\text{€}}{\text{\$}} \right) \downarrow$ (\$ Dep.)

FX Markets

Value of \$
 (in €)

$X \left(\frac{\text{€}}{\text{\$}} \right)$

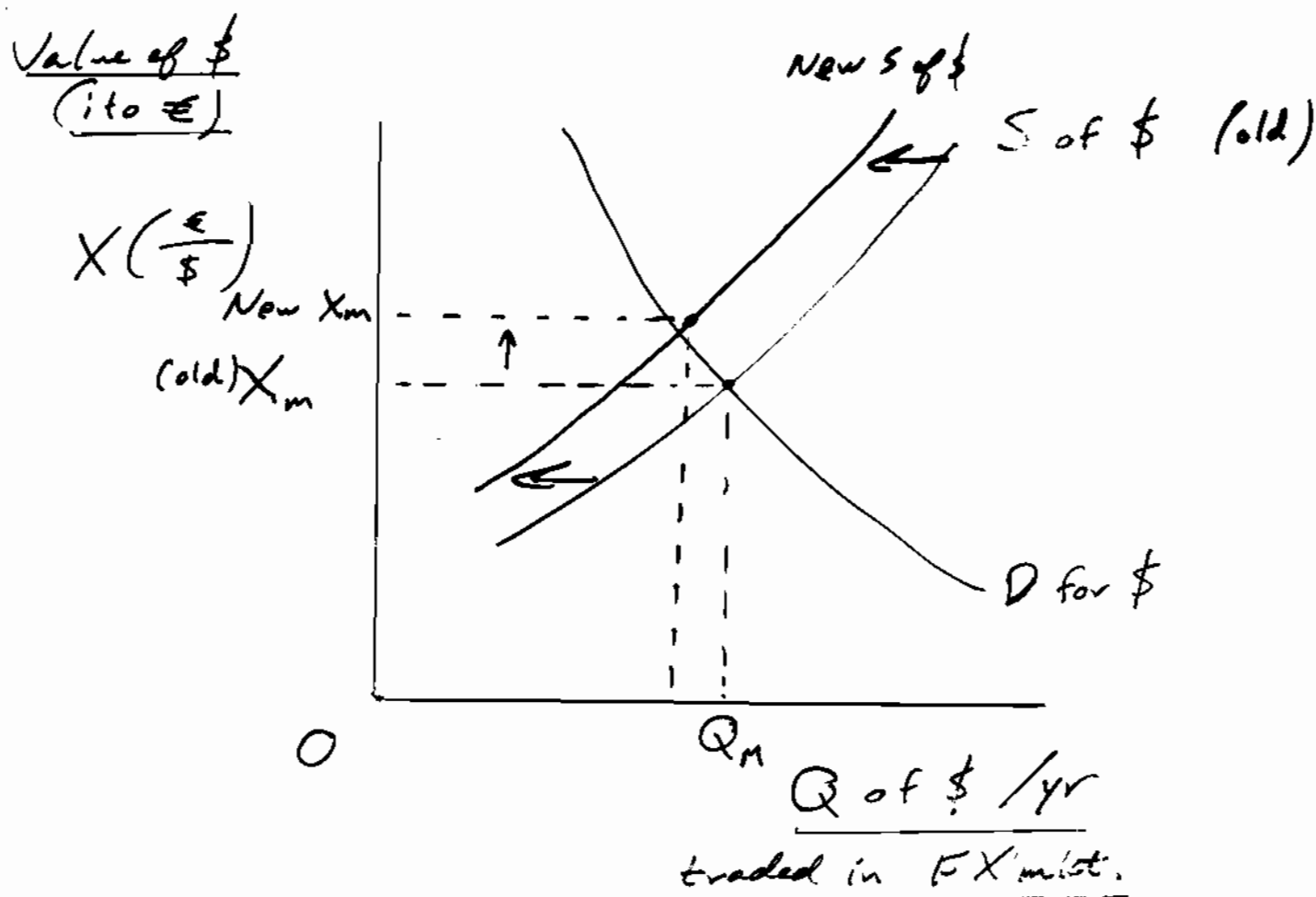
Old X_m
 New X_m



FX market for \$ (vs €)

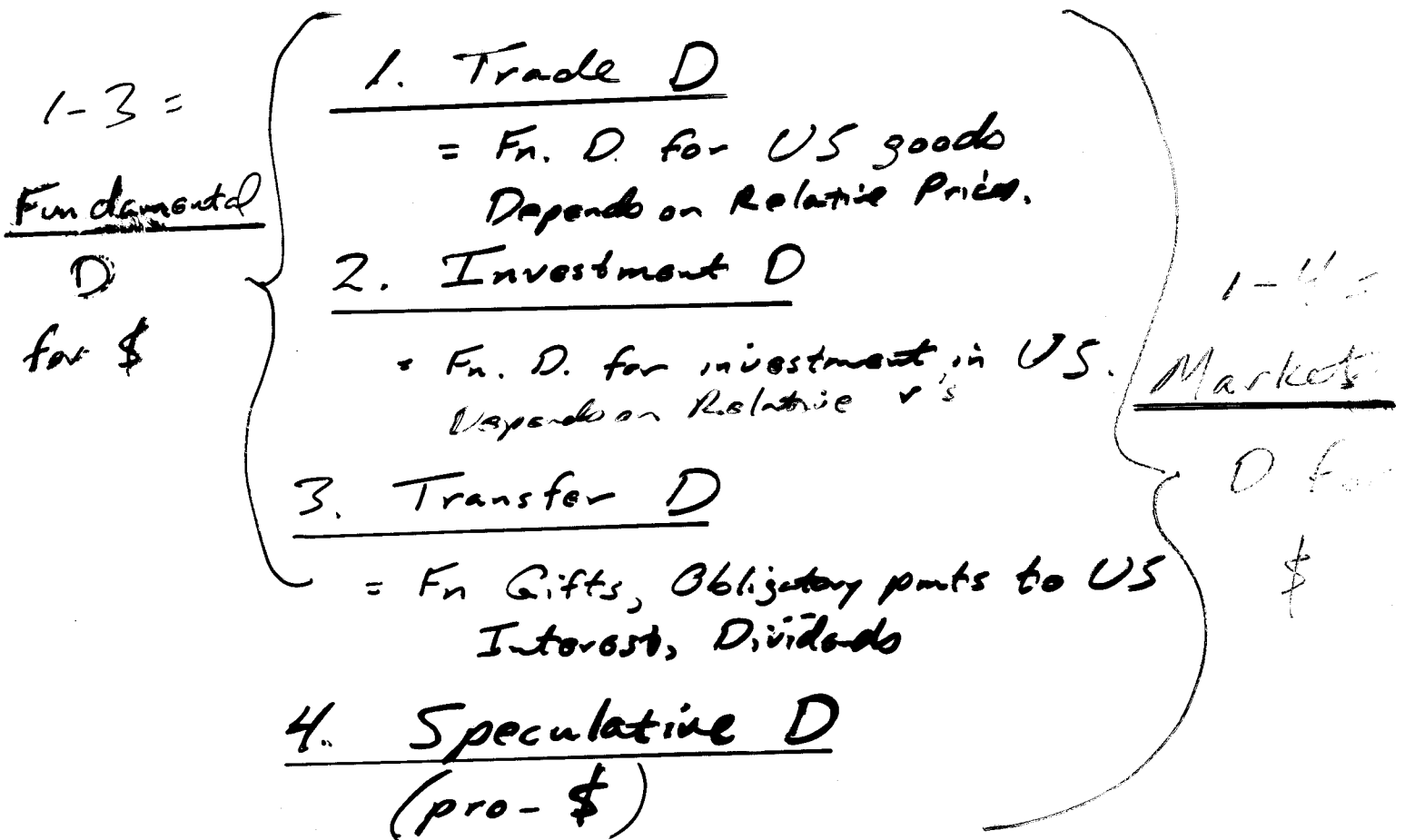
Decrease in Market S of \$ (leftward shift)
 $\Rightarrow X_m(\frac{\pounds}{\$}) \uparrow$ (\$ appreciates)

FX Markets



FX market for \$ (vs £)

FX D for \$



5. Official Intervention

Fed buys \$ with "I" → "I_{US}" ↓

ECB^{or} buys \$ with new Euros → "I_{ECB}" ↑

(European Central Bank)

FX S of \$

FX S of \$ $\equiv$ FX D for Fn. Curr. (us\$)

$\Rightarrow$ Determinants of FX S of \$
 $\equiv$ Determinants of FX D for Fn. Curr.

- Fundamental S
1. Trade S of \$
 $=$ US D for Fn goods.
 2. Investment S of \$
 $=$ US D for Inv. abroad
 3. Transfer S of \$
 $=$ US Gifts, Obligatory pmts abroad.
 4. Speculative S of \$
(anti-\$)
 5. Official S of \$
- Market S

Fed trades new \$ for Ius $\rightarrow$ Ius $\uparrow$
or ECB uses \$ (I_{ECB}) to buy € $\rightarrow$ I_{ECB} $\downarrow$

Purchasing Power Parity (PPP)

Strong Assumptions:

- All goods traded
- No trade barriers
 - No tariffs
 - No quotas
 - No exchange controls
- No transportation costs
 - or delays

$$\Rightarrow \boxed{X \left(\frac{\text{Cur 1}}{\text{Cur 2}} \right) \propto \frac{P_1}{P_2}} \quad \underline{\text{PPP}}$$

($\propto$ ~ "Proportional to", P_i = CPI in country i)

Dynamic Form of PPP

$$\pi_1 = \frac{\Delta P_1}{P_1}$$

$$\pi_2 = \frac{\Delta P_2}{P_2}$$

$$PPP \Rightarrow \boxed{\frac{\Delta X}{X} \left(\frac{C_{ur1}}{C_{ur2}} \right) \approx \pi_1 - \pi_2} \quad \frac{\text{Dynamic}}{\text{PPP}}$$

Eg

$$\pi_{US} = 7.0\% / \text{yr}$$

$$\pi_{Euro} = 2.0\% / \text{yr}$$

$$PPP \Rightarrow \frac{\Delta X}{X} \left(\frac{\$}{\pounds} \right) = (7) - (2) = 5\% / \text{yr}$$

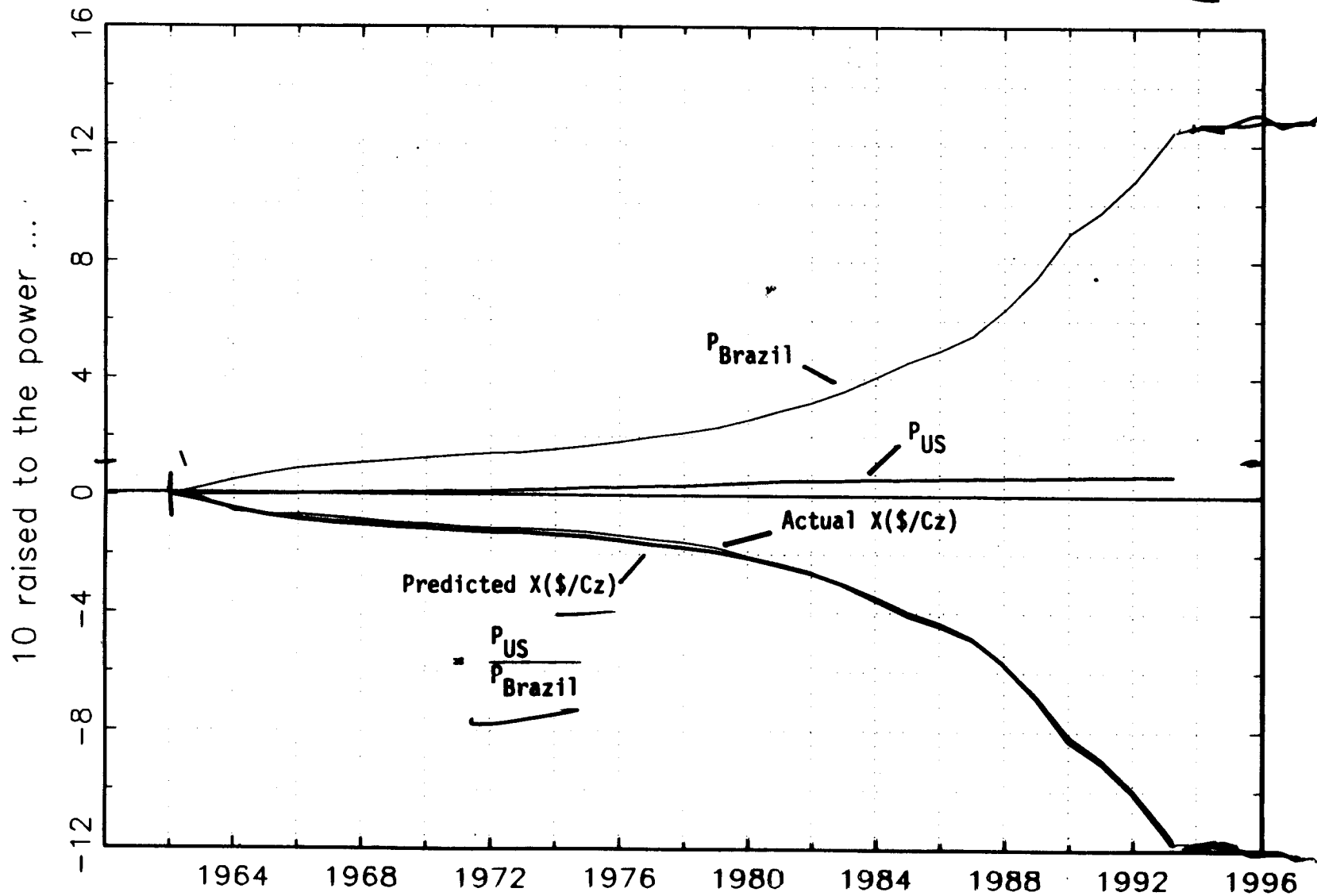
$\pounds$ Appreciates

$$\text{or } \frac{\Delta X}{X} \left(\frac{\pounds}{\$} \right) = (2) - (7) = -5\% / \text{yr}$$

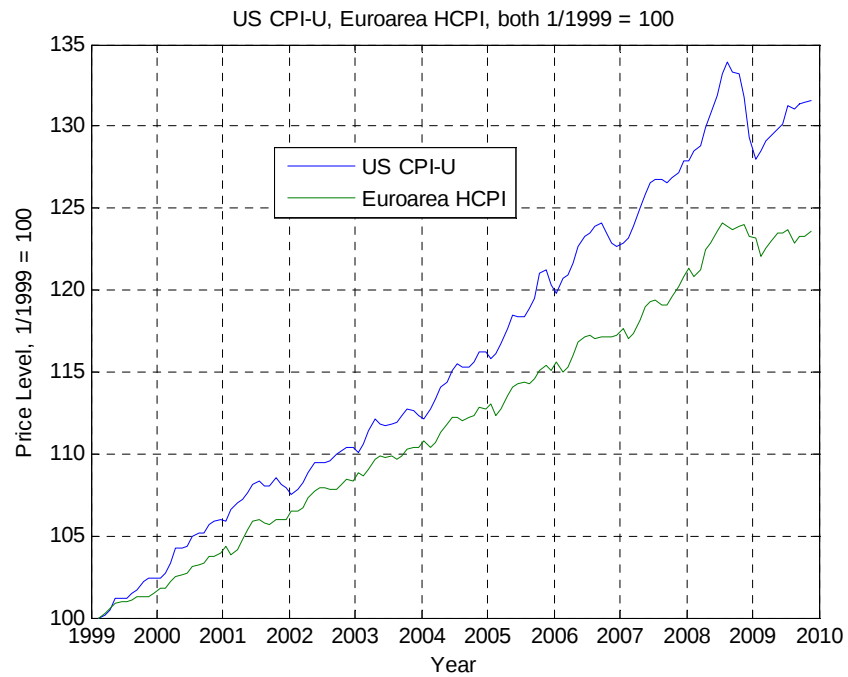
$\$$ Depreciates

- PPP explains most of change in Exchange Rate
for countries with very different π
eg US / Brazil
- But deviations from PPP are very apparent
for countries with similar π
eg US / Euro area

Brazilian & US CPI, Predicted & Actual FX Rate (1962 = 1)

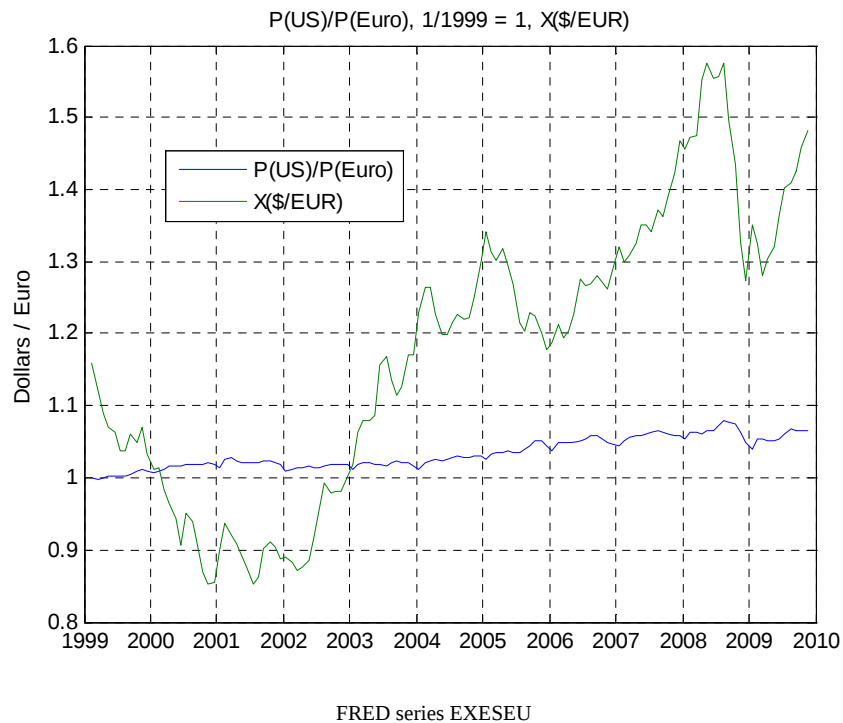


Can Purchasing Power Parity explain X(\$/EUR)?



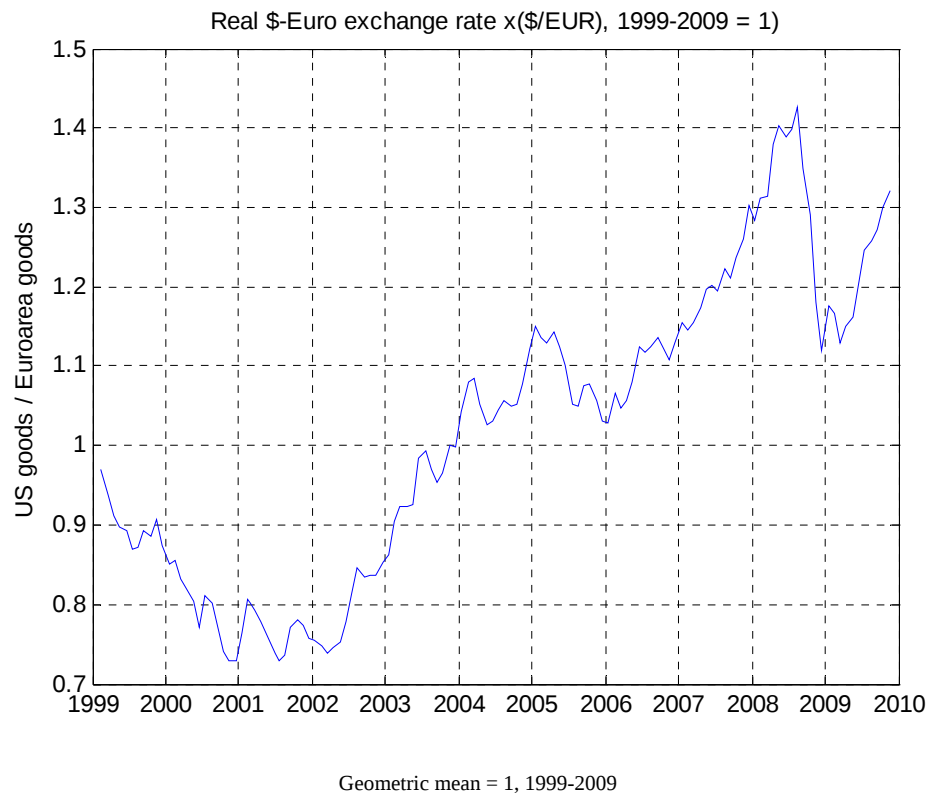
US CPI-U, All items, FRED series CPIAUCNS, rescaled to 1/1999 = 100
Euroarea Harmonized CPI, all items excluding alcohol & tobacco, from www.ecb.europa.eu

-- Only a little!



Real Exchange Rate:

$$x(\$/\text{EUR}) = X(\$/\text{EUR}) \cdot P(\text{Europe}) / P(\text{US})$$

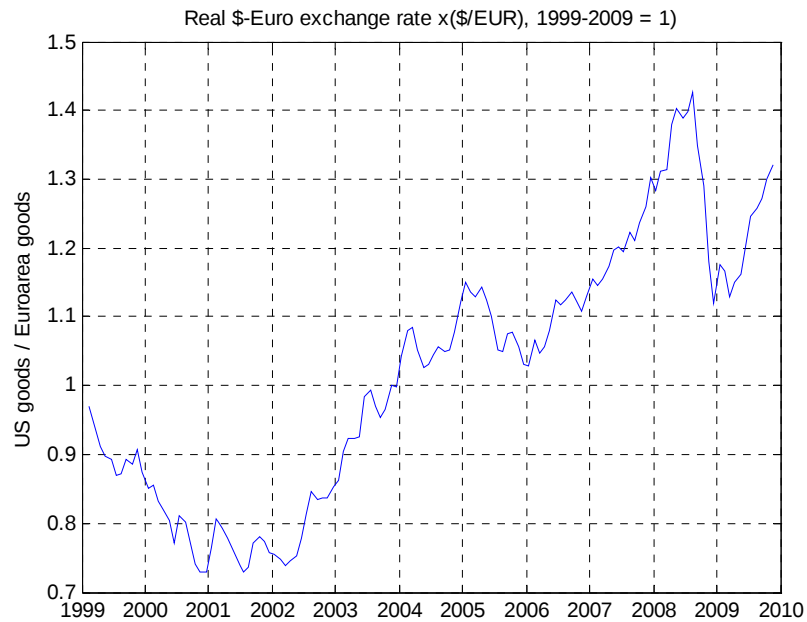


Real Exchange Rate should be nearly constant under PPP.

Instead, \$ strong relative to PPP before 2004,

Euro strong relative to PPP since 2004.

Deviations from PPP:



Interest rate differentials explain a little,
but why was \$ so weak in 2005-2007?

