The US Current account and the Dollar

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Introduction

- Two channels behind the large current account deficit:
  - An increase in the US demand for foreign goods
  - An increase in the foreign demand for US assets
    - High foreign private demand for US equities (mid-1990s)
    - Higher demand for US bonds in the 2000s by private actors and foreign central banks
- Meanwhile, a real dollar appreciation until 2001, then a depreciation

What is the link between these two phenomena ?

- This paper develops a portfolio model of exchange rate and current account determination

  - The introduction of valuation effects constitutes a novelty : a dollar depreciation increases the dollar value of US holdings of foreign assets and thus leads to the amelioration of US net debt position.

Model implications

- More dollar depreciation is to come
  - A « classical » result : trade deficit leads to depreciation
  - More demand for US assets in the short run will lead to a temporary appreciation and then to an even more important depreciation .

The Progression of the Presentation

- We will present the model's main assumptions
- We will present the dynamics of the model
- We will explore some scenarios that are often thought of as a way to stop the dollar depreciation

I. A Portoflio Balance Model of Current Account

- Main assumtions:
  - Two « countries »: the USA and the rest of the world
  - Imperfect substitution between US and Foreign goods and assets

$$F = X - W$$

F, US net debt position

X, the value of US assets

W, US wealth

- US net debt position can also be expressed from the foreigners' viewpoint:

$$F = X - W$$

$$F = W^*/E - X^*/E$$

E is the exchange rate defined as the price of US goods in terms of foreign goods:

If E rises, there is an appreciation of the dollar

If E goes down, there is a depreciation of the dollar

Gross rate of return on assets

- US assets: (1+r) in terrms of US goods
- Foreign assets: (1+r*) in terms of foreign goods
- Expected gross rate of retrun in terms of US goods:

$$(1+r^*) / (E'^e/E)$$

$$= (1+r^*).E/E'^e$$

- Relative expected gross rate on return of holding US assets versus foreign assets:

$$R \equiv (1+r)/(1+r^*) \; . \; E'^{e}/E$$

- However, there is imperfect substituability: a home bias affects arbitrage decisions

Shares in assets and imperfect substituability

- A share α of US wealth is invested in US assets and a share α* of foreign wealth is invested in foreign assets:

$$\alpha = \alpha(R) \text{ with } \alpha_R > 0 \text{ and } \alpha^* = \alpha^*(R) \text{ with } \alpha^*_R < 0$$

- A home bias affects shares so that:

$$\alpha(1) > X / (X + X^*/E) \text{ and } \alpha^*(1) > (X^*/E) / (X + X^*/E)$$

Goods and imperfect substituability

- US and foreign goods are imperfect substitutes. The US trade deficit in terms of US goods is a function of E and z, with z being the sum of all the factors influencing positively z.

$$D = D(E,z) \text{ with } D_E > 0 \text{ and } D_z > 0$$

$D_E > 0$ is the Marshall-Lerner condition: an increase in E, i.e an appreciation of the dollar, provokes a decrease in exports and an increase in imports.

The Portfolio Balance relation

$$X = \alpha(R)(X - F) + \left(1 - \alpha^*(R)\right)\left(\frac{X^*}{E} + F\right)$$

Equilibrium in the US asset market

- Diferentiation leads to (assuming R=1)

$$\frac{dX}{dF} = -\alpha(1) + \alpha^*(1) - 1 - (1 - \alpha^*(1))\frac{X^*}{E^2}\frac{dE}{dF}$$

Effect of a depreciation

$$\frac{dE}{dF} = -\frac{\alpha(1) + \alpha^*(1) - 1}{\big(1 - \alpha^*(1)\big)X^*/E^2} < 0$$

In the presence of home bias, higher net debt must be associated with a lower exchange rate.

US net debt ↑ = the US transfer wealth to the rest of the world. Home bias → the rest of the world owns more asset from the RoW than US assets → the demand for US asset ↓. Equilibrium on asset market → US return on asset must increase → E must ↓. (Remenber the PTINC :$(1 + r) = (1 + r^*)\frac{E}{E'^e}$)

The current account relation

$$F' = (1+r)F + \underbrace{\big(1-\alpha(R)\big)(1+r)\left(1-\frac{1+r^*}{1+r}\frac{E}{E'}\right)(X-F)}_{valuation\ \ effect} + D(E')$$

- Net debt next period is equal to

_ this period net debt time the gross rate of return : payment of interest (first term)

_ trade deficit next time (last term)

_valuation effect

Valuation effect

$$\big(1-\alpha(R)\big)(1+r)(1-\frac{1+r^*}{1+r}\underbrace{\frac{E}{E'}}_{<1})(X-F)$$

- An **unexpected** dollar depreciation (E<E') increases the dollar value of US holdings of foreign assets.
- Strengh of the valuation effect depends on :

_ the share of foreign asset in the US portfolio : (1-α(R))

_ the size of US wealth ((X-F))

_ the assumption that US gross liabilities are denoted in dollars, their value is not affected by a dollar depreciation (no original sin)

Effect of a depreciation

- A depreciation improves the US net debt position through two mechanisms :
  - Conventional effect: a depreciation improves the trade balance
  - Valuation effect : a depreciation increases the dollar value of US holdings of foreign asset

External and Internal Balance

- Additional condition :

D(E,z)=-S(r,.)

US trade deficit equal minus US saving

Short cut : interest rate is fixed.

US situation and the impact of E on D :Calibration

- Overview of current US and foreign wealths

W	W^*/E	X	X^*/E	F	α	α^*
\$35	\$36	\$37,7	\$33,3	\$2.7	0.77	0.70

- We are interested in the needed depreciation of the dollar in order to rebalance the current account deficit.

- The derivative of the ratio of the trade balance to GDP with respect to a proportional change in real exchange rate:

$$\Theta \equiv (\delta D/\text{exports}) / (\delta E/E)$$

Estimates of Θ in other studies: between 0,5 and 0,9

In order to have $(\delta D/GDP) = (-1\%)$, when Exports/GDP ≈ 10%.

$$0.5 < 10.(\delta D/GDP) / (\delta E/E) < 0{,}9$$

$$0.5 < -0{,}1 / (\delta E/E) < 0{,}9$$

$$-5 > 1 / (\delta E/E) > -9$$

$$-20\% < (\delta E/E) < -11\%$$

Achieving current account balance

- Current account deficit in the US, roughly 6%
- Current trade deficit in the US, roughly 5%
  - 1% surplus needed
- $-20\% < (\delta E/E) < -11\%$ for $(\delta D/GDP) = (-1\%)$ so that $(\delta E/E) \approx 15\%$ for each 1%-decrease of D/GDP.

  Required depreciation to achieve current account balande : 90% !
- However, valuation effects have been omitted: if depreciation is unexpected, the value of US holdings of foreign assets increases.

The required depreciation with valuation effects

- Consider a 15% depreciation of the dollar so that $(\delta D/GDP) = (-1\%)$ without valuation effects
- The value of US holdings in foreign assets increases by 15%
- Net debt to GDP evolves if US holdings of foreign assets are more valuable.
  - $F = X - W$ and $(1 - \alpha).W$ is 15% more valuable in US dollars. F/GDP evolves 15% times $(1 - \alpha).(X - F)/GDP$
  - $-15\% \times (1- 0{,}77) \times 35/11 = \delta F/GDP = -10\%$

- If $\delta F/GDP = -10\%$ and $r = 4\%$
  - There is a reduction in interests payments of 0,4%
- Thus, the valuation effect implies that a 15% unexpected depreciation products two changes in D/GDP:
  - Minus 1% because of trade elasticities
  - Minus 0,4% because of valuation effects

$\Rightarrow$ 6/1.4 = 4.29. 15% times 4.29 = 65%

Taking valuation effects into account reduces the needed depreciation from 90% to 65%.

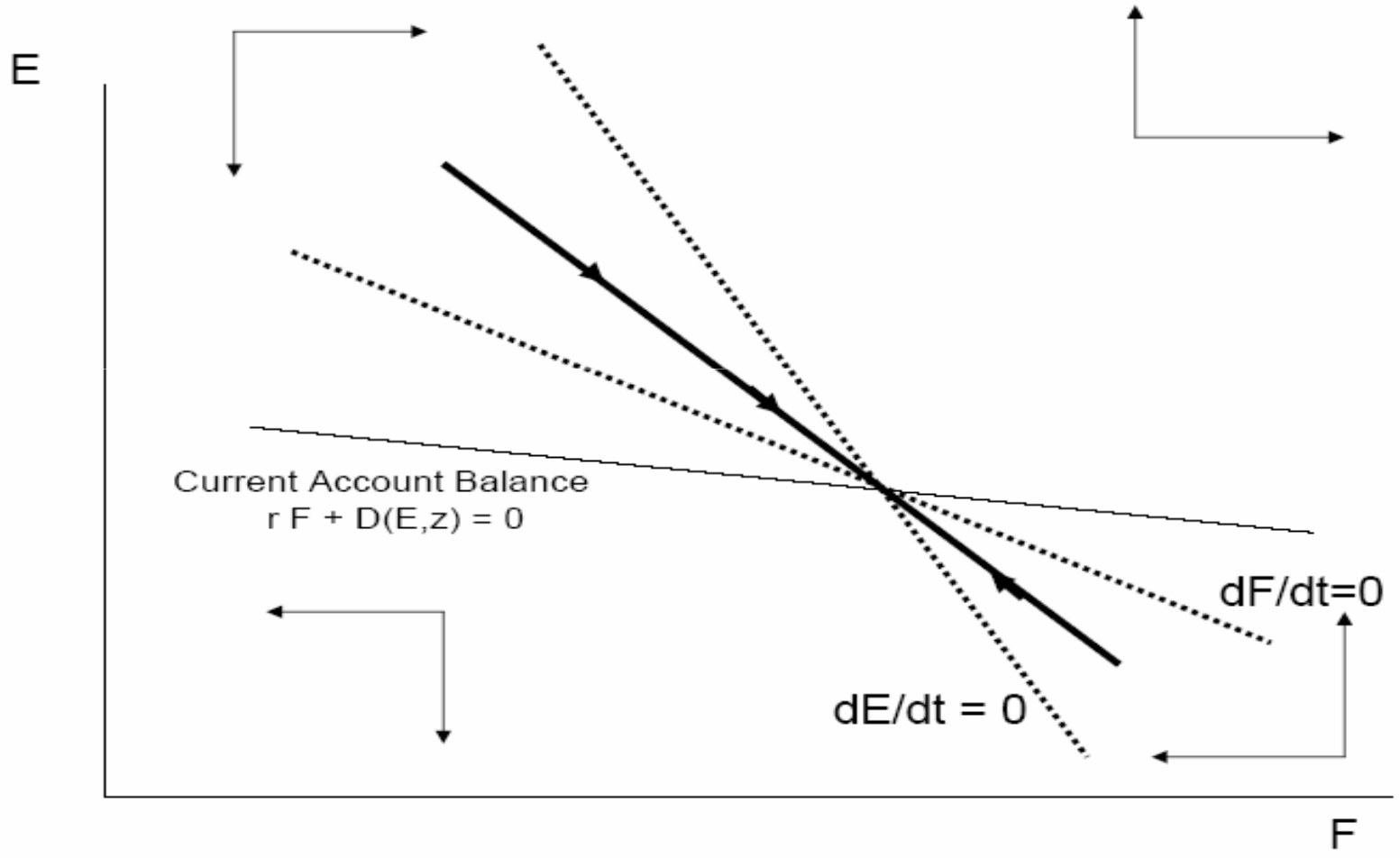
Equilibrium and dynamics

- In this section r=r*, so $R = 1 + \frac{\dot{E}^e}{E}$
  - Portfolio balance :

$$X = \alpha\left(1 + \frac{\dot{E}^e}{E}R\right)(X - F) + \left(1 - \alpha^*\left(1 + \frac{\dot{E}^e}{E}\right)\right)\left(\frac{X^*}{E} + F\right)$$

  - CA balance : $\dot{F} = rF + \left(1 - \alpha\left(1 + \frac{\dot{E}^e}{E}\right)\right)\frac{\dot{E}}{E}(X - F) + D(E)$
    - Expected depreciation determines the share of US portfolio put in foreign asset.
    - Actual depreciation determines the change in the value of that porfolio, and in turn the change in the US net debt position.

Figure A1. Adjustment of the exchange rate and the net debt position.



- The locus ($\dot{E}$=0) (porfolio equation) is downward sloping. As we have seen, in presence of home bias, an ↑ in net debt shifts wealth abroad → ↓ demand of US asset → E↓ .
- The locus ($\dot{F}$ =0) is also downward sloping. A depreciation leads to a smaller trade deficit and thus allow for a larger net debt position consistent with CA balance.

Condition for the equilibrium to be a saddle path

- the locus (F’ =0) must be flatter than the (Ė=0) locus. $\frac{r}{D_e} < \frac{\alpha + \alpha^* - 1}{(1-\alpha^*)X^*/E^2}$
- An ↑ in F has 2 effects:
  - ↑ the interest payments on the debt →deterioration of the CA
  - ↓the demand for US assets → E↓ →D ↓ →improvement of the CA
- The confition above implies that an increase in F reduces the current account deficit. It is more likely to be satisfied the smaller r the larger the response of the Trade balance to ER.

Steady state values of F and E

$$X = \alpha(1)(X - F) + \left(1 - \alpha^*(1)\right)\left(\frac{X^*}{E} + F\right)$$ US asset market clear

0=rF+ D(E) CA deficit=0

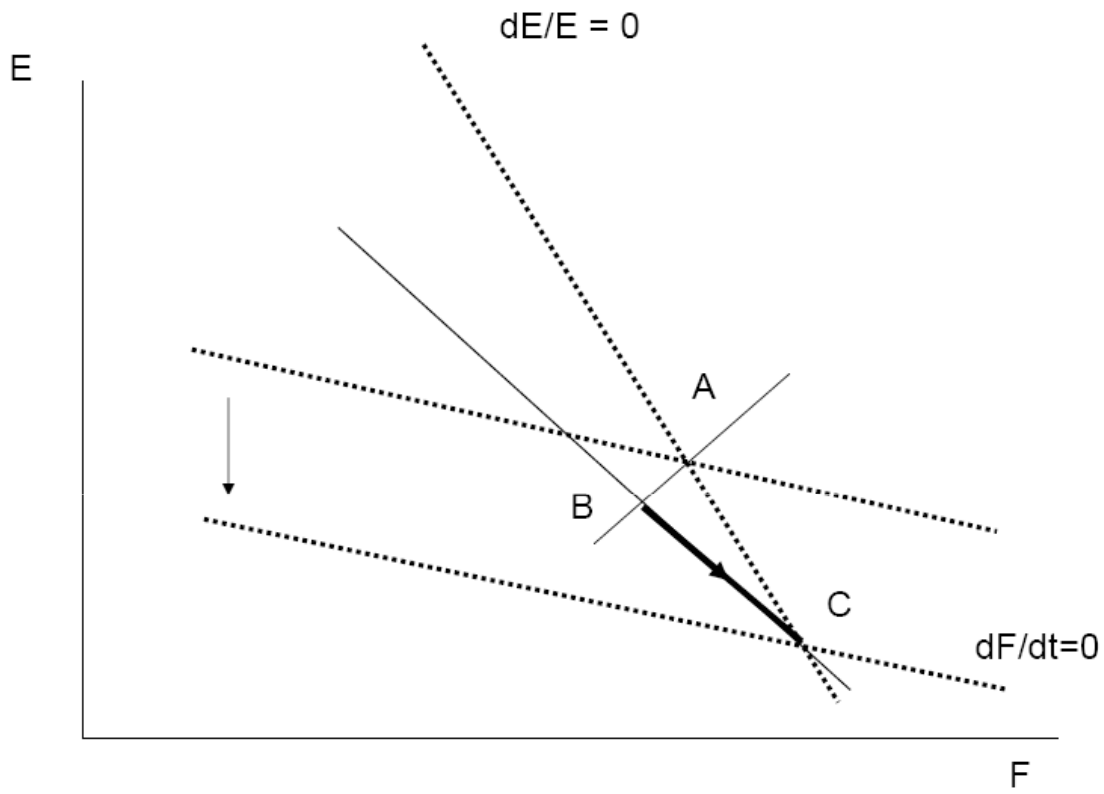
Implies a negative relation between net debt and the exchange rate .

Higher net debt implies larger interest payments and therefore a larger trade surplus to achieve CA balance. This larger trade surplus must be achieved through a lower exchange rate.($D_E>0$)

Goods and Assets preference shifts

- Two shifts may have dominated the dollar fluctuations of the past ten years
  - An (unexpected) increase in z. D(E,z) and $D_z > 0$
    - E decreases and F increases
  - An (unexpected) increase in the demand for US assets coming from an increase in α(1) or a decrease in α*(1)
    - The dollar first appreciates and then depreciates whereas F increases

An (unexpected) increase in z



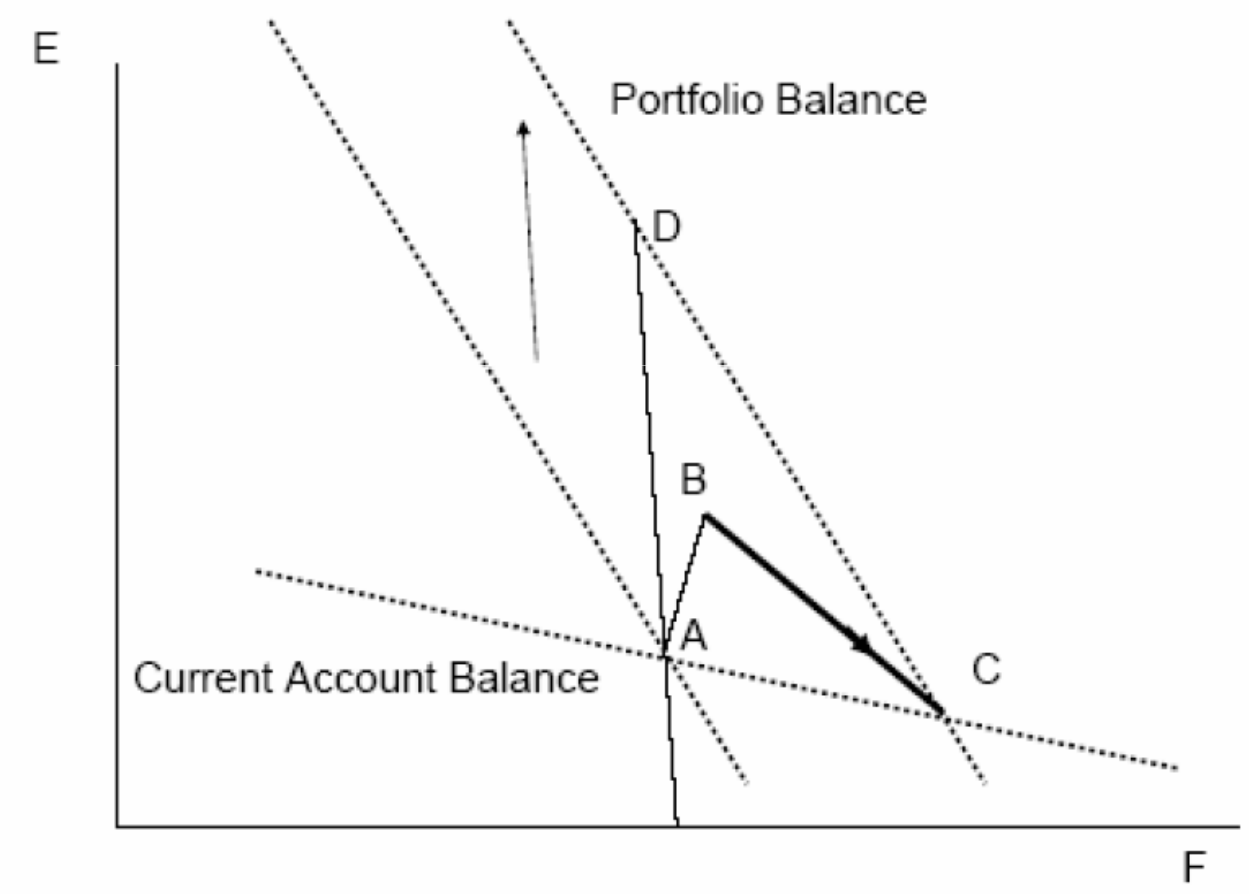
- The $\delta F = 0$ locus is such that: $0 = r.F + D(E, z)$ or $F = -D(E, z)/r$
  - The value of D increases with an increase of z. For any F given, E must be lower in order to compensate the increase in z: the locus goes downward
  - The depreciation is given by $\Delta F = (1-\alpha)(X-F).\Delta E/E$
  - The saddle point path location depends on the substituability of US and foreign assets : **$\delta F = r.F + (1-\alpha(R)).(r - r^* - \delta E/E).(X - F) + D(E, z)$ ➔ $\delta\alpha(R)/\delta R$**

An (unexpected) increase in the demand for US assets

- The $\delta E = 0$ locus is such that $X = \alpha.(X-F) + (1-\alpha^*).(X^*/E + F)$
  - If everything constant except E and α, changes in E and α must go in the same direction to maintain X constant.
  - If everything constant except F and α, the change in α must be compensated by a change in F going in the same way
  - If everything constant except E and α*, any increase of (1-α*) caused by a decrease of α* must be compensated by a decrease of X*/E, i.e an increase of E.
  - If everything constant except F and α*, any decrease of α* causes an increase of (1-α*). This increase is compensated by an increase of F as $\alpha > (1 - \alpha^*)$

Thus, any change such that α increases or α* decreases provokes a rise in E if F constant or a rise in F if E constant. The $\delta E = 0$ locus goes upward.

An (unexpected) increase in the demand for US assets



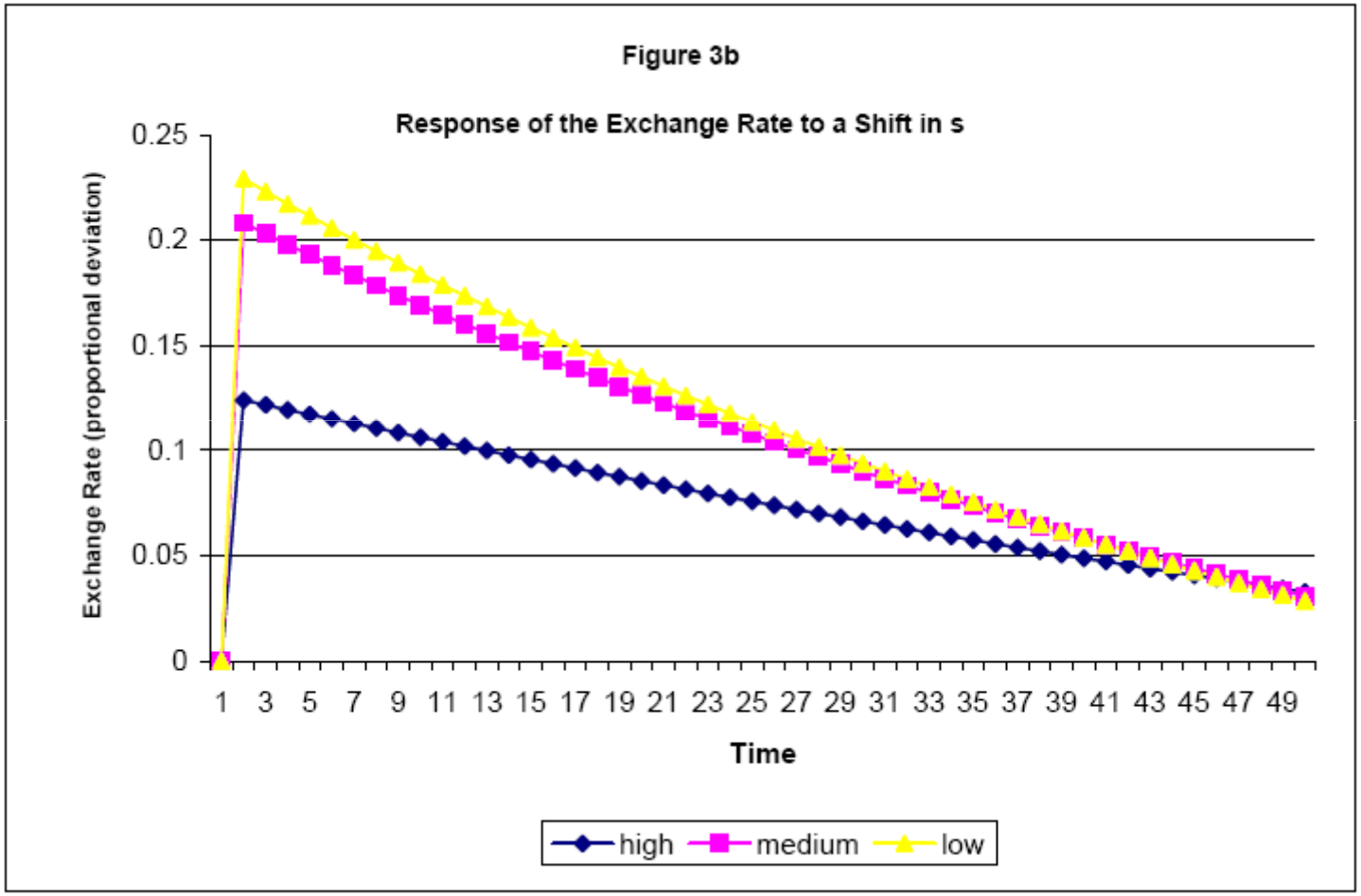


Figure 3b
Response of the Exchange Rate to a Shift in s
Exchange Rate (proportional deviation)
0.25
0.2
0.15
0.1
0.05
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49
Time
high
medium
low

Good news for the dollar. Higher US Interest rate.

- Assumption : If the increase of the US interest rate is stronger than expected by the market, it may stop or reverse the depreciation of the dollar.

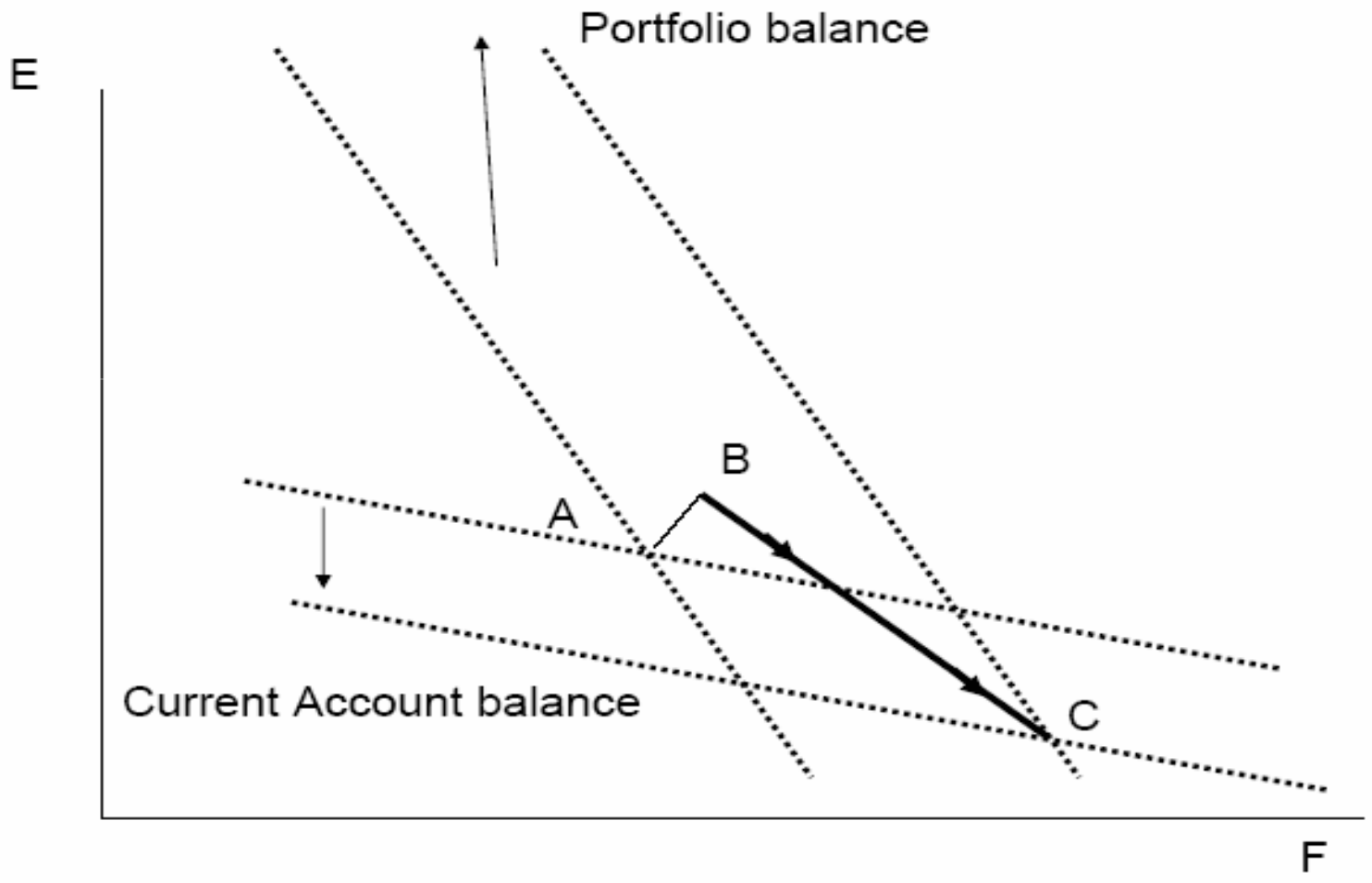
- We now allow for r to be different from r*

$$X = \alpha(R)(X - F) + \left(1 - \alpha^*(R)\right)\left(\frac{X^*}{E} + F\right)$$

$$\dot{F} = rF + \left(1 - \alpha(R)\right)(r - r^* - \frac{\dot{E}}{E})(X - F) + D(E)$$

with $R - 1 \equiv r - r^* + \frac{\dot{E}^e}{E}$

Figure 6. Adjustment of the exchange rate and the net debt position to an increase in the U.S. interest rate



- An increase in r, holding r* constant has 2 effects (starting from steady state and F>0):
- It shifts the locus $\dot{E}=0$ up

The increased return on US assets increase the demand for us asset and leads to an appreciation.

- It shifts the locus down $\dot{F} = 0$

  The US has now to pay a higher interest payment on its net debt position. The effect is equal to zero if net debt is equal to zero.

  The US has to pay higher interest payments on its gross liabilities. $(1 - \alpha)(X - F)$ The effect is present even if net debt is equal to zero.

Effect on exchange rate is ambiguous

- If gross liabilties are large, the effect of higher interest payments on the current account balance may well dominate the more conventionnal effects of increased attractiveness and thus lead to a depreciation rather than an appreciation.
- In any case, the steady state effect is higher net debt accumulations and thus a larger depreciation than if r has not increased.

- If the purpose is to limit the eventual dollar depreciation, the right monetary policy is actually to decrease interest rates, so as to have a larger depreciation in the short run, and a smaller depreciation in the long run.
- In order to achieve the corresponding increase in saving such a policy must be accompanied by a reduction of the budget deficit, so as to maintain output at its natural level.

Bad news for the dollar? Asian Central Bank

- Accumulation of US assets by the Japanese and the Chinese central Bank recently.

- What if the pegging of the renminbi stops or if Asian central banks change the composition of their portfolio?

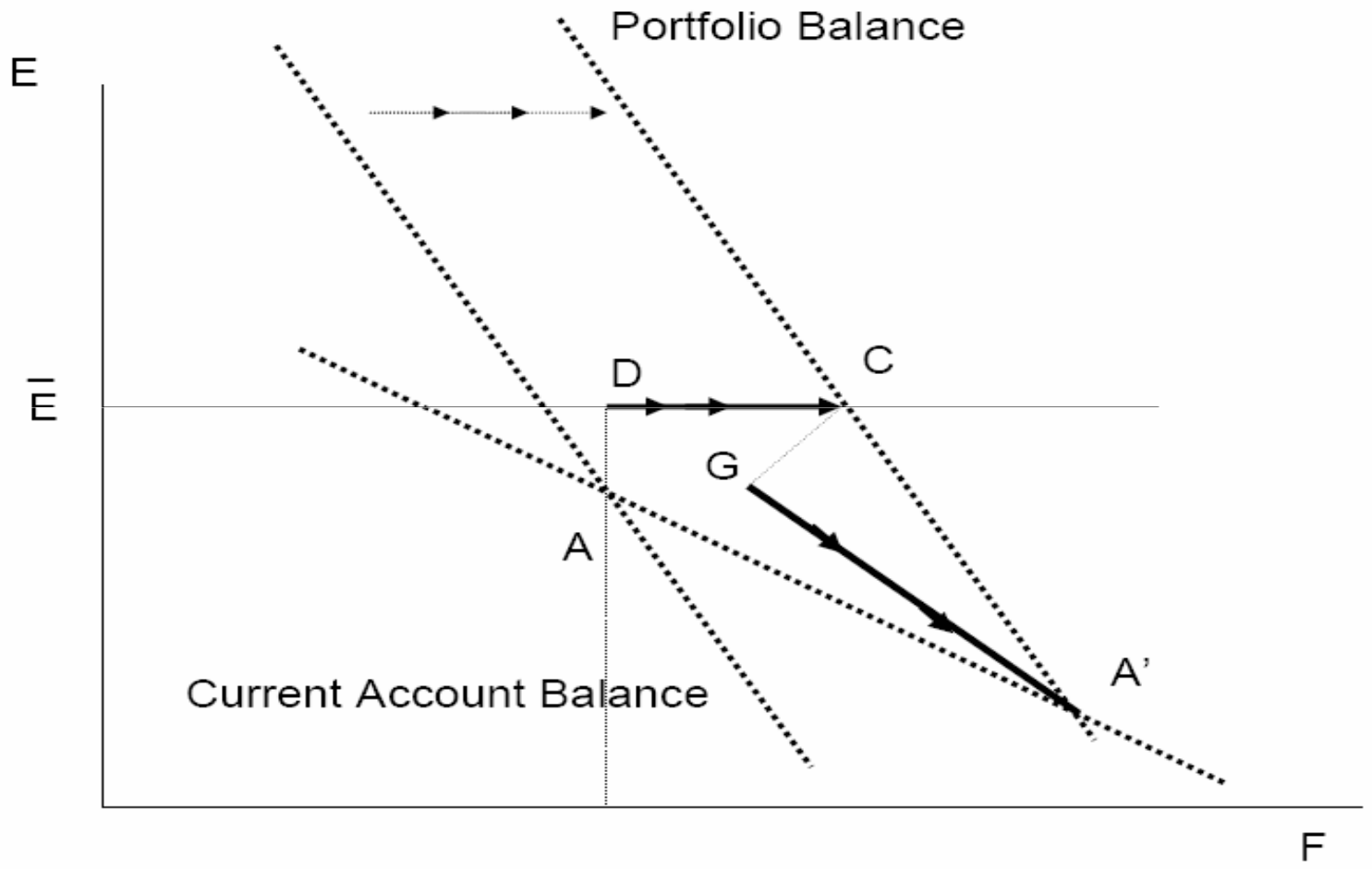
End of pegging

- Pegging means that the foreign central bank buys dollar assets to keep $E = \bar{E}$. If we call B the reserves (the US assets) held by the foreign central bank.

$$X = B + \alpha(1)(X - F) + \left(1 - \alpha^*(1)\right)\left(\frac{X^*}{E} + F\right)$$

- As $\bar{E}$ is such that the US foreign account is in deficit, F increases over time. Wealth gets steadily transfered to the foreign country, so the demand for US assets steadily decreases.
- To keep E unchanged, B must increase further over time.
- What the foreign central bank is actually doing is keeping demand for US assets unchanged by offsetting the fall in private demand.

Figure 5. Adjustment of the exchange rate and the net debt position to the end of pegging.



- If the foreign central banks stops pegging , withe the economy at point C just before the abandon of the peg, the economy jumps to G(valuation effect lead to a ↓ of F when there is an unexpected depreciation) and the economy then adjust along the saddle pass
- The longer the pegging the larger the initial and the eventual depreciation.

- In other words, the longer the Chinese wait to diversify their reserves of to stop the pegging, the larger the depreciation of the dollar.

- The conclusion will be similar with respect to changes in portfolio preferences.

  A shift away from US assets will lead to an initial depreciation leading to a lower current account deficit, a smaller increase in net debt and then to a smaller depreciation in the long run.

Conclusion

- Gives a good explanation for the recent evolution of the dollar real exchange rate.
- Taking into account valuation effects give a more precise view of the needed depreciation
- Taking into account imperfect substituability allow us to consider shocks in demand.
- r and r* are exogenous in the model.
- Another important point is how much of this depreciation is likely to be distributed against the euro, the yen, the renminbi and other currencies. Need for a 3-country model.