

The Fiscal Theory of the Exchange Rate: A Quantitative Assessment

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Fiscal theory of the exchange rate (FTER)

FTER is implied by

- ▶ Fiscal theory of the price level (FTPL)
 - ▶ Regime F: public debt/deficits determine P_t
- ▶ Purchasing power parity (PPP)

$$P_t = \mathcal{E}_t P_t^*$$

Regime F: public debt/deficits determine the exchange rate.

Fiscal theory of the exchange rate

Theoretical foundations

- ▶ Woodford (1996), Sims (1997, 1999), Dupor (2000), Daniels (2001, 2012), Bergin (2000)

Our contribution and research agenda

- ▶ Assess empirical relevance of FTER

Our research question for this project

- ▶ What is the contribution of US public debt to the Dollar-Mark exchange rate at the end of the Bretton Woods era?

Quantitative assessment of FTER

Ingredient 1: Regime F in one economy

- ▶ We consider the US as large open economy in the 60's and 70's.
- ▶ Bianchi, Illut (2016), Davig, Leeper (2007), Chen, Leeper, Leith (2015), Sims (2010)

inflationary pressure in the U.S. due to fiscal policy

Quantitative assessment of FTER

Ingredient 2: Dollar-Mark exchange rate

1. Until August 1971

fixed exchange rate regime and Gold standard

2. From December 1971 – March 1973

no Dollar convertibility into Gold, but Germany keeps pegging to the Dollar subject to realignments

3. After March 1973

flexible exchange rate

▶ FX figure

Model description

Mechanism

Outlook

Two-country New-Keynesian model

- ▶ US influences smaller country, not vice versa
- ▶ Germany small open economy
- ▶ Standard household and firms problem
- ▶ Cost-push shocks in both countries
- ▶ Fiscal policy (deficit) shock in the US
- ▶ Exchange-rate realignment shock

Model: policy regimes

Regime-switching DSGE model

- ▶ 3 regimes which correspond to the regimes at the end of Bretton Woods

Regime 1: Gold standard and fixed exchange rate

Regime with Gold standard and fixed Dollar-Mark exchange rates (until 1971)

- ▶ U.S. – exogenous money supply
- ▶ U.S. – active fiscal policy
- ▶ Germany – no independent monetary policy

This regime features explosive dynamics.

- ▶ Under the assumption that the regime will change with a positive probability, we obtain a mean square stable solution (Farmer, Waggoner, Zha (2011))

Regime 2: fixed Dollar-Mark exchange rates

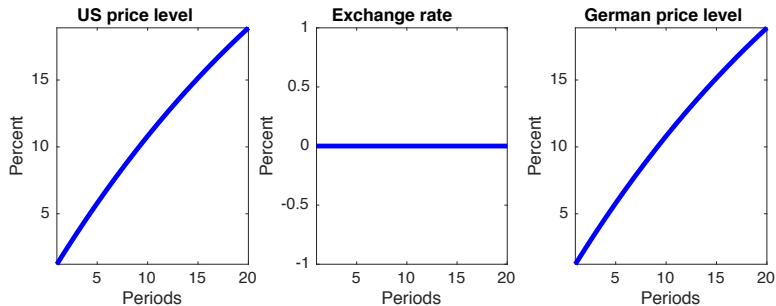
Regime with fixed Dollar-Mark exchange rate, no dollar convertibility into gold

- ▶ U.S. – Taylor-rule with passive monetary policy
- ▶ U.S. – active fiscal policy
- ▶ Germany – no independent monetary policy

Even with fixed exchange rates, FTER is at work:

$$P_t = \bar{\mathcal{E}} P_t^*$$

Effects of a US fiscal deficit shock



With fixed exchange rates: $P_t \rightarrow P_t^*$

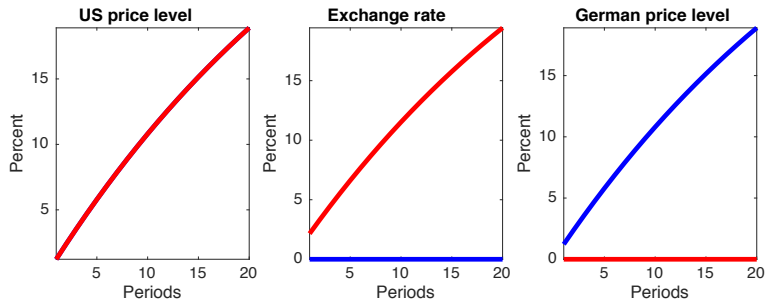
Regime 3: floating exchange rates

Floating exchange rates

- ▶ U.S. – Taylor-rule with passive monetary policy
- ▶ U.S. – active fiscal policy
- ▶ Germany – independent and active monetary policy

With floating exchange rates the exchange rate adjusts.

Effects of a US fiscal deficit shock



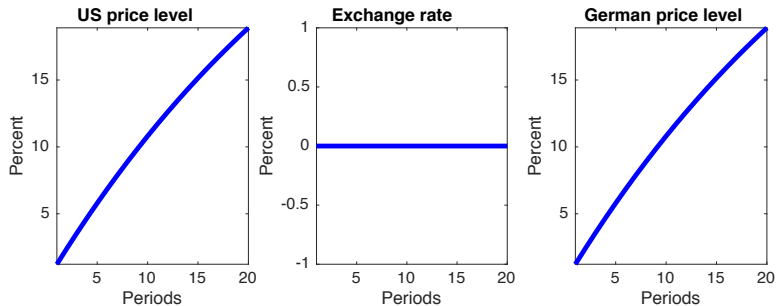
With floating exchange rates: $P_t \rightarrow \mathcal{E}_t$ (red line)

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Effects of a US fiscal deficit shock



With fixed exchange rates: $P_t \rightarrow P_t^*$

FTER and price-level spillovers

Krugman, Obstfeld, and Melitz (International Economics):

- ▶ “One interpretation of the Bretton Woods system’s collapse is that foreign countries were forced to import unwelcome U.S. inflation... ”
- ▶ To stabilize their price levels and regain internal balance, they had to abandon fixed exchange rate and allow their currencies to float.”

We capture expectations of regime change to a float while being in Bretton Woods.

Effects of a US fiscal deficit shock

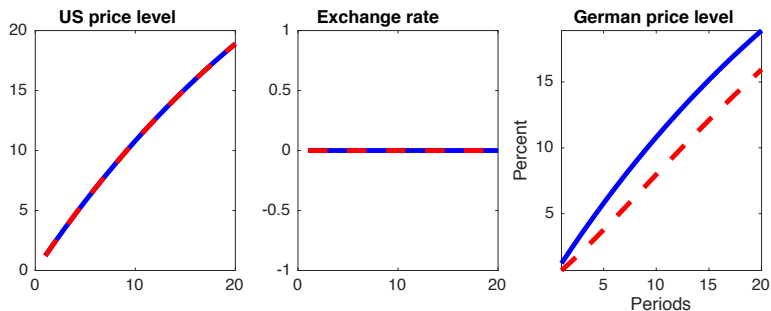


Figure: red line regime switching probability of 30%, blue line 0 %

Anticipation effects of a regime change

- ▶ Key are expectations of change to a float and the corresponding depreciation of the Dollar
- ▶ We can measure the expected depreciation using the UIP condition:

$$i_t - i_t^* = E_t [\Delta e_{t+1}]$$

Effects of a US fiscal deficit shock

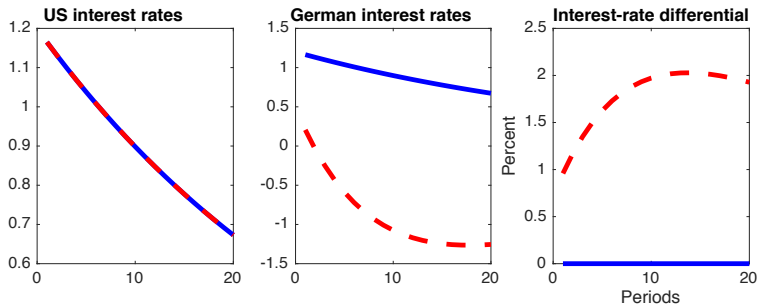


Figure: red line regime switching probability of 30%, blue line 0 %

FTER operates under (imperfectly credible) peg

Fixed exchange rate, with possible switch to float (probability λ)

- ▶ UIP condition implies interest rate differential

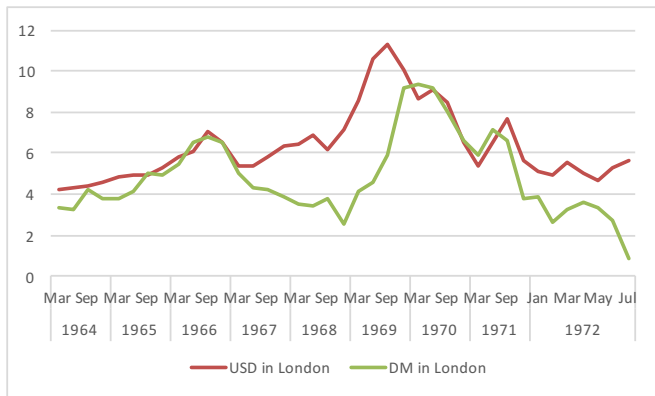
$$i_t - i_t^* = \lambda E_t [\Delta e_{t+1} | Float]$$

Expected depreciation depends on

- ▶ Probability of regime switch to float λ
- ▶ Size of the depreciation $E_t [\Delta e_{t+1} | Float]$

Debt/deficit matter for expected exchange rate, even under peg

Interest-rate differential: Eurocurrency rates in London



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Outlook: Project

Estimate the DSGE model on:

- ▶ Interest rates (Germany, USA) – include model friction to allow for capital controls
- ▶ Inflation (Germany, USA)
- ▶ Exchange rate
- ▶ Market value US debt

Perform counterfactuals.

Outlook: Agenda

Apply framework to further episodes

- ▶ EMS
- ▶ Argentina
- ▶ Mexico

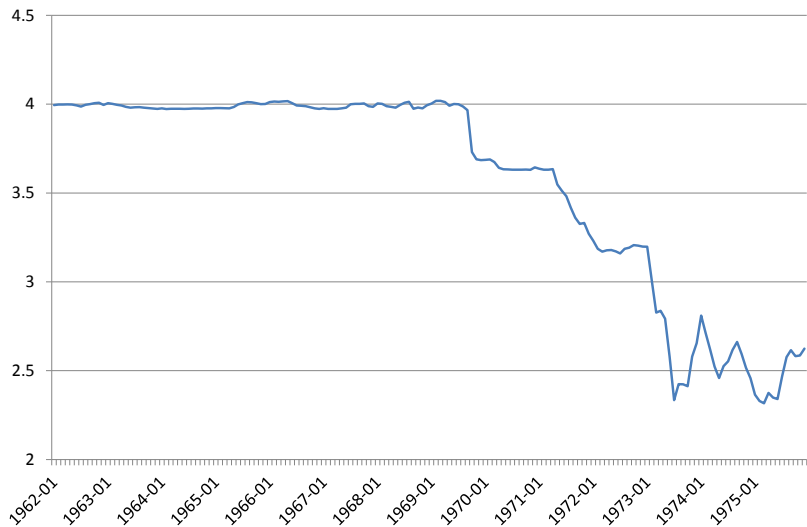
Discriminate between two forces of currency devaluation

- ▶ unsustainable fiscal policy
- ▶ competitiveness of industry

Open questions and discussion

- ▶ Convincing despite of short-time periods?
- ▶ Should we consider different variables and/or shocks?
- ▶ Suggestions for further episodes

Mark - Dollar exchange rate



[▶ Back](#)