The Fiscal Theory of the Exchange Rate: A Quantitative Assessment

Alexander Kriwoluzky (U Halle & IWH), Gernot Müller (U Tübingen & CEPR), Martin Wolf (U Bonn)

April 1, 2016
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)
  \[ P_t = \varepsilon_t P^*_t \]

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

Theoretical foundations


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.

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
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:

\[ P_t = \bar{\epsilon} P_t^* \]
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: $P_t \rightarrow \varepsilon_t$ (red line)
Model description

Mechanism

Outlook
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 $\lambda$)

- UIP condition implies interest rate differential

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

Expected depreciation depends on

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

Debt/deficit matter for expected exchange rate, even under peg
Interest-rate differential: Eurocurrency rates in London

[Graph showing the interest-rate differential between USD and DM in London from 1964 to 1972. The graph includes data points for each month from March to September, with a notable peak in 1969 for the USD in London.]
Model description

Mechanism

Outlook
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