Discussion of

‘A Theory of Foreign Exchange Interventions’

Sebastián Fanelli & Ludwig Straub

By: Robert Kollmann (Univ. Libre Bruxelles & CEPR)

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- Great paper! Important topic.
- Wealth of new analytical and empirical results!
- Very careful, clear, polished and well-written

Analyzes Foreign Exchange Interventions (FXI) using micro-founded dynamic model of a small open economy (SOE).

Key ingredient of model:

Assumption that Central Bank/Government [CB] has **frictionless** access to international financial markets & can borrow & lend at exogenous world interest rate, r^*

By contrast: Local household (HH) faces debt-elastic interest rate spread in the global financial market:

$$r = r^* - \gamma \cdot A, \quad \gamma > 0$$

r: interest rate faced by domestic HH

A: Household Net Foreign Assets

Central Bank can borrow/lend on more favorable terms than the Household!

Immediate implication for policy:

- Government asset portfolio management can completely eliminate the effect of the international financial friction by replicating HH's desired Net Foreign Assets under zero financial friction
- Under optimal CB policy, the HH does not need to borrow/lend internationally

Example: Assume that HH receives transitory positive endowment shock $\Rightarrow$ consumption smoothing dictates that HH saving $\uparrow$

Optimal policy: government levies a lump-sum tax on HH that equals desired saving. The CB then invests the proceeds of tax in global financial market at rate r^*. Later, the interest income of the CB Foreign Assets is paid to the HH as transfer.

(Alternatively, the CB could borrow the HH saving, and invest the proceeds at rate r^*)

Thus, the HH can 'indirectly' benefit from the world rate of return on her saving.

► **Assumptions about spreads in this paper depart from standard open econ. literature that posits that country spreads depend on combined NFA of all agents (eg Senhadji, 1997; Kollmann, 2002; Schmitt-Grohé & Uribe, 2003).**

► **Would like to see empirical support for key assumption here that CB faces no borrowing spread & that PRIVATE sector spread ONLY depends on private net assets.**

► **In reality, (parts of) the private sector might have spreads than the CB/government (e.g. when there are sovereign debt problems)**

► Important practical limitation for theoretical result that CB should act as financial stand-in for HH:

Some private financial transactions cannot easily be replicated by central banks.

E.g., many CBs do NOT invest in foreign portfolio equity & FDI (because of legal reasons and lack of expertise etc.)

Natural extension of model here would be to

- Allow for a richer & more realistic asset menu for private sector
- Assume that the CB/government too faces financial frictions (and may not be able to trade all asset types available to the private sector).

$\Rightarrow$ would allow more nuanced analysis of drivers of optimal CB foreign asset portfolios.

Authors analyze a dimension of policy that can lead to interesting trade-offs with financial-friction-elimination: TERMS OF TRADE MANIPULATION

- Model assumes country has market power as exporter. Central Bank can exploit market power (via effect of CB portfolio decisions on domestic absorption) to maximize national (household) welfare

HOWEVER: dynamic optimal terms-of-trade management is highly sensitive to model parameters (especially: trade elasticities).

■ The authors use a preference specification (unit trade elast.) that entails that the t.o.t. manipulation incentive does NOT alter optimal government foreign asset management, in response to endowment shocks.

■ In response to a world interest rate shocks, optimal terms-of-trade manipulation implies 'leaning of the wind' by the central bank:
a positive shock to the world interest rate lowers the SOE's consumption, which depreciates her real exchange rate (due to consumption home bias), and leads to a rise in the country's NFA.

Under assumed preferences, a government that internalizes the terms of trade response dampens the NFA accumulation, in order to dampen the RER depreciation.

However, it can be shown that this prediction is NOT robust. Slight model changes produce 'leaning WITH the wind'

■ Problem: optimal t.o.t. management depends on the RELATIVE benefit to manipulate the t.o.t in period t v.s. period t+1.

► By raising absorption in period t, the government improve the t.o.t. at 't', but lower saving at 't' imply that FUTURE absorption will be lower, and thus the FUTURE t.o.t. worsen

► If the t.o.t. sensitivity w.r.t. absorption is constant across dates, then the government has NO INCENTIVE TO DISTORT THE SAVING CHOICE TO MANIPULATE THE TERMS OF TRADE

Model:

HH receives endowment of two traded perishable goods (H,F): y_H, y_F

HH period utility: $u(C)$, **with** $C = (c_H/(1-\alpha))^{1-\alpha} \bullet (c_F/\alpha)^{\alpha}$

CPI: $P = (p_H)^{1-\alpha} \bullet (p_F)^{\alpha}$. **Normalize** $p_F \equiv 1. \Rightarrow P = (p_H)^{1-\alpha}$

- **Good F is also produced by rest of world (RoW), infinitely elastic RoW supply at price** $p_F \equiv 1.$ **Row CPI:** $P^* \equiv 1.$

Terms of trade: $p \equiv p_H$.

- **SOE faces downward sloping RoW demand for good H:**

$c_H^* = \alpha \cdot p^{-\varepsilon}, \ \varepsilon > 0.$

Domestic demand for goods H & F:

$$c_{H,t}=(1-\alpha)P_tC_t/p_t=(1-\alpha)p_t^{-\alpha}C_t,$$

$$c_{F,t}=\alpha P_tC_t.$$

Market clearing for good 'H':

$$y_{H,t}=c_{H,t}+c_{H,t}^{*}\Rightarrow y_{H,t}=(1-\alpha)p_t^{-\alpha}C_t+\alpha p_t^{-\varepsilon}$$

In equilibrium, the terms of trade are a function of $C_t, y_{H,t}$ **:**

$$p_t=f(C_t,y_{H,t})=f_t(C_t),\ \textbf{with}\ f_t'>0.$$

► To understand logic of terms of NFA & aggregate demand management as terms of trade manipulation:

■ Assume that the government perfectly controls the country's NFA, and thus aggregate absorption, C.

■ Assume frictionless lending & borrowing at world interest rate (denominated in foreign good 'F').

Period budget constraint:

$A_{t+1} + NX_t = A_{t+1}(1 + r_t^*)$, A_{t+1}: **net foreign assets**

$NX_t \equiv p_t y_{H,t} + y_{F,t} - P_t C_t$: **net exports**

$NX_t = g(y_{H,t}, y_{F,t}, C_t) = g_t(C_t)$

- **Euler equation of a government that acts as a price taker:**

$$(1+r_{t+1}^*)(P_t/P_{t+1})\beta\{u'(C_{t+1})/u'(C_t)\} = 1$$

- **Euler equation of gov't that acts as t.o.t. manipulator:**

$$(1+r_{t+1}^*)\{(\partial NX_t/\partial C_t)/(\partial NX_{t+1}/\partial C_{t+1})\}\beta\{u'(C_{t+1})/u'(C_t)\} = 1$$

NB for a price taking gov't: $\partial NX_t/\partial C_t = -P_t$.

- **Euler equation of a price-taker gov't:**

$$(1+r^*_{t+1})(P_t/P_{t+1})\beta\{u'(C_{t+1})/u'(C_t)\}=1$$

$$\Rightarrow r^*_{t+1}-\rho=(\sigma+\eta_P)\cdot(\widehat{C_{t+1}}-\widehat{C_t}),$$

with $\sigma\equiv -u''\cdot C/u'>0,\ \eta_P\equiv(\partial P/\partial C)(C/P)>0$

- **Euler equation of gov't that acts as t.o.t. manipulator:**

$$(1+r^*_{t+1})\{(\partial NX_t/\partial C_t)/(\partial NX_{t+1}/\partial C_{t+1})\}\beta\{u'(C_{t+1})/u'(C_t)\}=1$$

$$\Rightarrow r^*_{t+1}-\rho=(\sigma+\eta_{NX'})\cdot(\widehat{C_{t+1}}-\widehat{C_t})$$

$\eta_{NX'}\equiv NX''\cdot C/NX'$: **curvature of net exports w.r.t. C.**

WE KNOW <u>NOTHING</u> (in theory & in data) ABOUT $\eta_{NX'}$

Does optimal t.o.t. manipulation magnify or dampen C & RER response? Completely open question.

- **Elasticity $\eta_{NX'} \equiv NX'' \cdot C / NX'$ is complicated object that depends on GENERAL EQUILIBRIUM mechanisms.**

$\Rightarrow$ LIKELY TO DEPEND ON ALL MODEL PARAMETERS

$\Rightarrow$ WE DON'T UNDERSTAND WHAT DETERMINES $\eta_{NX'}$

$\Rightarrow$ I HAVE DOUBTS THAT A THEORY OF GOVERNMENT PORTFOLIIO management as dynamic terms of trade manipulation can deliver reliable & robust quantitative results.

- **Depending on $\eta_{NX'} \equiv NX'' \cdot C / NX'$ optimal t.o.t. policy can feature 'leaning against the wind', or 'leaning with the wind' (amplification of terms of trade response to world interest rate shocks).**

NB: paper assumes that export demand has unit price elasticity: $c_H^* = \alpha \cdot p^{-\varepsilon}$, with $\varepsilon = 1 \Rightarrow$ leaning against the wind.

I verified that for $\varepsilon < 1$, 'leaning with the wind' can be optimal.

$\Rightarrow$ Authors should study the robustness of their normative t.o.t. manipulation results.

OTHER IMPORTANT RESULTS: MODEL PROVIDES INTERESTING INSIGHT ABOUT TRANSMISSION MECHANISM OF GOVERNMENT FOREIGN ASSET ACCUMULATION

► Assume that the government purchases foreign bonds, financed by a lump sum tax, or by borrowing from the private sector.

⇒ The HH finances the lump sum tax (or the increased lending to the gov't) by borrowing more from the RoW.

⇒ HH's borrowing rate 'r' ↑

⇒ HH aggregate consumption ↓

⇒ Real exchange rate depreciates.

Note: government capital outflow is predicted to be accompanied by a private capital INFLOW.

Empirically, for a sample of 50 EMEs, gov't capital outflows & private capital inflows are HIGHLY POSITIVELY CORRELATED ! (Figure 2)

Would be very useful to have empirical evidence regarding the transmission channel to RER: does a government capital outflow LOWER consumption, and is this accompanied by a RER depreciation, in reality?

- The paper provides evidence that suggests that the domestic-foreign interest rate spread ('UIP spread') increase in response to government purchase of foreign assets (Table 1).

- However, the empirics compares domestic and foreign interest rates that are denominated in domestic and foreign currencies, respectively.

- Yet, the model assumes that the small open economy is fully dollarized. Domestic and foreign bonds are all denominated in units of foreign output.

- Is there any empirical evidence on the link between the domestic-foreign interest rate spread and net private debt, for dollarized economies?

Summary of main suggestions:

■ To capture more realistic portfolio balance channel, authors should extend the model by allowing for richer asset menu &

drop the assumption that the government can always borrow or lend internationally on more favorable terms than the private sector

■ Check robustness of normative results about terms of trade manipulation

■ Need more empirical evidence on the transmission channels of government foreign reserve accumulation to the real exchange rate and to the real economy.

CONCLUSION: OUTSTANDING PAPER & VERY PROMISING RESEARCH PROGRAM

I LOOK FORWARD TO READING FUTURE PAPERS BY THESE AUTHORS

THANK YOU !!!