International Portfolios

Introductory Remarks

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March 2021

Segmented International Markets

- Last 15 years characterized by severe crises and large policy interventions in financial markets

- Became more obvious that "*who owns which assets*" is an important question at the macro level

- Lot's of theoretical work to incorporate financial market imperfections into general equilibrium framework

- Beginning of detailed micro-data on global capital allocations

Taking Stock:

- Brief review of what has been done

- What is still missing? Where to go next?

Where do we come from?

- International macro always paid some attention to frictions, more so than domestic macro

- Nurkse's view that capital flows generate destabilizing movements in exchange rates

- Kouri & co.: portfolio balance approach to exchange rates. Currencies are imperfect substitutes and demand and supply of assets in different currencies pin down the exchange rate

- A key insight, but had gotten lost in modern models. Lack of foundations; not straightforward to make it stick in a model

The Framework in One Picture
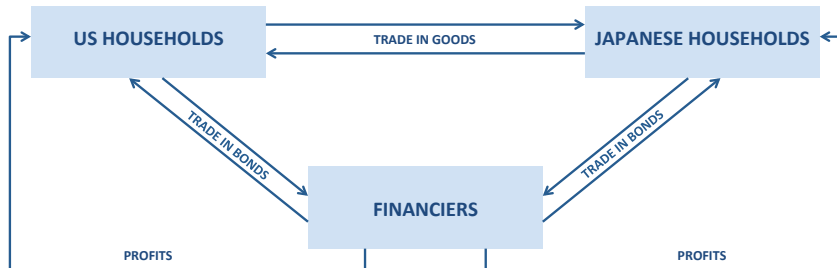
Source: Gabaix and Maggiori (2015)

A First Pass at General Equilibrium with Segmented Markets

A basic three equations model,

$$\xi_0 e_0 - \iota_0 + Q_0 = 0; \qquad \xi_1 e_1 - \iota_1 - R Q_0 = 0.$$

$$Q_0 = \frac{1}{\Gamma} \mathbb{E}\left[e_0 - \frac{R^*}{R} e_1 \right]$$

the equilibrium exchange rate follows (assume $\xi_t = R = R^* = 1$):

$$e_0 = \frac{(1 + \Gamma)\, \iota_0 + \mathbb{E}[\iota_1]}{2 + \Gamma}; \qquad \mathbb{E}\left[\frac{e_0 - e_1}{e_0} \right] = \frac{\Gamma\,(\iota_0 - \mathbb{E}\,[\iota_1])}{(1 + \Gamma)\, \iota_0 + \mathbb{E}[\iota_1]}$$

- Financial Autarky ($\Gamma \uparrow \infty$): $e_0 = \iota_0$
- UIP ($\Gamma \downarrow 0$): $e_0 = \mathbb{E}[e_1] = \frac{\iota_0 + \mathbb{E}[\iota_1]}{2}$
- Exchange rate disconnect

A Second Pass: Gross Portfolio Flows

▶ Gross mismatched flows important for risk taking

▶ For simplicity, assume that some Japanese households have a noise demand f^* for Dollar bonds (financed in Yen bonds), then the equilibrium exchange rate follows:

$$e_0 = \frac{(1 + \Gamma)\, \iota_0 + \mathbb{E}[\iota_1] - f^*\Gamma}{2 + \Gamma}$$

▶ $\frac{\partial e_0}{\partial f^*} = -\frac{\Gamma}{2+\Gamma}$: if Japanese households demand Dollar bonds ($f^* > 0$), then the Dollar appreciates ($\downarrow e_0$): supply and demand of assets matters!

▶ This effect is absent both in complete market models or in models that assume UIP

Model Extensions

- More general portfolio flows (e.g. return chasing, carry trade, search for yield, delegated portfolios)

$$f = b + c(R - R^*)$$
$$f^* = d + g(R - R^*)$$

- Monetary shocks and endogenous volatility:

$$\Gamma_t = \gamma var_t(e_{t+1})^\alpha$$

- Infinite horizon: Γ_t acts as myopia

Estimating The Slope of the Financiers' Demand Curve

- Reduced-form approach: index inclusions and exclusions

- Identifies exogenous flows that occur due to quirks in the index

  - Hau, Massa, Peress (2010): MSCI equity index restatement

  - Pandolfi and Williams (2019) and Broner, Martin, Pandolfi, Williams (2020): JP Morgan GBI index weighting

  - They find causal evidence of flows on exchange rates (and local asset prices)

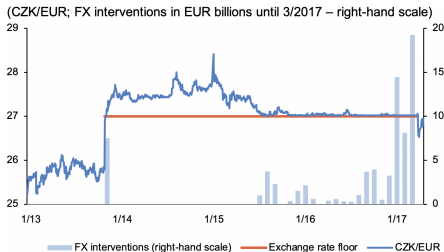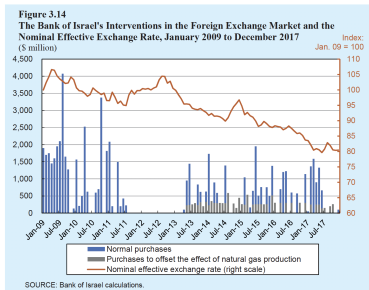# Estimating The Slope of the Financiers' Demand Curve

- ▸ Structural Approach: industrial organization supply/demand

- ▸ Imposes a model structure to back out elasticities jointly from portfolios and asset prices

  - ▸ Koijen and Yogo (2020)

  - ▸ Jiang, Richmond and Zhang (2020), and Pellegrino, Spolaore and Wacziarg (2020)

  - ▸ They estimate a portfolio model on bilateral asset holdings at the country level for bonds and equities jointly with asset prices (exchange rates, bond yields, and equity prices) and the supply (issuance level) of these assets. Find an important role for segmentation

More Portfolios Flows

Many other flows on top of short-term bonds:

- Equity Flows: Hau and Rey (2006) and Camanho, Hau and Rey (2018)

- Long-term and short-term bonds: Greenwood, Hanson, Stein and Sunderam (2020) and Gourinchas, Ray and Vayanos (2020)

- Models of infrequent trading: Bacchetta and Van Wincoop (2010), (et al. 2020)

- Commodities, real estate: ?

- Government intervention

Foreign Exchange Interventions

Figure 3.14
The Bank of Israel's Interventions in the Foreign Exchange Market and the Nominal Effective Exchange Rate, January 2009 to December 2017

SOURCE: Bank of Israel calculations.

(CZK/EUR; FX interventions in EUR billions until 3/2017 – right-hand scale)

Source: SNB and CNB respectively

Lot's of great theory work: Cavallino (2019); Amador, Bianchi, Bocola and Perri (2020); Fanelli and Straub (2020); Davis, Devereux and Yu (2020); Hassan, Mertens and Zhang (2020)

Foreign Exchange Interventions

- Simple environment: uncertainty $\mathbb{E}[\iota_1] = 1$, sticky prices $\bar{p}^*_{F,0}$

- The Japanese government buys q^* dollars and sells $\frac{q^*}{e_0}$ yen at time 0

$$e_0 - \iota_0 + q^* + Q_0 = 0; \qquad e_1 - \iota_1 - q^* - Q_0 = 0.$$

- $e_0(q^*) = 1 - \frac{\Gamma}{2+\Gamma}q^*$: Yen depreciates...

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- ...creating employment: $Y_{F,0}(e_0) = \min\left(\frac{a^*_0 + \iota_0/e_0}{\bar{p}^*_{F,0}}, L \right)$

- If $\Gamma > 0$ and $Y_{F,0}(q^* = 0) < L$, then intervention can increase welfare

Some Remarks on the Nature of FX Interventions

- ▸ Interventions as a swap

- ▸ Less role for reserves; more role for fiscal capacity of CB

- ▸ Potency of intervention depends on state of FX market (Γ_t)

- ▸ Capital controls are one way to segment the market

    - ▸ The government taxes financiers' profits at rate τ, rebates lump sum
    - ▸ Then, financiers' demand: $Q_0 = \frac{\mathbb{E}[e_0 - e_1](1-\tau)}{\Gamma} \equiv \frac{\mathbb{E}[e_0 - e_1]}{\Gamma^{eff}}$

- ▸ Empirical evidence: Recent literature finds more success for intervention; Still...endogeneity largely unaddressed.

Some Classic and New Issues

- Covered Interest Parity:
  - Structural break after 2007
  - Models of risk premia but with no frictions incapable of matching this arbitrage

- Exchange Rate Disconnect:
  - Exchange rate more connected to financial forces than fundamentals
  - Empirical evidence is building

- Carry Trade:
  - Crashes of the CT are periods of heightened financial constraints
  - Relationship between volatility and expected retruns

Conclusion: what next?

- Theory places financiers at the core of international macro

- We still know relatively little about global capital allocations

- Lot's of work taking place in this direction:

  - Big effort in official sector (national statistics, central bank data, repositories of trades)

  - Commercial data are improving fast (mutual funds, insurance companies, sovereign wealth funds, issuance)