

# SONOMA: a Small Open ecoNOmy for MAcrofinance

by Max Croce, Mohammad Jahan-Parvar and Samuel Rosen

Discussion by: Fabrizio Perri  
Minneapolis Fed



Summer Institute 2020, IFM

# Overview: finance in open economy macro

- In open economies 3 channels of transmission / prices
  1. Intra-temporal trade / exchange rates
  2. Inter-temporal trade / interest rates
  3. Valuation effects / asset prices

# Overview: finance in open economy macro

- In open economies 3 channels of transmission / prices
  1. Intra-temporal trade / exchange rates
  2. Inter-temporal trade / interest rates
  3. Valuation effects / asset prices
- Holy Grail: explain all 3 prices and have all 3 channels
- Reality: leading open macro models miss along many dimensions
  - ▶ Examples: IRBC and NOEM have a hard time explaining exchange rates and asset prices.

# Overview: finance in open economy macro

- In open economies 3 channels of transmission / prices
  1. Intra-temporal trade / exchange rates
  2. Inter-temporal trade / interest rates
  3. Valuation effects / asset prices
- Holy Grail: explain all 3 prices and have all 3 channels
- Reality: leading open macro models miss along many dimensions
  - ▶ Examples: IRBC and NOEM have a hard time explaining exchange rates and asset prices.
- SONOMA: goes after 2 and 3
- Ambitious and necessary endeavor

# Outline

- Empirical contribution
- Theoretical contribution
- On interest rates and economic activity
- Identification and directions

# Empirical contribution

- 6 (sort of) small open economies:  
Finland, Italy, Portugal, Spain, Sweden, Switzerland, 1995-2017, quarterly
- 3 variables:
  - ▶ Long run component of productivity growth (estimated using productivity and stock market data)
  - ▶ Corporate debt to output ratio
  - ▶ Long term rates (on govt debt), not explained by external debt

# Main finding

- Increases in long term interest rates (on average) are associated to
  - ▶ Declines in future productivity growth ( $\beta_{r,x} < 0$ )
  - ▶ Reduction in corporate debt ratios ( $\beta_{r,\xi} < 0$ )
- Positive Co-skewness between long term rates and long run productivity growth
  - ▶ A bit confusing: *Two random variables exhibit positive co-skewness when undergo extreme positive deviations at the same time*

## Comment

- All 3 variables potentially endogenous
- Paper takes them as forcing exogenous variables
- Empirical analysis does not tell what drives what, but potentially crucial for policy!



## Comment

- All 3 variables potentially endogenous
- Paper takes them as forcing exogenous variables
- Empirical analysis does not tell what drives what, but potentially crucial for policy!
- **Alternative 1:** (Arellano, Bai and Bocola, 2019) spread  $\uparrow$ , Bond prices  $\downarrow$ , banks in trouble, credit  $\downarrow$ , investment  $\downarrow$ , long run growth  $\downarrow$
- **Alternative 2:** (Bai, Kehoe and Perri, 2020) long run growth  $\downarrow$ , default risk  $\uparrow$ , spread  $\uparrow$ , credit  $\downarrow$

## Theoretical contribution

- Small open economy, real, model
- Three correlated exogenous shocks (motivated by empirics above):  
Firm's domestic credit constraints (Jerman and Quadrini, 2012), Long Run Growth prospects (Bansal and Yaron, 2004), Household external interest rate (Mendoza, 1991)
- In a closed economy: credit shocks drive BC fluctuations, LR growth drive stock prices ✓
- Can talk about valuation effects ✓

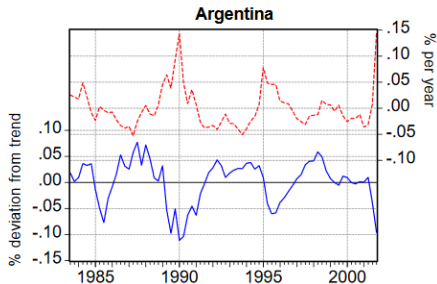
## Theoretical contribution

- Small open economy, real, model
- Three correlated exogenous shocks (motivated by empirics above):  
Firm's domestic credit constraints (Jerman and Quadrini, 2012), Long Run Growth prospects (Bansal and Yaron, 2004), Household external interest rate (Mendoza, 1991)
- In a closed economy: credit shocks drive BC fluctuations, LR growth drive stock prices ✓
- Can talk about valuation effects ✓
- What do shocks to international rate bring?
- Since  $\beta_{r,\xi} < 0$  and  $\beta_{r,x} < 0$  mechanically they trigger the other 2 negative shocks..

## Theoretical contribution

- Small open economy, real, model
- Three correlated exogenous shocks (motivated by empirics above):  
Firm's domestic credit constraints (Jerman and Quadrini, 2012), Long Run Growth prospects (Bansal and Yaron, 2004), Household external interest rate (Mendoza, 1991)
- In a closed economy: credit shocks drive BC fluctuations, LR growth drive stock prices ✓
- Can talk about valuation effects ✓
- What do shocks to international rate brings?
- Since  $\beta_{r,\xi} < 0$  and  $\beta_{r,x} < 0$  mechanically they trigger the other 2 negative shocks..
- Do they have independent effect on domestic economy?

# Interest Rates and Economic Activity, 1

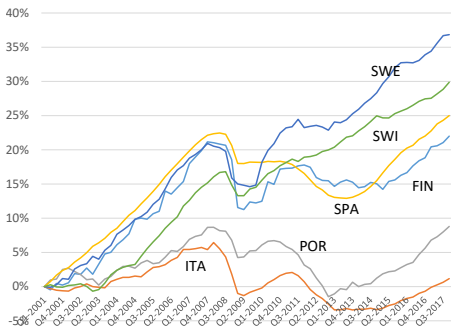


- Data: negative relation between interest rates and economic activity
- IRBC type models (like SONOMA) direct effect of interest increase is either zero or positive
  - ▶ Increase in interest rate make country poorer, labor supply  $\uparrow$ ,  $Y \uparrow$
- Same issue in Perri-Quadrini (2 country version of Jermann-Quadrini) main driver of economic activity is credit constraints, not interest rate

## Interest Rates and Economic Activity, 2

- Alternative models
- Working capital+GHH preferences (Neumeyer Perri, 2004), tightening of financial constraints (Bocola, 2016), sticky prices plus labor mkt frictions (NOEM)
- Suggestion: incorporating some of these channels in SONOMA might help explain the initial empirical findings

## Identification of macro-finance shocks



- Most interesting idea of the paper is that financial shocks can be, endogenously, connected with long run growth performance
- Within sample large variation in long run performance (and financial shocks)
- Use more country specific variation (in growth, shocks and possible other states such as government debt) to identify impact of financial shocks and connection to long run growth