

Changing Patterns of Risk-Sharing Channels in the United States and the Euro Area

Discussion of Cimadomo, Giuliadori, Lengyel and Mumtaz (2023)

Simon Lloyd

Bank of England and Centre for Macroeconomics

November 2023

The views expressed here do not necessarily reflect the position of the Bank of England.

This Paper

#1. **Propose a methodology to account for time variation in risk-sharing channels**

⇒ Time-varying parameter panel VAR with stochastic volatility

- 3 channels: capital, credit and fiscal
- Application to 2 'currency areas': US and EA

#2. **Develop new test for 'complementarity' and 'substitutability' of different channels**

⇒ Based on correlation between impulse response of channels to output shocks

- Capital and credit channels substitutes; Fiscal and credit complements

#3. **Explain determinants of time-variation in channels**

⇒ Draw on macro and financial variables in US

- Stronger financial integration leads to better functioning fiscal and credit channels

#1. What Underpins The Model?

Suggestion #1a: Clarify the underpinnings of the model for the uninitiated reader

#1. What Underpins The Model?

Suggestion #1a: Clarify the underpinnings of the model for the uninitiated reader

Basic idea:

- ▶ **No Risk Sharing**: Financial autarky implies tight link between cons. and income

$$C_t^i = Y_t^i \quad \forall i, t$$

- ▶ **Full Risk Sharing**: Complete markets allows smoothing in response to risks

$$\frac{u'(C_{t+1})}{u'(C_t)} \cdot \frac{u'(C_t^*)}{u'(C_{t+1}^*)} \cdot \frac{RER_{t+1}}{RER_t} = 1$$

#1. What Underpins The Model?

Suggestion #1a: Clarify the underpinnings of the model for the uninitiated reader

Basic logic: regress successively smoother income measures on idiosyncratic GDP:

$$\Delta \log GDP_{it} - \Delta \log GNP_{it} = d_t^K + g^K \Delta \log GDP_{it} + e_{it}^K \quad (\text{Capital})$$

$$\Delta \log GNP_{it} - \Delta \log GDI_{it} = d_t^G + g^G \Delta \log GDP_{it} + e_{it}^G \quad (\text{Fiscal})$$

$$\Delta \log GDI_{it} - \Delta \log C_{it} = d_t^C + g^C \Delta \log GDP_{it} + e_{it}^C \quad (\text{Credit})$$

$$\Delta C_{it} = d_t^U + g^U \Delta \log GDP_{it} + e_{it}^U$$

where g^K , g^G and g^C reflect % of smoothing of GDP shock carried out by capital markets, fiscal stabilisation and credit markets and g^U is % unsmoothed

#1. What Underpins The Model?

Suggestion #1a: Clarify the underpinnings of the model for the uninitiated reader

What this paper adds:

- ▶ VAR: to orthogonalise GDP innovations
- ▶ Panel: to use cross-country data, with some country-specific coefficients
- ★ Stochastic volatility: to allow for time-variation in channels

Suggestion #1b: Clarify the gain from stochastic volatility more in results

#2. What's Missing From The Model?

Another lens through which to interpret the model:

$$GDP_{it} \equiv \frac{GDP_{it}}{GNP_{it}} \cdot \frac{GNP_{it}}{GDI_{it}} \cdot \frac{GDI_{it}}{C_{it}} \cdot C_{it}$$

Take logs, apply $\Delta_k = 1 - L^k$, take deviations from cross-sectional aggregate, multiply both sides by $\Delta_k gdp_{it}$, take expectations, and divide both sides by $\text{var}(gdp_{it})$:

$$1 \equiv \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gdp_{it} - \Delta_k gnp_{it})}{\text{var}(\Delta_k gdp_{it})} + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gnp_{it} - \Delta_k gdi_{it})}{\text{var}(\Delta_k gdp_{it})} \\ + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gdi_{it} - \Delta_k c_{it})}{\text{var}(\Delta_k gdp_{it})} + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k c_{it})}{\text{var}(\Delta_k gdp_{it})}$$

#2. What's Missing From The Model?

Another lens through which to interpret the model:

$$GDP_{it} \equiv \frac{GDP_{it}}{GNP_{it}} \cdot \frac{GNP_{it}}{GDI_{it}} \cdot \frac{GDI_{it}}{C_{it}} \cdot C_{it}$$

Take logs, apply $\Delta_k = 1 - L^k$, take deviations from cross-sectional aggregate, multiply both sides by $\Delta_k gdp_{it}$, take expectations, and divide both sides by $\text{var}(gdp_{it})$:

$$1 \equiv \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gdp_{it} - \Delta_k gnp_{it})}{\text{var}(\Delta_k gdp_{it})} + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gnp_{it} - \Delta_k gdi_{it})}{\text{var}(\Delta_k gdp_{it})} \\ + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gdi_{it} - \Delta_k c_{it})}{\text{var}(\Delta_k gdp_{it})} + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k c_{it})}{\text{var}(\Delta_k gdp_{it})}$$

What about relative prices?

[Cole & Obstfeld, 1991; Corsetti, Dedola & Leduc, 2008; Corsetti, D'Aguanno, Dogan, Lloyd & Sajedi, 2023]

#2. What's Missing From The Model?

Could extend identity to:

$$GDP_{it} \equiv RER_{it} \cdot \frac{GDP_{it}}{GNP_{it}} \cdot \frac{GNP_{it}}{GDI_{it}} \cdot \frac{GDI_{it}}{C_{it}} \cdot \underbrace{\frac{C_{it}}{RER_{it}}}_{\equiv \tilde{C}_{it}}$$

Then variance decomposition would include:

$$1 \equiv \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k r_{erit})}{\text{var}(\Delta_k gdp_{it})} + \dots + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k \tilde{C}_{it})}{\text{var}(\Delta_k gdp_{it})}$$

Suggestion #2: Extend model to allow role for relative-price adjustment

#3. Is 'Complementarity' vs. 'Substitutability' Really Tested Here?

Authors develop new test of complementarity vs. substitutability based on correlation of impulse responses of channels to idiosyncratic output shocks

$$1 \equiv \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gdp_{it} - \Delta_k gnp_{it})}{\text{var}(\Delta_k gdp_{it})} + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gnp_{it} - \Delta_k gdi_{it})}{\text{var}(\Delta_k gdp_{it})} \\ + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k gdi_{it} - \Delta_k c_{it})}{\text{var}(\Delta_k gdp_{it})} + \frac{\text{cov}(\Delta_k gdp_{it}, \Delta_k c_{it})}{\text{var}(\Delta_k gdp_{it})}$$

#3. Is 'Complementarity' vs. 'Substitutability' Really Tested Here?

Authors develop new test of complementarity vs. substitutability based on correlation of impulse responses of channels to idiosyncratic output shocks

$$1 \equiv \underbrace{\beta_{it}^K(k)}_{\approx 50\%} + \underbrace{\beta_{it}^G(k)}_{\approx 10\%} + \underbrace{\beta_{it}^C(k)}_{\approx 30\%} + u_{it}(k)$$

#3. Is 'Complementarity' vs. 'Substitutability' Really Tested Here?

Authors develop new test of complementarity vs. substitutability based on correlation of impulse responses of channels to idiosyncratic output shocks

$$1 \equiv \underbrace{\beta_{it}^K(k)}_{\approx 50\%} + \underbrace{\beta_{it}^G(k)}_{\approx 10\%} + \underbrace{\beta_{it}^C(k)}_{\approx 30\%} + u_{it}(k)$$

Totally differentiating: $0 \equiv d\beta_{it}^K(k) + d\beta_{it}^G(k) + d\beta_{it}^C(k) + du_{it}(k)$

#3. Is ‘Complementarity’ vs. ‘Substitutability’ Really Tested Here?

Authors develop new test of complementarity vs. substitutability based on correlation of impulse responses of channels to idiosyncratic output shocks

$$1 \equiv \underbrace{\beta_{it}^K(k)}_{\approx 50\%} + \underbrace{\beta_{it}^G(k)}_{\approx 10\%} + \underbrace{\beta_{it}^C(k)}_{\approx 30\%} + u_{it}(k)$$

Totally differentiating: $0 \equiv d\beta_{it}^K(k) + d\beta_{it}^G(k) + d\beta_{it}^C(k) + du_{it}(k)$

Given risk sharing is bounded, is the test not always going to suggest that a channel with substantive share is a ‘substitute’? For another channel to increase, mustn’t a large (enough) one decrease?

Suggestion #3: Discuss merits (and drawbacks) of this test more

Two Other Questions

Where Do Demand Shocks Fit?

In open-economy model, relative demand shocks $\tilde{\zeta}$ enter in risk-sharing definition:

$$\frac{\tilde{\zeta}_{t+1}}{\tilde{\zeta}_t} \cdot \frac{u'(C_{t+1})}{u'(C_t)} \cdot \frac{u'(C_t^*)}{u'(C_{t+1}^*)} \cdot \frac{RE R_{t+1}}{RE R_t} = 1$$

Two Other Questions

Where Do Demand Shocks Fit?

In open-economy model, relative demand shocks $\tilde{\zeta}$ enter in risk-sharing definition:

$$\frac{\tilde{\zeta}_{t+1}}{\tilde{\zeta}_t} \cdot \frac{u'(C_{t+1})}{u'(C_t)} \cdot \frac{u'(C_t^*)}{u'(C_{t+1}^*)} \cdot \frac{RE R_{t+1}}{RE R_t} = 1$$

What's Ex Ante and What's Ex Post?

Ex ante and ex post dimensions to risk sharing

VAR seems to include ex ante dimension (capital), alongside ex post dimensions (fiscal and credit)

Should the two be combined?

In Sum

- ▶ Interesting paper: sensible addition to VAR-based tests of risk sharing
- ▶ Yields interesting results of first-order policy relevance in US and EA
- ▶ Interested in seeing more on:
 - Underpinnings of model
 - Role for relative prices
 - Merits and drawbacks of impulse response test