

Research Proposal: Network Structure of Global Monetary System

Memon, Sonan

1. MOTIVATION

Despite the existence of IMF, Bank for International Settlements, EU and World Bank, coordination of monetary policy rules across countries remains sub-optimal from a global business cycle management perspective¹. Even when national objectives of each country are considered, cooperation through information sharing and enhancing *connectedness* of policies² creates some welfare gains for all, which are currently under-exploited. In fact, [Blanchard, 2013](#) has likened such policy coordination to the Loch Ness Monster: merely a fragment of economists' imagination.

2. METHODOLOGY AND CONTRIBUTIONS

I aim to develop an empirical methodology to quantify degree of international *coordination* in monetary policy. As a baseline, I will use central bank governor meeting dates at the BIS³ and linguistic analysis of governors' speeches at BIS meetings to capture *coordination shocks* ([Armelius, 2020](#) is closely related here) using Latent Dirichlet allocation [Blei, 2003](#). The idea is that when key players in the international economy signal a joint policy strategy, it can have strong transmission effects due to the coordination signal alone.

I will also construct a novel shock series using news and official discourse surrounding IMF debt contracts and debt-restructuring or roll-over negotiations with developing-country clients. By explicitly capturing monetary policy conditions imposed: either directly or indirectly through IMF lending arrangements, this measure reflects international monetary coordination in a broader sense than existing approaches, such as [Armelius, 2020](#), which focus on only 23 advanced economies. This will be my major empirical contribution.

¹Of course, the mandate and objectives of policy-makers in the age of nation states does not require them to cool down global business cycles but achieve price/output stability at national levels.

²For instance, the EU and Federal Reserve collaborate to deal with common monetary shocks. The Oxford-NYU Fed conference or the Jackson Hole Conference is another example of coordination through sharing best practices in monetary policy.

³Bank for International Settlements.

The empirical analysis will use newly assembled cross-country panel covering 190 countries over the period 1950-2024, drawing on the IMF Global Debt Database, FRED, the Global Macroeconomic Database Müller, 2025, and the Monetary Policy Event Study Database for FOMC announcements Acosta, 2025. Whereas, the econometric methodology for shock-transmission will primarily use SVAR-IV approach, explained in StockWatson, 2018 and also used by GertlerKaradi, 2015 and MertensRavn, 2013. For robustness checks, I will also use local projections for panel data (see Jordà, 2023) due to their elegance and popularity in hitherto literature as an alternative tool.

Moreover, the project will utilize tools at the intersection of macro-econometrics and network science, building on the frameworks of DieboldYilmaz, 2015, DieboldYilmaz, 2023 and Elliott, 2014 (see De Paula, 2020 for a review of econometric methods for networks), to uncover the network structure governing international monetary transmission. This approach allows assessment of whether U.S. Federal Reserve shocks reach Central Asia primarily through regional intermediaries such as Pakistan or Egypt, or instead via direct bilateral channels. Similarly, for Europe, the analysis examines whether transmission is concentrated through core economies such as France and Germany or whether exposure to Federal Reserve shocks is broadly uniform across countries. While such financial contagion has been studied, existing work is highly Eurocentric and my focus on global spillovers through networks including the ones in Asia, Africa and South America.

Another objective is to quantify welfare changes in observed transmission channels relative to a counterfactual benchmark in which global monetary policy objectives are fully coordinated and transmission is direct for all countries. The full-information benchmark is not necessarily a first best since that depends on normative questions and some shocks may be harmful for the receiving economies, which may benefit from insulation. Such a welfare approach to network structure is also sparse in existing work, which is another contribution.

3. QUESTIONS

The questions I aim to answer through this research agenda are stated below:

- Does coordination of monetary policy matter for the global business cycle? If so, then what is the magnitude and horizon of its impact on inflation, output gap, financial markets and their volatility across countries?

- What is the network structure of US monetary policy transmission across the world? What are the key hubs for transmission in Europe, Asia and Africa?
- What is the welfare loss or gain for countries relative to a world with full coordination and seamless transmission of monetary policy: a global monetary union.

4. MONETARY SPILLOVER NETWORK

The graph below shows a hypothetical monetary transmission network including some countries from Europe, Central Asia, South Asia and Africa for illustrative purposes. For some countries such as Japan or France, there is a direct spillover of monetary policy shock from USA and vice-versa; whereas for other countries such as Botswana, Greece or Uzbekistan, there is only an indirect pathway through key players in the region. Moreover, some connections are uni-directional such as from US to Pakistan where monetary shocks in Pakistan do not impact US.

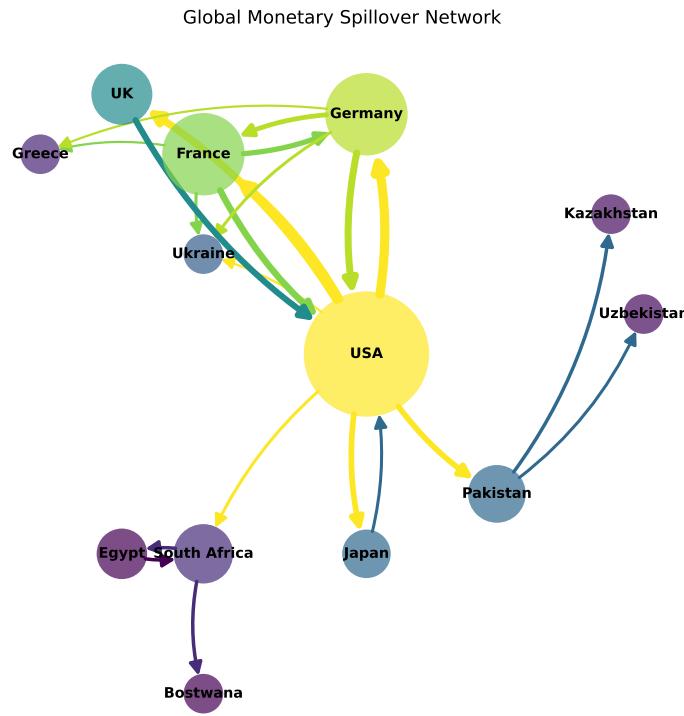


Figure 1: Hypothetical Global Monetary Spillover Network

5. STYLIZED VAR

For ease of exposition, the reduced form VAR is provided below:

$$Y_{c,t} = \sum_{j=1}^p \delta_j Y_{c,t-j} + \epsilon_t + \mu_{c,t}^4. \quad (1)$$

$Y_{c,t} = (r_t \ \tilde{y}_{c,t} \ \pi_{c,t})^T$ consists of a mix of country/region level and global variables: r_t is federal funds rate in USA, $\pi_{c,t}$ is inflation at country or regional level and $\tilde{y}_{c,t}$ is output gap at country or region level. The shocks to be identified are: $\epsilon_{r_t}, \sigma_{r_t}$ i.e. level and volatility shocks to Federal Funds Rate which will be proxies for global interest rate level and uncertainty shocks. Meanwhile, dynamic transmission has to be measured for all three variables⁵ and for each country/region. For identification of shocks, SVAR-IV and local projections using BIS and IMF debt events described above will be used.

6. RELATION WITH CLOSELY RELATED WORK

Firstly, I will replicate and extend results of [Armelius, 2020](#) which is useful since the literature on this question is sparse; to the best of my knowledge, [Armelius, 2020](#) is the only published paper, using BIS events as shocks. However, my major and minor proposed contributions go beyond [Armelius, 2020](#) and are stated below:

- **Major Contributions**

- Since BIS-based shocks restrict identification to at most 30 member countries (and 23 observer countries)⁶ and are available only from 2002 onwards, I will construct a *novel* IMF-meetings and communications-based shock series. This approach allows the extension of monetary coordination shocks to a broader set of countries and time periods, also including emerging economies such as Pakistan, Sri Lanka, and Egypt.
- I will quantify welfare losses and gains across different regions under the current international monetary system relative to a counterfactual scenario featuring seamless global monetary policy integration.

⁴The corresponding structural form $AY_{c,t} = \sum_{j=1}^p \alpha_j Y_{c,t-j} + A\epsilon_t + A\mu_{c,t}$ ([Lütkepohl, 2005](#))

⁵I will use HCPI: harmonized consumer price inflation as a baseline for $\pi_{c,t}$.

⁶If common speeches are considered, the set of identified shocks becomes even smaller.

- **Minor Contributions**

- While Armelius, 2020 discuss the role of central bank networks where the Federal Reserve is central but signals from other central banks⁷ play a limited role, they do not conduct an explicit network analysis, particularly with respect to network structure and is also Eurocentric apart from the exception of Japan. Whereas, I will more directly measure and characterize monetary policy transmission networks using methods developed in DieboldYilmaz, 2015 and De Paula, 2020 for the global economy.
- I will employ more transparent and contemporary econometric methodologies, such as Panel Local Projections (Panel-LP) Jordà, 2023⁸ and SVAR-IV, instead of VARs with sign restrictions used in Armelius, 2020. The latter imposes stronger assumptions on the data-generating process and offers less flexibility.

⁷Notably the Bank of Japan and the European Central Bank.

⁸Local Projections.

7. APPENDIX: LITERATURE

My question broadly relates to currently growing literature on global spillovers of monetary policy shocks (see for instance [Kansoy, 2025](#); [PinchettiSzczeplaniak, 2024](#) and [Miranda-AgrippinoRey, 2020](#)). For instance, [LastauskasNguyen, 2023](#) study the impact of an increase in US based monetary policy uncertainty (MPU) and its transmission effects: they find that policy rate uncertainty decreases output and inflation in the US, raises output and inflation volatility in the US and has effects on the global business cycle. One potential interpretation of the shocks I wish to construct could be that they reduce monetary policy uncertainty ([Bloom, 2009](#)) through signaling collaboration and communication across international borders.

While there exists a significant literature on central bank communication with the public including financial sector *within* a country, since the seminal work summarized in [Blinder, 2001](#), [Woodford, 2005](#) and others [HansenMcMahon, 2016](#), the literature on global spillover of this communication channel is sparse. The details regarding how signals regarding international cooperation or synchronization of policy are communicated to global markets need further exploration. More specifically, to the best of my knowledge, BIS shocks have been used in recent work only by [Armelius, 2020](#) and [ImisikerTas, 2019](#) where [Armelius, 2020](#) is the only published work.

Lastly, since I will construct an IMF communications shock, my work relates to debt restructuring and debt traps faced by emerging economies (classical work on these topics includes: [Eichengreen, 2003](#), [Dvorkin, 2021](#), [ReinhartRogoff, 2010](#) and [Panizza, 2009](#)). This literature highlights that sovereign debt crises in emerging economies are marked by prolonged restructurings, sizable output losses, and persistent exclusion from capital markets. High debt levels can generate debt traps in which low growth and elevated risk premia mutually reinforce each other. Restructuring outcomes are shaped by legal frictions, creditor coordination problems, expectations about future policy and political stability. In this environment, IMF communications can play a critical role by influencing beliefs about debt sustainability, restructuring prospects, and the timing and severity of market discipline.

REFERENCES

- Acosta, M., Ajello, A., Bauer, M., Loria, F., & Miranda-Agrippino, S. (2025). *Financial market effects of FOMC communication: Evidence from a new event-study database* (Working

Paper No. 2025-30). Federal Reserve Bank of San Francisco. <https://doi.org/10.24148/wp2025-30>

- Armelius, H., Bertsch, C., Hull, I., & Zhang, X. (2020). Spread the word: International spillovers from central bank communication. *Journal of International Money and Finance*, 103, 102116.
- Blanchard, O., Ostry, J., & Ghosh, A. (2013). International policy coordination: The loch ness monster." imfdirect.
- Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent dirichlet allocation. *Journal of machine Learning research*, 3(Jan), 993–1022.
- Blinder, A. S. (2001). *How do central banks talk?* Centre for Economic Policy Research.
- Bloom, N. (2009). The impact of uncertainty shocks. *econometrica*, 77(3), 623–685.
- De Paula, Á. (2020). Econometric models of network formation. *Annual Review of Economics*, 12(1), 775–799.
- Diebold, F. X., & Yilmaz, K. (2023). On the past, present, and future of the diebold–yilmaz approach to dynamic network connectedness. *Journal of Econometrics*, 234, 115–120.
- Diebold, F. X., & Yilmaz, K. (2015). *Financial and macroeconomic connectedness: A network approach to measurement and monitoring*. Oxford University Press.
- Dvorkin, M., Sanchez, J. M., Saprista, H., & Yurdagul, E. (2021). Sovereign debt restructuring. *American Economic Journal: Macroeconomics*, 13(2), 26–77.
- Eichengreen, B. (2003). Restructuring sovereign debt. *Journal of Economic Perspectives*, 17(4), 75–98.
- Elliott, M., Golub, B., & Jackson, M. O. (2014). Financial networks and contagion. *American Economic Review*, 104(10), 3115–3153.
- Gertler, M., & Karadi, P. (2015). Monetary policy surprises, credit costs, and economic activity. *American Economic Journal: Macroeconomics*, 7(1), 44–76.
- Hansen, S., & McMahon, M. (2016). Shocking language: Understanding the macroeconomic effects of central bank communication. *Journal of International Economics*, 99, S114–S133.
- Imisiker, S., & Tas, B. K. O. (2019). International monetary policy coordination through communication: Chasing the loch ness monster. *58th issue (June 2019) of the International Journal of Central Banking*.
- Jordà, Ò. (2023). Local projections for applied economics. *Annual Review of Economics*, 15(1), 607–631.
- Kansoy, F. (2025). The immediate global impact of us monetary policy.

- Lastauskas, P., & Nguyen, A. D. M. (2023). Global impacts of us monetary policy uncertainty shocks. *Journal of International Economics*, 145, 103830. <https://doi.org/https://doi.org/10.1016/j.inteco.2023.103830>
- Lütkepohl, H. (2005). *New introduction to multiple time series analysis*. Springer Science & Business Media.
- Mertens, K., & Ravn, M. O. (2013). The dynamic effects of personal and corporate income tax changes in the united states. *American economic review*, 103(4), 1212–1247.
- Miranda-Agrippino, S., & Rey, H. (2020). Us monetary policy and the global financial cycle. *The Review of Economic Studies*, 87(6), 2754–2776.
- Müller, K., Xu, C., Lehbib, M., & Chen, Z. (2025). *The global macro database: A new international macroeconomic dataset* (Working Paper No. 33714). National Bureau of Economic Research. <https://doi.org/10.3386/w33714>
- Panizza, U., Sturzenegger, F., & Zettelmeyer, J. (2009). The economics and law of sovereign debt and default. *Journal of Economic Literature*, 47(3), 651–698.
- Pinchetti, M., & Szczepaniak, A. (2024). Global spillovers of the fed information effect. *IMF Economic Review*, 72(2), 773–819.
- Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a time of debt. *American Economic Review Papers and Proceedings*, 100(2), 573–578.
- Stock, J. H., & Watson, M. W. (2018). Identification and estimation of dynamic causal effects in macroeconomics using external instruments. *The Economic Journal*, 128(610), 917–948.
- Woodford, M. (2005). Central bank communication and policy effectiveness.