

Department of Economics and Finance



The Time-Varying Effect of Monetary Policy on Income Inequality in the US

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events such as financial market liberalization and changes in the Federal Reserve's priorities, and short-term unexpected shocks like policy decisions or announcements

However, studies on the e!

debate. A benchmark study is provided by Primiceri (2005), who provided not only the time-varying counterparts to the fixed-parameter structural VARs but also added to the bad luck side of the story as did Benati and Mumtaz (2007) in the upcoming years based on sign restrictions.

Regarding more recent investigations on the time-varying effects of monetary policy, Aastveit et al. (2017) examines whether the FED responded to the house and stock price changes. The findings state that stock price growth (represented by the S&P500) entered the reaction function with a positive and significant coefficient. Similar conclusions are provided for house prices. A study that looks at the response of asset prices to a monetary policy shock, i.e. deviations from the monetary policy rule and hence, the other side of the picture compared to Aastveit et al. (2017) is provided by Paul (2020). The author states that a monetary policy shock always leads to decreased industrial production, inflation and house prices. Thereby, stock and house prices show a substantial time variation in their responses.

in McKay and Wolf (2023). The crucial insights are that new heterogeneous agent approaches are placing more weight on the indirect effects (i.e., general equilibrium forces) to explain the transmission channels of monetary policy shock (Arupudias et al. (2018).

The empirical front of this area presents mixed findings of monetary policy on inequality concerning the signs of the effects. A concise yet inclusive list of benchmark studies reveals evidence that suggests expansionary monetary policies can increase inequality (Chetty et al. (2017), Cloyne et al. (2018)) while others confirm that a monetary tightening leads to an increase in inequality especially in the US (Gorbunov et al. (2017)), the UK (Mumtaz and Theophilopoulou (2017)), the EU (Guerello (2018), Samarina and Nguyen (2019)) as well as a sample of countries (Furceri et al. (2018)).

3 Data and Instrument

We use household data from the real-time inequality database. Following Blanchet et al. (2022) this database produces monthly income distributions that become available within a few hours after the official high-frequency national account aggregates are published. It uses publicly available data sources and combines monthly and quarterly survey data with corresponding monthly and quarterly national account statistics. One positive feature of this approach is that it is free of the common drawback of pure survey-based data that tend to underestimate the level of inequality.

measure to decompose growth since it adds up to national income. We calculate the sum of income by ID and define income at the household level. Based on the provided weights, we derive the deciles of factor income and its main components. Our Pnal dataset comprises the deciles of total income, capital income, labour income, as well as the sub-components of capital income (i.e., interest income, corporate profits and proprietors' income). Thereby, the first decile comprises the average income of households from the 0 to the 10th percentile, the second decile comprises households between the 10th and the 20th percentile, and so on. Using the deflator provided in the database, we then calculate real income values

functions. The relative IRF can be derived by:

$$r_{kj} =$$

5 Baseline Results

Our baseline results are presented in Figure 4 (which shows the time-varying effects of a monetary policy shock on the US economy from January 1991 to September 2017). While it is common to normalize the shock to make the impact response of the policy rate equal for every year, this method would result in rescaled shock sizes every year. Therefore, in our estimation, we normalize the shock to produce a 20 basis point impact increase in the

(a) Interest Rate

(b) CPI

(c) Shares

(d) Industrial Production

(e) P80/P20

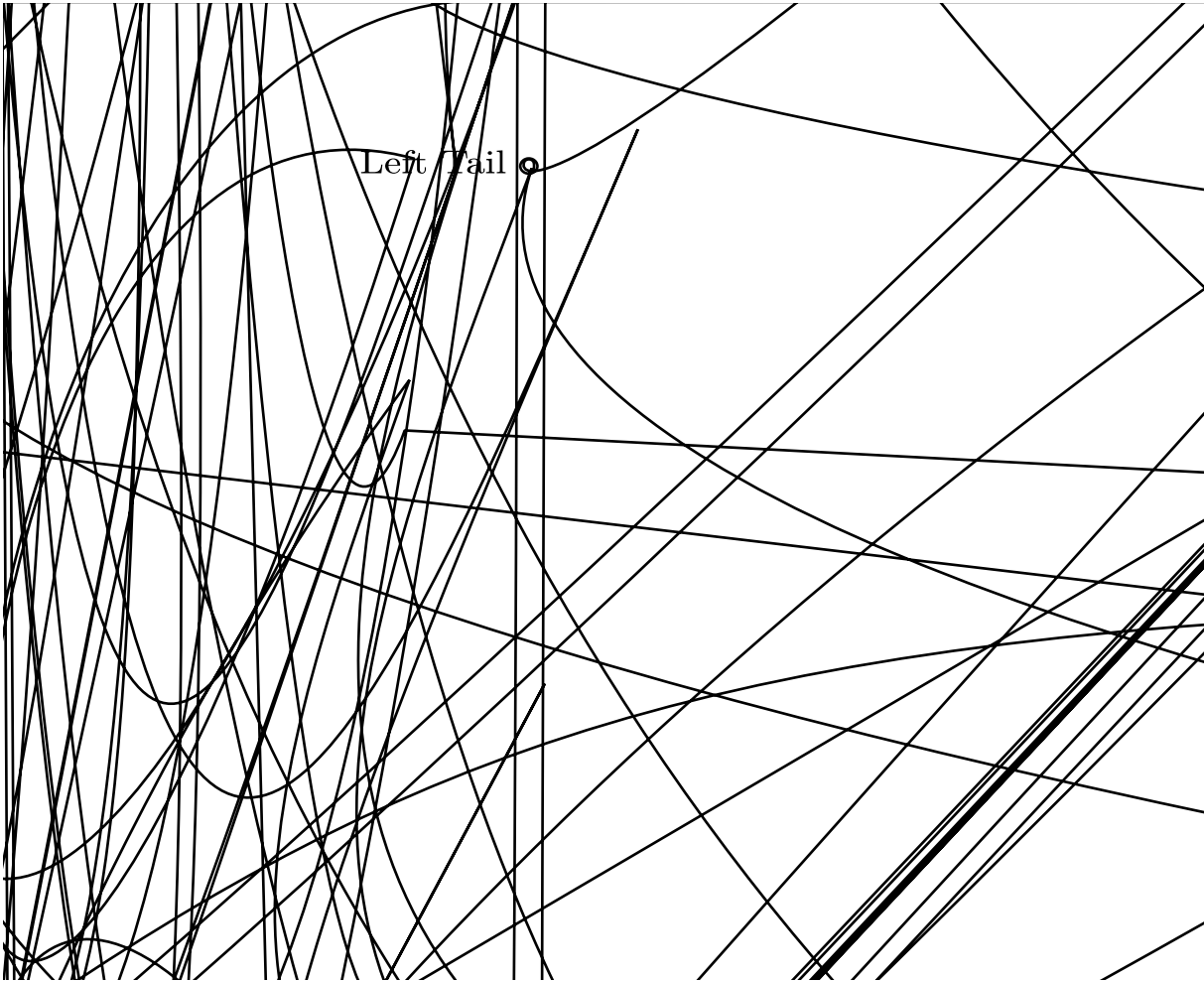
Figure 1: Baseline Results - cumulative IRFs to a contractionary monetary policy shock that lead to an increase of 20 Bps in the FFR in 1991M1. All variables entered the model in log differences except the FFR.

P80/P20 ratio (red line) in a 2D format along the time axis. Looking at the levels of inequality, the figure displays high fluctuations over the observation period. The P80/P20 ratio decreased substantially during the first decade of the sample reaching the lowest level closely after the dotcom crisis. The period between the dotcom crisis and the great financial crisis in 2008 was characterized by rather stagnating levels of income inequality. The great financial crisis left the US $uneq_6(t) = -390.8$ (P Tf [2 (i)) -0. (a) -0.8 (i)6.2 (y) 80 -390. -1

(a) P50/P20

(b) P80/P50

Figure 3: Tails of the Income Distribution - cumulative IRFs to a contractionary monetary policy shock. All specifications equal the Baseline estimation.



as we move up the income distribution. Households at the top end of the distribution tend to receive a significant proportion of their income from other sources than labour i.e., businesses and interests. Consequently, capital income, whose main components are corporate profits and interest income, plays a significant role for high-income households, indicating a higher exposure to financial markets of this group. While the literature states that business income (i.e., corporate profits and proprietors' income) is negatively

(a) Capital Income Left Tail

(b) Labour Income Left Tail

(c) Capital Income Right Tail

(d) Labour Income Right Tail

Figure 6: Impulse Response Functions of the main Income components. The Figure presents the two tails of the income distribution. All settings of the estimation equal the benchmark specification.

Looking at the response of interest income inequality, we observe that the impact of the shock varies considerably over time. In more recent years, the IRFs indicate both more persistent and more pronounced reactions. The highest point of this increase was reached during the crisis of 2008. After the crisis the responsiveness remains at high levels. At the same time, the right tail displays a short-term increase in inequality in the right tail which remains homogeneous over time.

Turning to inequality in proprietors' income, the left tail displays a similar shape as seen for the previous component. The responsiveness of inequality in the first decade of the sample remains low and slightly increases above zero. However, this behaviour changed after the dotcom crisis in 2001. Inequality becomes more responsive and even displays

(a) Corp. ProBts Left Tail

(b) Corp. ProBts Right Tail

2. Hyperparameter selection: as noted by Primiceri (

(a) Time-Varying Volatility

8 Conclusion

of capital income inequality, we decomposed capital income into its main components. We find substantial time variation in the responsiveness to a monetary policy shock for each component of the left tail with all components indicating a persistent increase in the left tail that lasts over the whole IRF horizon. Compared to these findings the results regarding the right tail display a short-term increase in inequality which gradually fades away over the IRF horizon. This effect is less time-varying with the only exception be-

References

Aastveit, Knut Are, Francesco Furlanetto and Francesca Loria, 2017, Has the Fed responded to house and stock prices? A time-varying analysis,

Furceri, Davide, Prakash Loungani and Aleksandra Zdzienicka, 2018, The effects of monetary policy shocks on inequality, *Journal of International Money and Finance* 85(C), 168-186.

Gertler, Mark and Peter Karadi, 2015, Monetary Policy Surprises, Credit Costs, and Economic Activity, *American Economic Journal: Macroeconomics* 7(1), 44-76.

Giannone, Domenico, Lucrezia Reichlin and Michele Lenza, 2008, Explaining the Great Moderation: It Is Not the Shocks, *Journal of the European Economic Association* 6(2/3), 621-633.

Gornemann, Nils, Keith Kuester and Makoto Nakajima, 2021, Doves for the Rich, Hawks for the Poor? Distributional Consequences of Systematic Monetary Policy, *ECON-*

Lubik, Thomas A. and Christian Matthes, 2015, Time-Varying Parameter Vector Autoregressions: Specification, Estimation, and an Application, *Economic Quarterly* (4Q), 323-352.

McKay, Alisdair and Christian K Wolf, 2023, Monetary policy and inequality, *Journal of Economic Perspectives* 37(1), 121-144.

Michael, FORSTER, 2014, United States-TACKLING HIGH INEQUALITIES CREATING OPPORTUNITIES FOR ALL-JUNE 2014.

Miranda-Agrippino, Silvia and Giovanni Ricco, 2015, The Transmission of Monetary Policy Shocks, *Discussion Papers 1711*, Centre for Macroeconomics (CFM).

Mumtaz, Haroon and Angeliki Theophilopoulou, 2017, The impact of monetary policy on inequality in the UK. An empirical analysis, *European Economic Review* 98(C), 410-423.

Paul, Pascal, 2020, The Time-Varying E!

Theophilopoulou, Angeliki, 2022, The impact of macroeconomic uncertainty on inequality: An empirical study for the United Kingdom, *Journal of Money, Credit and Banking* 54(4), 859D884.

A Appendix: The Evolution of the Real Factor Income Share Gap in the US

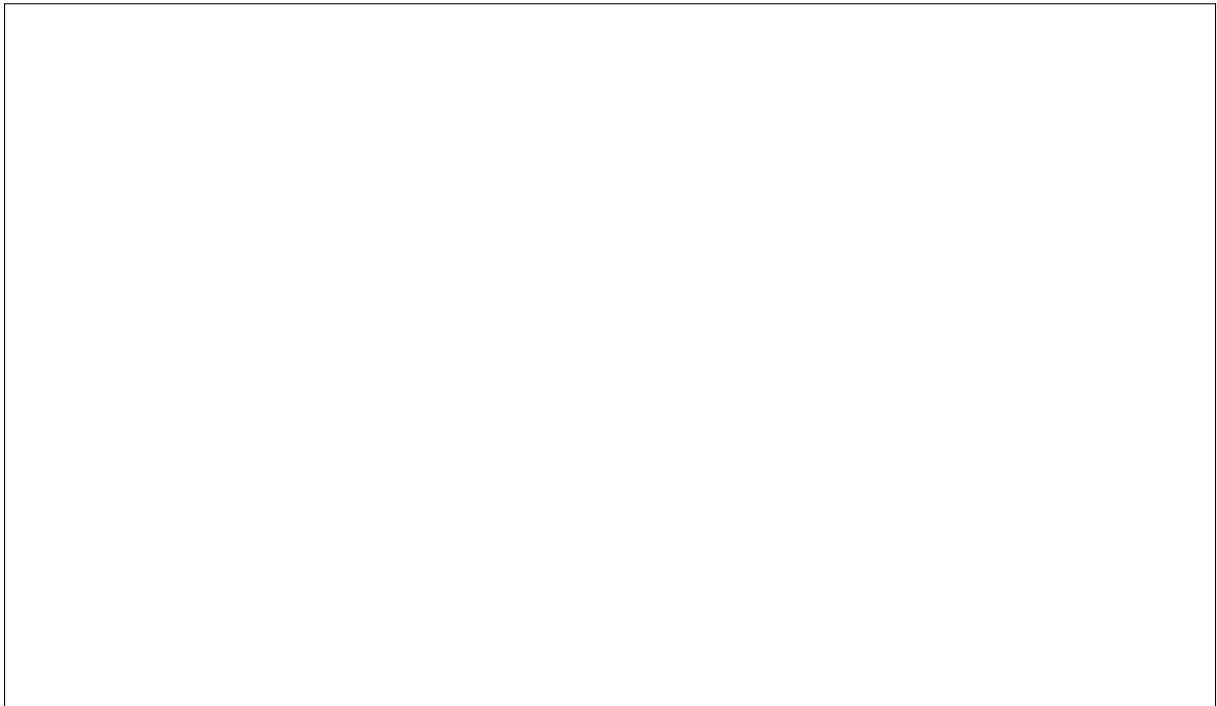


Figure 9: The evolution of real factor income share in the US by the corresponding percentile. Factor income is defined as the sum between labour and capital income and deflated by the GDP deflator. The data is available at the Realtime Inequality Database which can be accessed [here](#)

C Appendix: Stochastic Volatility Extension: Overall setup and priors

In our robustness check of plot (a) in Figure 7, we extend the volatility setup following Cogley and Sargent (2005). Consider the following decomposition of the variance-covariance matrix of the VAR errors from equation (6) in the main text:

$$\Sigma = C^{-1} H_t C^{-1} \quad (8)$$

with C being a lower triangular matrix of covariance parameters and H_t a diagonal ma-