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**Working Paper**

## News Shocks under Financial Frictions: A comment on Görtz et al. (2022)

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Thomas Ash

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**August 2023**

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# News Shocks under Financial Frictions: A comment on Görtz et al. (2022)\*

Thomas Ash, Giorgi Nikolaishvili, Ethan Struby<sup>†</sup>

July 1, 2023

## Abstract

Görtz et al. (2022) estimate the effects of innovations to future total factor productivity (TFP) on financial markets. In a Bayesian vector autoregression, they identify a TFP news shock as one that explains the largest share of 40-quarter ahead forecast error variance (FEV) of TFP. Their estimated impulse responses functions show that a positive news shock significantly decreases credit market spreads and increases credit market supply. They also find that a shock that explains the maximum of the FEV of the “excess bond premium” (EBP) (Gilchrist and Zakrajsek 2012) causes similar responses. These results are consistent with an estimated DSGE model with financial frictions.

We estimate the main IRFs of the study using the original data and a frequentist estimation approach. We obtain similar point estimates for the dynamic responses to TFP news and EBP max-share shocks. We also update their macroeconomic and financial time series, as some of the data has been revised substantially since their original estimate. We use the updated data to re-estimate the above-mentioned IRFs, and we find that the results are robust to this change in the data. Finally, we investigate the computational reproducibility of their DSGE results, and find that their provided code (consistent with warnings in their README file) does not execute in the most recent version of Dynare or Matlab. Using the version indicated in their replication files, we encounter issues estimating the posterior mode.

**KEYWORDS:** Replication, News Shocks, Financial Frictions, Excess Bond Premium

**JEL CODES:** E12, E31, E32, E44, G12, G21

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## 1 Introduction

[Görtz et al. \(2022\)](#) re-examine the contribution of news about future total factor productivity as a source of business cycle variation. The previous literature had disagreed on the importance of news shocks; studies employing VARs tended to find that news shocks were important, while estimated DSGE models had not attributed much importance to these shocks. The authors use both structural VARs and an estimated New Keynesian DSGE model to (re)establish that news shocks are an important source of business cycles, and reconcile the two literatures by demonstrating that and that financial frictions underpin news shocks' macroeconomic effects. Particularly, they show that TFP news shocks induce similar impulse responses as a shock identified to explain the maximum forecast error variance ("max FEV") of the [Gilchrist and Zakrajsek \(2012\)](#) excess bond premium. They then show a two-sector New Keynesian DSGE model augmented with a financial friction can generate a similar data pattern.

Our replication focuses on the structural VAR findings. In light of significant data revisions to the underlying macroeconomic data and estimates of utilization-adjusted total factor productivity from [Fernald \(2012\)](#), we reconstruct the [Görtz et al. \(2022\)](#) dataset. We code a frequentist version of their VAR in a different programming language (R). In doing so, we note that the max-FEV share method results in two possible solutions (corresponding to different signs of the impulse responses). If we pick the sign that is consistent with the authors' original reported impact responses, the changes in the statistical framework, programming environment, and data vintage do not qualitatively affect their main findings. Most of the quantitative results are also similar, although we find a larger quantitative response of default risk to news shocks than the authors.

We also conduct a robustness test examining the identification of news shocks with different time horizon choices. We investigate this in part because the news shock literature has considered different horizons (e.g. [Francis et al. \(2014\)](#) use

a maximum of 20 quarters, while [Kurmann and Sims \(2021\)](#) use a horizon of 80 quarters). We find that, using our alternative estimation method, the effects of news shocks appear sensitive to the horizon choice; the response of the excess bond premium fall notably at shorter horizons. This suggests that the effects the authors identify are most important for longer horizons horizons of news (between 5 and 10 years).

In the context of the 2023 San Diego Replication Games, we did not have time to fully replicate the DSGE estimation exercise in the paper. We did examine the computational reproducibility of the authors' results using the provided code. Consistent with the authors' warnings in their README file, the DSGE model code does *not* run in the most recent version of Dynare ([Adjemian et al. \(2022\)](#)), but does run in the version the authors indicate.

## 2 Reproducibility

**Computational Reproducibility: Data** We attempted to build the main dataset for the VAR model from scratch using the indicated sources and most of the transformations the authors used in their provided Excel file, but using the most recent available vintage of the data.<sup>1</sup> A comparison of the data provided by the authors and the replicated data set is shown in figure 1.

Some of the differences – particularly, in the first line of the figure – are due to changes in the underlying source data due to NIPA revisions or updates in the methodology used by [Fernald \(2012\)](#). This affects both the nominal and real quantities of the series used to construct the data, but the differences (with the exception of TFP levels) appear to be relatively minor. The source of the difference in the [Gilchrist and Zakrajsek \(2012\)](#) default risk measure (“default risk”) is unclear – it does not appear to be a result of scaling, and the other two data series from the same source are similar to their counterparts in the replication package. The level differ-

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<sup>1</sup>One of the extensions in the original paper used the value of bank equity for the aggregate economy, using data from CRSP. We took the authors' values for this series as given in the interest of time.

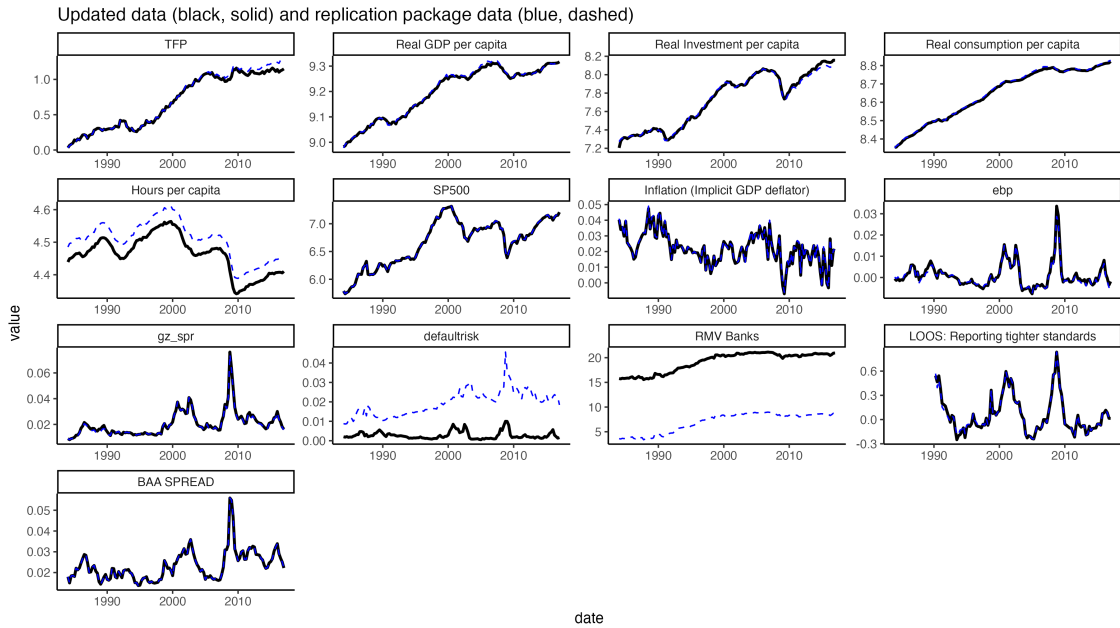


Figure 1: Original and updated data

ence in the real value of banks (“RMV Banks”) is primarily due to an inconsistency in the original source data. The authors originally index the civilian population to 1 in Q3 of 1992, and then use the index to scale per-capita variables (real consumption, investment, GDP, and hours per capita, and the SP500 index). However, the RMV Banks measure in the replication files is scaled with actual population, rather than the population index. It’s not clear whether this was an intentional choice by the authors or a coding error. We chose to use the same scaling for all per-capita variables. This difference in levels does not meaningfully impact the results.

**Computational reproducibility: VAR Model.** Our goal was to reproduce the main VAR figures using a different software package (R). We were able to replicate the authors’ figures using a simple maximization routine to maximize the forecast error variance and using the restrictions identified by the authors.

One challenge was identifying the exact maximization problem and ensuring that the argument to be maximized had the desired effect on the objective function. We note that the maximization problem, as it maximizes the square of an error term, has two solutions – one negative and one positive. In our replication, we focus on the solution that matches the sign of the mean impact response reported in [Görtz](#)

[et al. \(2022\)](#).

### 3 Replication

**Conceptual replicability: Authors’ data, new estimation procedure** Below we present our replicated figures which mostly replicate the authors’ qualitative findings; for the most part, the OLS estimates fall within the posterior credible bands of the authors’ results.

The sole notable difference is in the response of default risk in Figure 3. The authors conclude that it is primarily the Excess Bond Premium (EBP) affected by the news shock, noting in their Figure 2 that the IRF for default risk looks small and unrelated to the GZ spread response. We find a more pronounced and persistent response of default risk. The main difference in our approaches is that we use a classical OLS estimation approach rather than a Bayesian approach. It may be that the prior used by the authors is dampening the response of default risk; with flat priors, the posterior of a VAR is centered at the OLS ([Giannone et al. \(2015\)](#)) so it seems like the prior is exhibiting more influence for default risk in particular.

However, the core argument of the authors – that the “max FEV EBP shock” still reproduces similar dynamics to the TFP news shock – continues to hold. (The relatively higher path for output, consumption, and TFP are also consistent with figure 3 in [Görtz et al.](#)) This suggests that the authors’ DSGE modeling strategy continues to be justified by the VAR.

**Direct replicability: new data, new code** In figures 5 - 7, we replicate the authors’ Figures 1-3 using the new data described in the previous section. Qualitatively, conclusions remain the same; relative comparisons do change slightly.

**Robustness: Old data, new code.** We conduct one robustness test. [Görtz et al.](#), following [Francis et al. \(2014\)](#) identify the TFP news shock in as the shock that maximizes the variance of TFP at a “long, but specific horizon.” [Görtz et al.](#) choose



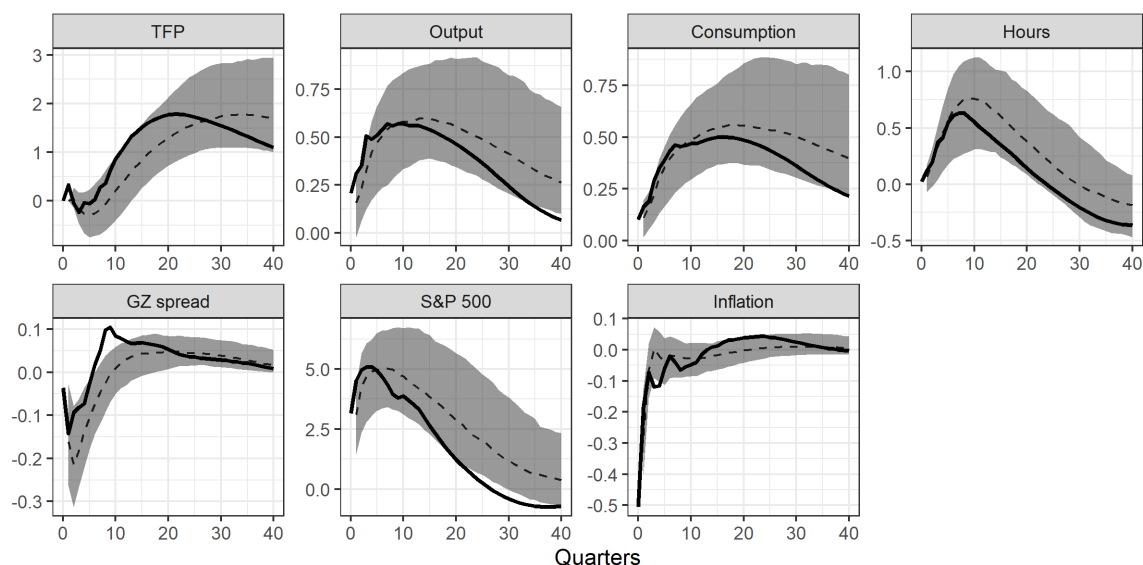


Figure 2: Replication of Figure 1 (impulse response to a TFP news shock) from [Görtz et al. \(2022\)](#), using their data. Solid black line is estimated using OLS as described in the text. Dashed line is the mean posterior draw using the replication code provided by [Görtz et al.](#); gray bands are the 16 percent and 84 percent posterior bands using their code.

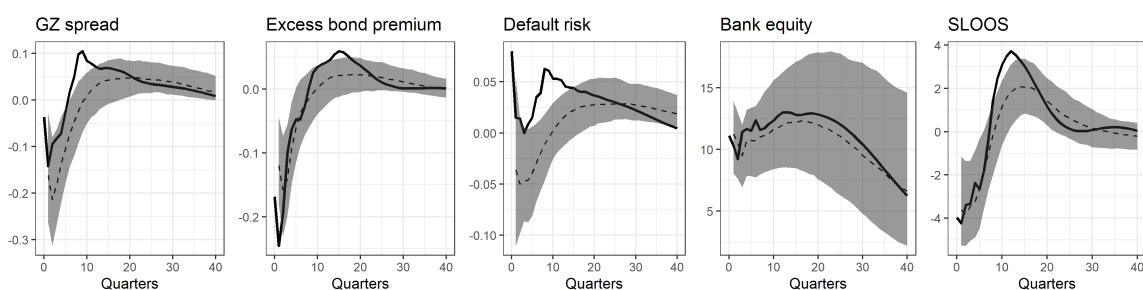


Figure 3: Replication of Figure 2 (response of financial variables to a TFP news shock) from [Görtz et al. \(2022\)](#), using their data. Solid black line is estimated using OLS as described in the text. Dashed line is the mean posterior draw using the replication code provided by [Görtz et al.](#); gray bands are the 16 percent and 84 percent posterior bands using their code.

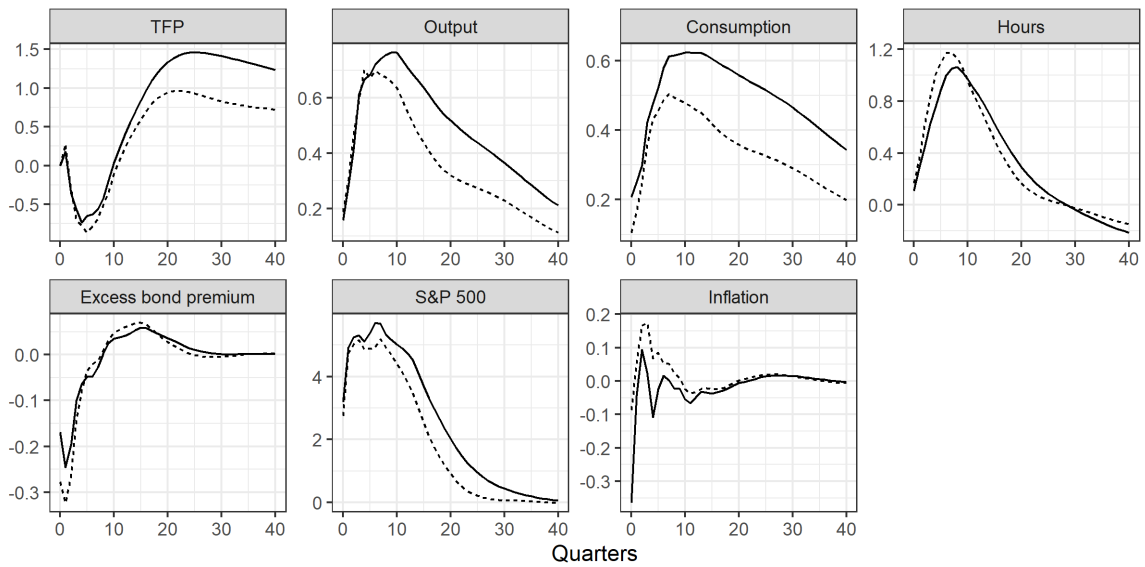


Figure 4: Replication of Figure 3 (comparison of TFP news shock to “max FEV EBP shock” from [Görtz et al. \(2022\)](#)). Estimated using OLS as described in the text. Solid black line is estimated using OLS as described in the text. Solid black line is the TFP news shock; dashed line is the max FEV EFB shock.

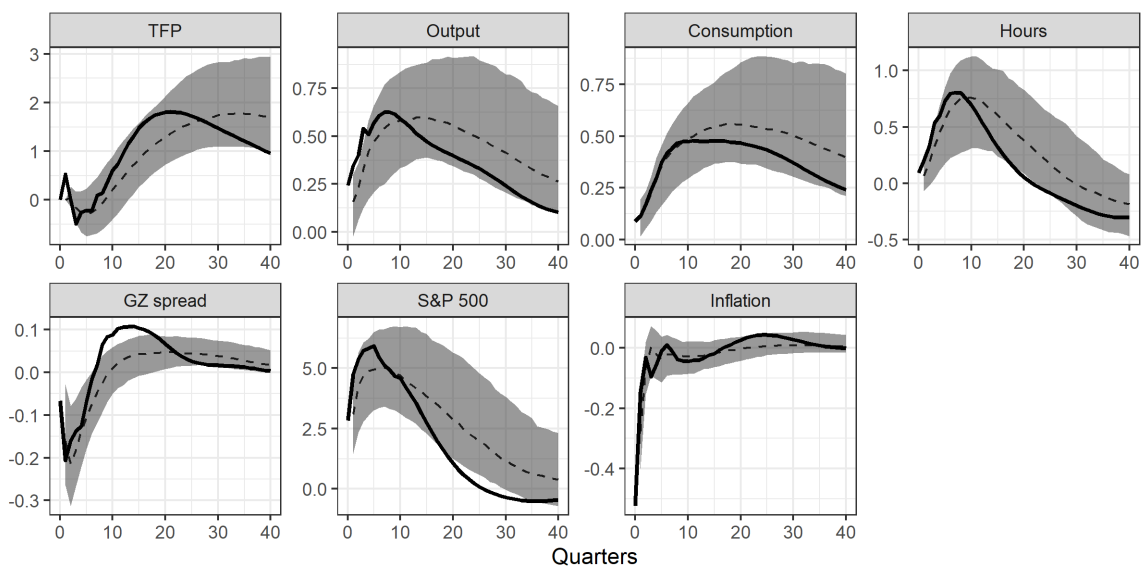


Figure 5: Replication of Figure 1 (impulse response to to a TFP news shock) from [Görtz et al. \(2022\)](#), using updated data. Solid black line is estimated using OLS as described in the text. Dashed line is the mean posterior draw using the replication code provided by [Görtz et al.](#); gray bands are the 16 percent and 84 percent posterior bands using their code.

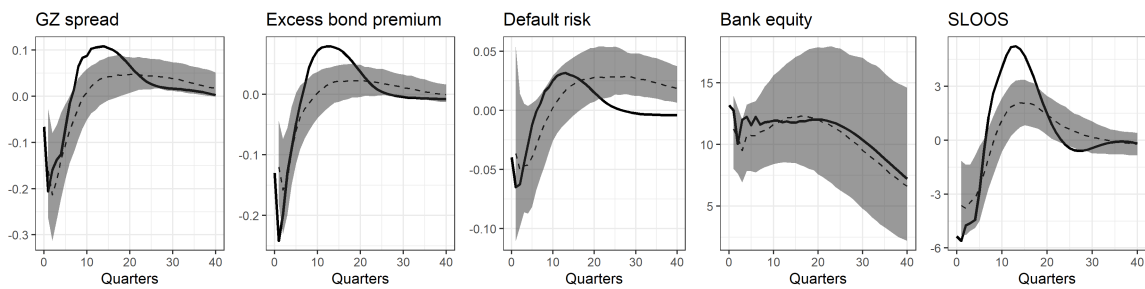


Figure 6: Replication of Figure 2 (response of financial variables to a TFP news shock) from [Görtz et al. \(2022\)](#), using updated data. Solid black line is estimated using OLS as described in the text. Dashed line is the mean posterior draw using the replication code provided by [Görtz et al.](#); gray bands are the 16 percent and 84 percent posterior bands using their code.

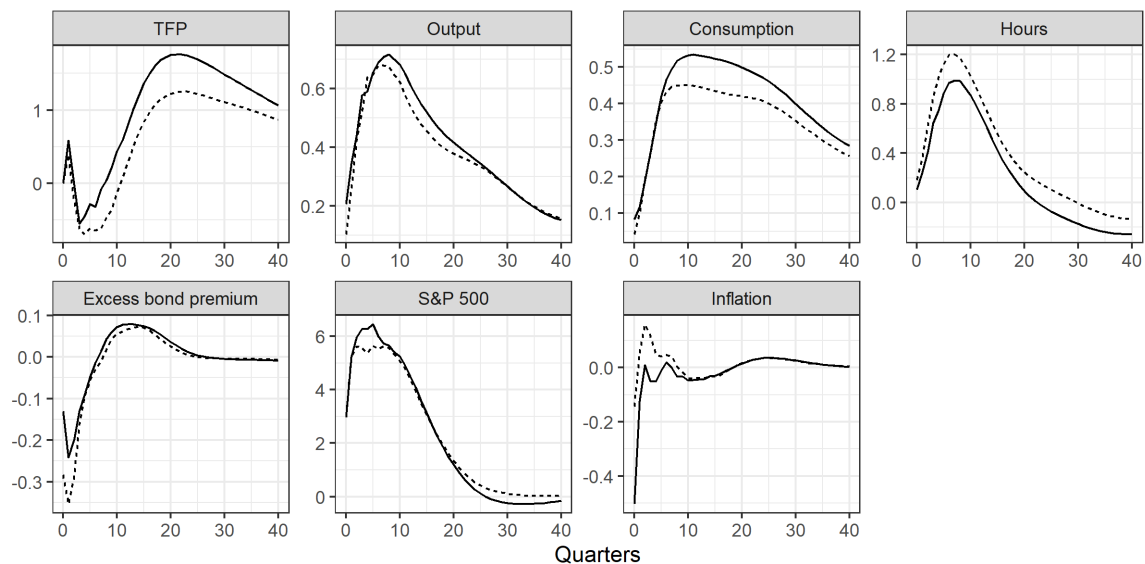


Figure 7: Replication of Figure 3 (comparison of TFP news shock to “max FEV EFB shock”) from [Görtz et al. \(2022\)](#) using updated data. Responses are estimated using OLS as described in the text. Solid black line is the TFP news shock; dashed line is the max FEV EFB shock.

40 quarters, which is longer than Francis et al. (2014) who investigate horizons from 5 to 20.

In light of these differences, we test robustness of the authors’ results to smaller horizon choices. In Figure 8 we demonstrate that the authors’ conclusions do appear sensitive to horizon choice. Using a horizon of  $h = 20$ , the figure shows a much more muted response of the real variables. The crucial decrease in the GZ spread disappears on this horizon. Since the authors are interested in the effect of changes in expectations of fundamentals far in the future this may not be an issue. However, it is interesting that this shock channel appears to rely very much on horizon periods 20-40 (using horizon choices 25 and 30 show the size of the GZ drop roughly increasing proportionally).

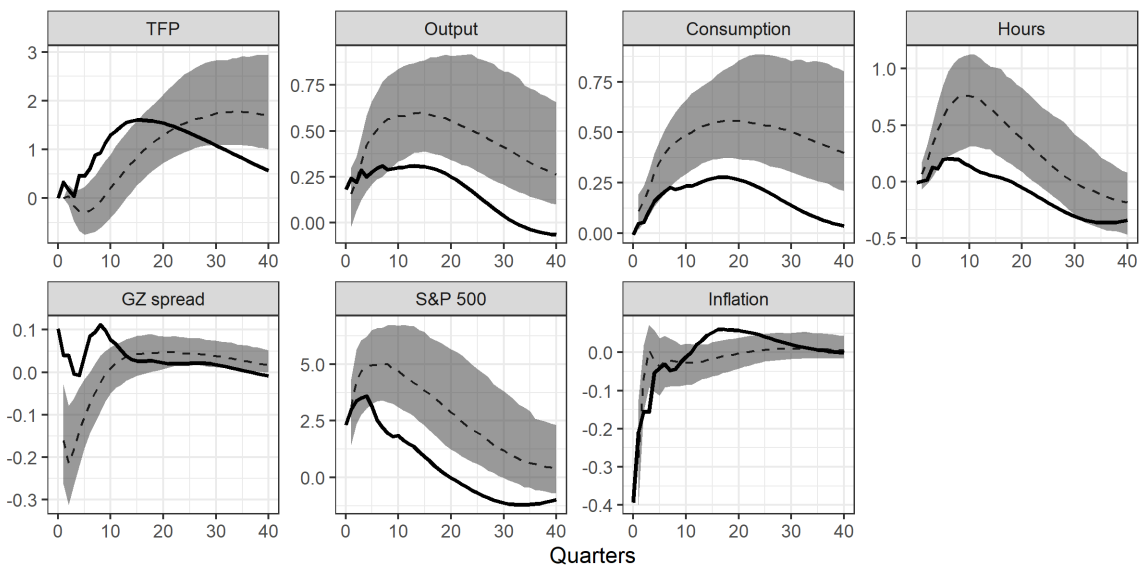


Figure 8: Robustness of Figure 1 (impulse response to a TFP news shock) from Görtz et al. (2022) using a shorter horizon of 20. Solid black line is estimated using OLS as described in the text. Dashed line is the mean posterior draw using the replication code provided by Görtz et al.; gray bands are the 16 percent and 84 percent posterior bands using their code.

**Computational Reproducibility: DSGE model** Given time constraints, our main focus in replication was on the VAR results, rather than the DSGE results. We did briefly examine the computational reproducibility of the authors DSGE code. They solve and estimate their model using Dynare (Adjemian et al. (2022)). In particular,

the original study used Dynare version 4.3.1 and Matlab version 2013b. We checked the computational reproducibility of their code on the most recent versions of both Dynare (5.4) and Matlab (2023a).<sup>2</sup> When attempting to solve the model in the most recent version of Dynare, the code fails to run because of a preprocessing error.<sup>3</sup> When run on the indicated version of Dynare, the code solves, but the replication files do not include the posterior mode used to undertake the MCMC estimation of the parameters or indicate which mode-finding algorithm the authors used. We attempted to find the posterior mode using the `csmmwel` routine provided in Dynare but the minimization produced a non-positive-definite Hessian matrix. Other procedures (such as a Monte Carlo procedure) might be more successful.

We emphasize that the authors are explicit about the version requirement in their replication files and that we did not investigate further for lack of time. We note the issues running the indicated code simply as a guide to future researchers, rather than as a criticism of the authors' replication package.

#### 4 Conclusion

We found that the main qualitative and quantitative VAR results of [Görtz et al. \(2022\)](#) are robust to the method of estimation (OLS versus a Bayesian VAR) and to updated versions of the underlying data. Future replication efforts could focus on the DSGE model and identifying (1) Whether the appropriately updated code can be run in more recent versions of Dynare and (2) The robustness of the DSGE model to perturbations in choices of prior distribution or modeling assumptions.

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<sup>2</sup>We ran the code in Windows 10 Enterprise on an Intel Core i7-1065G7.

<sup>3</sup>In particular, the model is entered in linearized form, and Dynare requires that the second derivatives of the model are zero. However, three equations – for observed credit spreads – have nonzero second derivatives. Since this error does not arise on earlier versions of Dynare, it seems likely that some change in the preprocessing code is the source of the issue.

## References

- Adjemian, S., Bastani, H., Juillard, M., Karamé, F., Mihoubi, F., Mutschler, W., Pfeifer, J., Ratto, M., Rion, N. and Villemot, S.: 2022, Dynare: Reference Manual Version 5, *Dynare Working Papers 72*, CEPREMAP.
- Fernald, J. G.: 2012, A quarterly, utilization-adjusted series on total factor productivity, *Working Paper Series 2012-19*, Federal Reserve Bank of San Francisco.
- Francis, N., Owyang, M. T., Roush, J. E. and DiCecio, R.: 2014, A flexible finite-horizon alternative to long-run restrictions with an application to technology shocks, *The Review of Economics and Statistics* **96**(4), 638–647.  
**URL:** <http://www.jstor.org/stable/43554945>
- Giannone, D., Lenza, M. and Primiceri, G. E.: 2015, Prior selection for vector autoregressions, *The Review of Economics and Statistics* **97**(2), 436–451.
- Gilchrist, S. and Zakrajsek, E.: 2012, Credit Spreads and Business Cycle Fluctuations, *American Economic Review* **102**(4), 1692–1720.
- Görtz, C., Tsoukalas, J. D. and Zanetti, F.: 2022, News Shocks under Financial Frictions, *American Economic Journal: Macroeconomics* **14**(4), 210–243.
- Kurmann, A. and Sims, E.: 2021, Revisions in Utilization-Adjusted TFP and Robust Identification of News Shocks, *The Review of Economics and Statistics* **103**(2), 216–235.  
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