Economics Bulletin

Volume 37, Issue 4

The heterogeneity of uncertainty shocks: evidence from France

Idriss Fontaine
University of Cergy-Pontoise - THEMA

Abstract

This paper investigates whether the effects of uncertainty shocks on the French economy are heterogeneous. By exploiting two different measures of uncertainty, one reflecting policy uncertainty and another one reflecting financial uncertainty, I find important discrepancies in the responses of French macro-variables. In particular, consumption and employment do not respond significantly to a financial uncertainty shock while they significantly decrease after a policy uncertainty shock. Furthermore, in contrast to policy uncertainty, financial uncertainty is not a major driver of business cycles fluctuations in France. This result is in stark contrast with the empirical evidence based on U.S. data, for which regardless its origins uncertainty impedes economic activity in a similar fashion.

I would like to thank Alexis Parmentier for helpful comments. I also thank an anonymous referee for its suggestions that greatly improve the quality of this paper. All mistakes and imprecisions are of my responsibility.
Citation: Idriss Fontaine, (2017) "The heterogeneity of uncertainty shocks: evidence from France", *Economics Bulletin*, Volume 37, Issue 4, pages 2835-2845
Contact: Idriss Fontaine - idriss.fontaine@u-cergy.fr.
Submitted: August 21, 2017. **Published:** December 04, 2017.

1. Introduction

The attention of economists for the real impact of uncertainty is at the heart of a long-standing literature. Initiated first by the work of Bernanke (1983), this literature has seen a renewed interest since the Great Recession and the seminal contribution of Bloom (2009). From a theoretical point of view, it is well recognized that uncertainty impedes economic activity by a mechanism in line with the "wait and see" mechanism of Bernanke (1983) (Bloom (2009), Leduc and Liu (2016) or Bloom, Floetotto, Saporta-Eksten, and Terry (2012)). Empirically, it is shown that uncertainty may be at the origin of important fluctuations of macroeconomic variables. For example, Bloom (2009) shows that, after an uncertainty shock, U.S. employment displays a rapid decline of about 0.7% with a rapid rebound 8 months after the impact. However, the consensus of the literature has mainly an U.S. perspective and the economic impact of uncertainty on other economies is under-researched. To the best of my knowledge, no works put a particular attention to the relationship between uncertainty and the real side of the French economy. This is potentially problematic for at least two reasons. On the one hand, the institutions governing these two countries are different in several respects: minimum wages, level of taxes and employment protection (among other). Thus, nothing ensures that the magnitude and the transmission channels of uncertainty are identical across these two developed economies. On the other hand, it is important to keep in mind that uncertainty has multiple origins, such as, bad anticipations about the future level of macroeconomic variables, economic policy unpredictability, financial markets etc. It remains possible that the French economy reacts more to a specific uncertainty shock than another one.

This paper asks the following questions: *Are the impact of uncertainty shocks on the French economy the same whatever their origins ? Are uncertainty shocks important drivers of macroeconomic fluctuations in France ?* To give answers to these questions, I exploit the heterogeneity of uncertainty by considering two of the most popular proxies of uncertainty. The first one reflects economic policy uncertainty while the second one reflects financial uncertainty. Then, based on structural Vector Autoregression (VAR, henceforth) models, I show that the French economy is more sensitive to policy uncertainty than financial uncertainty. In particular, for aggregate variables as consumption or employment, the maximum responses are 4 and 6 times larger when the French economy is hit by a policy uncertainty shock. In addition, it appears from the forecast error variance decompositions (FEVD, henceforth), that financial uncertainty shock is not a major driver of business cycles for France since in most cases it explains less than 2% of the variance of variables of interest. Finally, a comparison with the U.S. indicates that uncertainty has larger adverse effects than in France. These

results underscore that discrepancies in the transmission channel of uncertainty exist among the U.S. and France, two developed economies. Furthermore, it also suggests that for France there is some heterogeneity in the impact of uncertainty shocks. In this respect, identifying the source of uncertainty becomes a major issue.

This paper is organized into 5 sections. Section 2 describes the data and the empirical framework. Section 3 presents the main empirical results. In section 4, I make a comparison between the French and the U.S. evidence. Finally, section 5 provides some concluding remarks.

2. Empirical framework

2.1. Data

As mentioned above, uncertainty can propagate into the economy through different channels. To take into account this potential heterogeneity, I consider successively two different and largely accepted measures of uncertainty. The first one reflects uncertainty about economic policy. It is the Economic Policy Uncertainty (EPU, thereafter) index of Baker, Bloom, and Davis (2016). This index is based on newspaper coverage frequency of two leading French newspapers: "Le Monde" and "Le Figaro". To be included in the index, a newspaper article should contain a triple of terms related to the economy, policy and uncertainty[1]. The second measure reflects the level of uncertainty about financial markets. More specifically, I use the volatility of the CAC40 (VCAC, thereafter) computed by the *volatility institute*[2]. In particular, the institute estimates the daily volatility of the index by a GARCH model[3]. Such a measure is commonly used since the work of Bloom (2009). Other time series used in the empirical analysis are: real output, the unemployment rate, investment, consumption and the level of employment. All data, except the employment level[4], are available on the website of the French National Institute of Statistics and Economic Studies. Variable selection is guided by a survey of literature. In particular, Bloom (2009) employs a VAR with both employment and output, Caggiano, Castelnuovo, and Groshenny (2014) put a particular attention on unemployment and theoretical models, as the one developed by Basu and Bundick (2017), often study responses of consumption and investment after uncertainty shock[5].

[1]The French EPU index is are freely available on: http://www.policyuncertainty.com.

[2]I would like to thank Robert Engle and Michael Robles to send to me these data.

[3]More details about the procedure can be founded on the website: https://vlab.stern.nyu.edu/.

[4]The latter being available on the OECD database.

[5]As the purpose of this paper is to focus on the French economy, I do not include an interest rate variable. Indeed, the latter is largely dependent on the monetary policy conducted by the European Central Bank.

2.2. The VAR framework

All VAR models estimated in this article are trivariate systems including a measure of uncertainty (the EPU index or the VCAC), real output and a measure of economic activity (unemployment, investment, consumption or employment). A trivariate system is a parsimonious way to model the joint dynamics of uncertainty and economic activity[6]. The VAR model has the following reduced form:

$$X_t = A(L)^{-1}\eta_t = C(L)\eta_t \tag{1}$$

with X_t the vector of endogenous variables, $A(L)$ the matrix of estimated coefficients, $C(L)$ an infinite-order matrix of lag polynomial and η_t the $n \times 1$ vector of residuals with non-diagonal variance-covariance matrix Σ. Let ε_t be a $n \times 1$ vector of mutually independent structural innovations with normalized variance equal to 1 such that $E(\varepsilon_t \varepsilon_t^{'}) = I$, with I the identity matrix. The reduced form disturbances η_t and the structural disturbances ε_t can be linked through the following relationship:

$$\eta_t = D\varepsilon_t \tag{2}$$

With estimates of A and η_t in hand[7] and knowledge about D the structural disturbances can be fully characterized. In this paper, D is computed as the Cholesky factor of Σ implying:

$$\Sigma = E(\eta_t \eta_t^{'}) = DE(\varepsilon_t \varepsilon_t^{'})D^{'} = DD^{'} \tag{3}$$

The uncertainty variable is ordered first in the vector X_t. This ordering and the triangular inferior nature of the matrix D are crucial for the identification of structural shocks. Thus, it is assumed that an uncertainty shock may have a non-zero contemporaneous impact on the other variables of the system. However, this also implies that uncertainty responds to other shocks only after a one-period delay. This identifying assumption is largely used in the empirical literature (see for instance Bloom (2009) Caggiano, Castelnuovo, and Groshenny (2014) or Leduc and Liu (2016)). The VARs are estimated on a quarterly basis[8] and the sample coverage varies with the measure of uncertainty. The sample spans the 1987Q1-2016Q2 period when French uncertainty is measured by the EPU index. When the VCAC is used, the sample coverage is shorter because the later is only available over the 1990Q1-

[6] By using such a parsimonious framework, my empirical analysis follows the one of Bachmann, Elstner, and Sims (2013) who estimate bi-variate models.

[7] Ordinary least squares are used to obtain these estimates.

[8] All economic variables, except uncertainty and consumption, are available only with a quarterly frequency. That is why, I do not apply on French data the same empirical framework as Baker, Bloom, and Davis (2016).

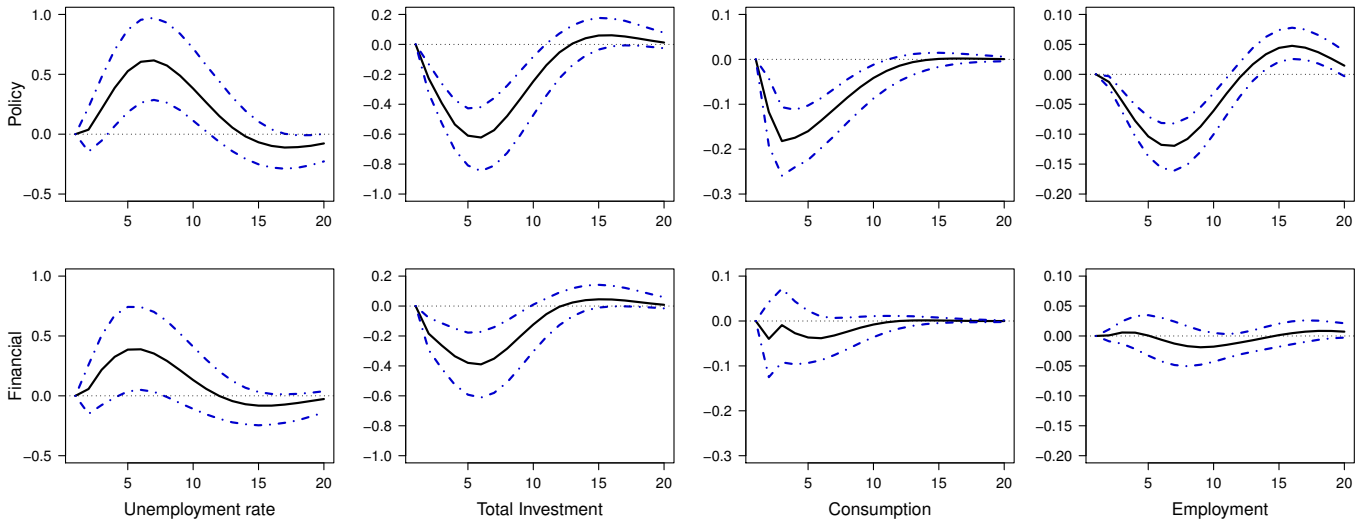

Figure 1: Impulse response functions to uncertainty shocks in France.
Notes: the first row reports responses to economic policy uncertainty shocks. The second row reports response to financial uncertainty shocks. Solid black lines are the median responses to a one-standard deviation increase in the uncertainty variable. Blue dashed lines report the 64-percent error bands. Units of the horizontal axis are quarters. Units of the vertical axis are percentage points.

2016Q2 period[9]. In order to interpret the effects of uncertainty shocks as short-term dynamics relative to the stationary steady state, and to avoid any problem of long term relationship among variables, all time series are seasonally adjusted and log-detrended by applying an HP-filter with a standard smoothing parameter (i.e. $\lambda = 1600$ for quarterly data)[10]. All VAR models are estimated within a Bayesian framework by imposing the Minnesota prior. The number of lag included in the VAR are based on the Akaike, Hanan-Quin and Schwarz criteria[11].

3. Main results

The impulse responses of French macro-variables to both uncertainty shocks are displayed in figure 1. In order to save space, output responses are not reported[12]. In the figure the first row reports the responses obtained after a policy uncertainty shock, while the second row reports those obtained after a financial uncertainty shock. Inspection of figure 1 leads to two main comments. First, the qualitative responses of French macro-variables to uncertainty shocks

[9]Restricting the sample coverage to 1990Q1 to 2016Q2 when the EPU index is used has no incidence on the results.

[10]The non-stationary test of Elliott, Rothenberg, and Stock (1996) has been applied on the time series. In general, the test fails at rejecting the alternative hypothesis of stationary around a trend.

[11]Models with investment, consumption and employment includes 2 lags while the one with unemployment include 3 lags. Changing the number of lag has no incidence on the conclusions. Corresponding results are available upon request.

[12]The output response is negative and u-shaped after both shocks. This result is available upon request.

are quite varying. In particular, following a financial uncertainty shock both employment and consumption do not respond significantly, whereas, they significantly decrease after a policy uncertainty shock. By contrast, the responses of unemployment and investment are similar after both shocks. The unemployment rate reacts in a hump-shaped manner while investment response is u-shaped. Second, it is worth noting that French variable responses are always higher for a policy uncertainty shock than a financial uncertainty shock. For instance, the peak response of unemployment is higher of about 50% after an EPU shock. For consumption and employment the difference is even greater. Hence, after an unexpected rise in policy uncertainty the maximum response of consumption (in absolute value) is 4.5 times larger than after a financial uncertainty shock. This figure amounts to 6.4 for employment.

Tables 1 compares the percentage of the variance of the error made (at the median) in forecasting each endogenous variable by the two uncertainty shocks. Evidence is quite clear: financial uncertainty shocks are not at the origin of important macroeconomic fluctuations in France. Except for investment, it accounts for a negligible share, no more than 2%, of the variable fluctuations. By contrast, a policy uncertainty shock appears to be more important for business cycles fluctuations. For instance, around 16% of the variance of consumption is explained by this shock. For employment, the latter accounts for by 34%. Finally, 10% of the variance of unemployment can be attributed to policy uncertainty shock, while for investment it explains approximately 25% of the variance.

4. Comparison to the U.S. and discussion

In order to allow for a strict comparison, I successively estimate the same VAR models on U.S. data. The measure of policy uncertainty is the News Economic Policy Uncertainty of Baker, Bloom, and Davis (2016) and financial uncertainty is assessed by the volatility index of the S&P500 constructed by the *volatility institute*[13]. All other variables are extracted from the FRED database

Figure 2 and the bottom part of table 1 display the impulse response functions to uncertainty shocks and the FEVD. Several insights should be drawn from the comparison. After the policy uncertainty shock, qualitative patterns are similar across the two countries. The unemployment rate responses are hump-shaped, whereas the other three variables follow a u-shaped path. However, in quantitative terms the responses of U.S. macro-variables are in general higher than what they are for France. For instance, the maximum response of unemployment is 4 times as large as in France. The picture is the same for investment for which

[13]When I use the more common VIX index as a measure of financial uncertainty the evidence is virtually identical. However, to ensure a direct comparability with the French case I favor the volatility index of the S&P500 computed by the *volatility institute*. Complementary results are available upon request

Country	Variable	Uncertainty	Quarters after the shock					
			1	4	6	8	12	24
France	Unemployment	Policy	0.006	0.032	0.064	0.086	0.091	0.091
		Financial	0.002	0.019	0.015	0.013	0.013	0.013
	Investment	Policy	0.005	0.123	0.193	0.236	0.248	0.249
		Financial	0.001	0.052	0.086	0.108	0.113	0.114
	Consumption	Policy	0.002	0.101	0.142	0.158	0.163	0.163
		Financial	0.001	0.007	0.011	0.013	0.014	0.014
	Employment	Policy	0.017	0.124	0.240	0.325	0.338	0.344
		Financial	0.006	0.009	0.013	0.019	0.021	0.022
U.S.	Unemployment	Policy	0.140	0.351	0.398	0.422	0.427	0.424
		Financial	0.071	0.244	0.313	0.348	0.362	0.362
	Investment	Policy	0.030	0.281	0.330	0.325	0.295	0.294
		Financial	0.045	0.335	0.429	0.425	0.380	0.368
	Consumption	Policy	0.067	0.187	0.212	0.216	0.209	0.210
		Financial	0.156	0.357	0.361	0.350	0.344	0.345
	Employment	Policy	0.035	0.236	0.274	0.288	0.291	0.291
		Financial	0.000	0.143	0.216	0.251	0.262	0.263

Table 1: Forecast error variance decomposition for U.S. variables.

the maximum response (in absolute value) is twice as large in the U.S. as in France. Another difference is appealing. In the U.S., regardless the origin of uncertainty, the magnitude of the response is virtually identical[14]. This is at odds with the French case. Finally, the FEVD analysis indicates that both shocks are equally important for business cycle fluctuations in the U.S.. After 4 quarters around 30% of the variance of investment, consumption and employment is generated by uncertainty shocks. For unemployment, the policy uncertainty shock accounts for a larger share since it generates, at its peak, 60% of forecast variance. Overall, the policy uncertainty shock is less important for business cycle fluctuations in France.

Two stylized facts emerge from this paper. On the one hand, the magnitude of the recessionary impacts of uncertainty shocks are very different in France. On the other hand, financial uncertainty does not matter in explaining French business cycles. All in all, the empirical analysis conducted in this paper suggests that the U.S. case should not be seen as a good approximation for other economies. This finding is consistent with two previous works. Bachmann, Elstner, and Sims (2013) construct a proxy for time varying business-level uncertainty for the U.S. and Germany. They show that uncertainty is associated with a fall in employment and production in both countries. However, they highlight that the responses of German macro-variables are less persistent than in the U.S. case. Choi and Shim (2016)

[14]In a recent contribution, Choi and Shim (2016) find similar evidence for the U.S. economy.

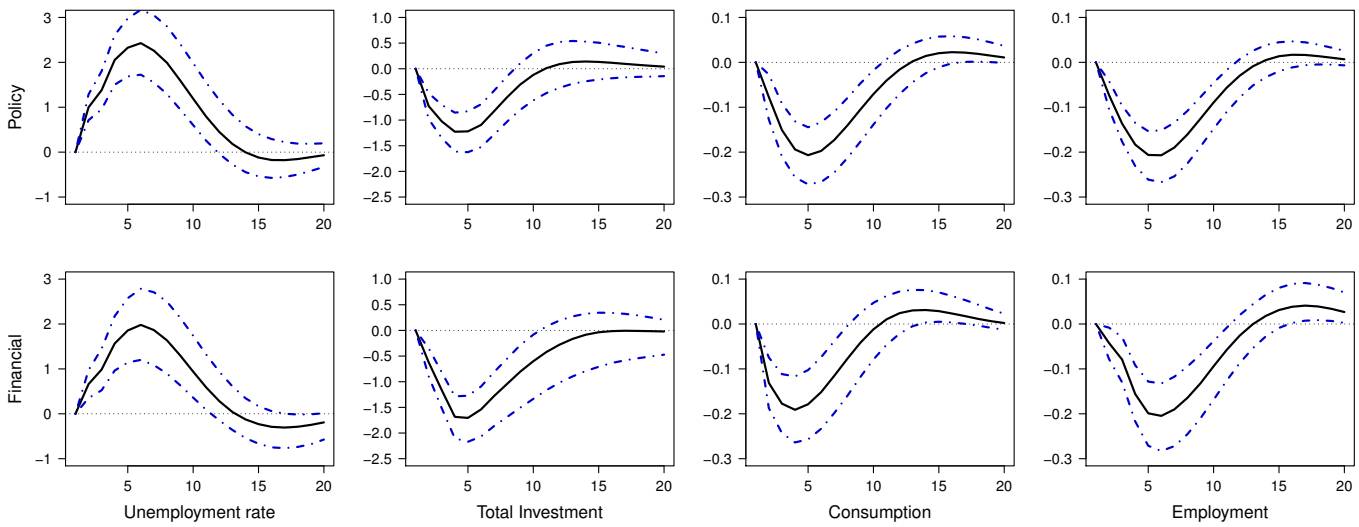

Figure 2: Impulse response functions to uncertainty shocks in the U.S..
Notes: the first row reports responses to economic policy uncertainty shocks. The second row reports response to financial uncertainty shocks. Solid black lines are the median responses to a one-standard deviation increase in the uncertainty variable. Blue dashed lines report the 64-percent error bands. Units of the horizontal axis are quarters. Units of the vertical axis are percentage points.

consider South Korea. As in this paper, they find that both types of uncertainty shocks impede in a similar fashion U.S. aggregates. However, they find that the South Korean economy is much more related to financial uncertainty than policy uncertainty. This finding holds also for countries as China, India and Russia. By contrast to them, I find that important differences exist in the transmission channel of uncertainty, not only between developed and emerging economies, but also among developed economies. One piece of explanation could come from the fact that France and the U.S. have different economic institutions.

5. Concluding remarks

The empirical results of this paper indicate that the responses of the French macro-variables to uncertainty shocks are not in lines with current U.S. evidence. Specifically, I show that financial uncertainty shocks lead to lower macroeconomic responses than policy uncertainty shocks. This is especially true for variables as consumption or employment. In terms of driver of business cycle fluctuations, financial uncertainty accounts for only a small proportion of business cycle variations. Taken together, my empirical evidence suggests that the French economy is much more related to policy uncertainty. The application of the same empirical framework on U.S. data shows that, whatever its origins, uncertainty induces higher macroeconomic fluctuations than in France.

This paper should be seen only as a first step for the understanding of the consequences

of uncertainty on the French economy. In particular, further researches should investigate more precisely the reason explaining the marginal role of financial uncertainty for the French economy. In this respect, a theoretical framework including these two sources of uncertainty would be probably enlightening. This problematic is beyond the scope of this paper, but it is on my agenda for future investigations.

References

Bachmann, R., S. Elstner, and E. R. Sims (2013): "Uncertainty and Economic Activity: Evidence from Business Survey Data," *American Economic Journal: Macroeconomics*, 5(2), 217–249.

Baker, S. R., N. Bloom, and S. J. Davis (2016): "Measuring Economic Policy Uncertainty," *The Quarterly Journal of Economics*, 131(4), 1593.

Basu, S., and B. Bundick (2017): ""Uncertainty Shocks in a Model of Effective Demand"," *Econometrica*, 85(3), 937–958.

Bernanke, B. (1983): "Irreversibility, Uncertainty and Cyclical Investment," *Quarterly Journal of Economics*, 98 (1), 85–107.

Bloom, N. (2009): "The Impact of Uncertainty Shocks," *Econometrica*, 77(3), 623–685.

Bloom, N. (2014): "Fluctuations in Uncertainty," *Journal of Economic Perspectives*, 28(2), 153–76.

Bloom, N., M. Floetotto, I. Saporta-Eksten, and S. J. Terry (2012): "Really Uncertain Business Cycles," NBER Working Paper 18245, National Bureau of Economic Research.

Caggiano, G., E. Castelnuovo, and N. Groshenny (2014): "Uncertainty shocks and unemployment dynamics in U.S. recessions," *Journal of Monetary Economics*, 67, 78–92.

Choi, S., and M. Shim (2016): "Financial vs policy uncertainty in emerging economies: evidence from Korea," Working Paper.

Elliott, G., T. J. Rothenberg, and J. H. Stock (1996): ""Efficient Tests for an Autoregressive Unit Root"," *Econometrica*, 64(4), 813–836.

Leduc, S., and Z. Liu (2016): "Uncertainty shocks are aggregate demand shocks," *Journal of Monetary Economics*, 82, 20–35.

Appendices

A.1. Robustness - Monthly data

Throughout the paper, I estimate VAR models on quarterly data. This choice is a consequence of French data limitations. To convince the reader that working on quarterly data has no incidence on the identification of uncertainty shocks, I (re-)estimate VAR models with monthly data when series are available. In France, this is the case for consumption and unemployment. At this point, it should be mentioned that unemployment data used here does not satisfy ILO's definition. It is administrative data based on unemployment registers. This is the unique measure of unemployment in France available at monthly frequencies. The latter measure is available only from 1996.

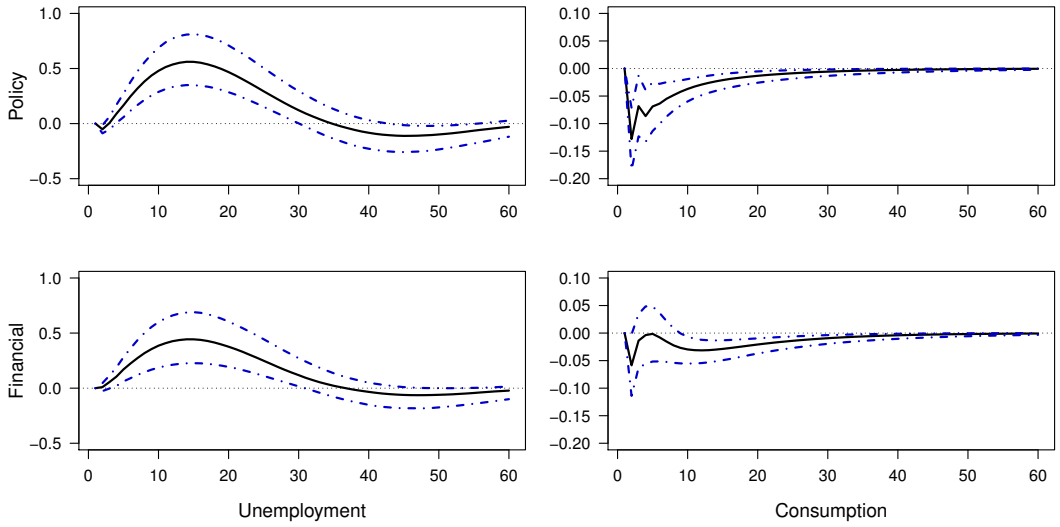

Figure 3: Impulse response functions to uncertainty shocks in France - monthly data.
Notes: the first row reports responses to economic policy uncertainty shocks. The second row reports response to financial uncertainty shocks. Solid black lines are the median responses to a one-standard deviation increase in the uncertainty variable. Blue dashed lines report the 64-percent error bands. Units of the horizontal axis are quarters. Units of the vertical axis are percentage points.

As shown in figure 3, when using monthly data responses of unemployment and consumption are very close to the benchmark analysis. In particular, the peak responses of both variables are higher after a policy uncertainty shock than a financial uncertainty shock. As in the baseline case, consumption response after a financial uncertainty shock is nearly 0, while it is significantly negative after a policy uncertainty shock. Figure 4 plots U.S. macrovariable responses when time series are monthly. Overall, responses are very close to those based on quarterly data. Finally, the FEVD analysis of table 2 confirms previous analysis: financial uncertainty shocks do not appear as a driver of French macroeconomic fluctuations.

By contrast, in the U.S. both uncertainty shocks are important. Overall, this robustness check confirms the main message of this paper and data frequencies do not alter the results.

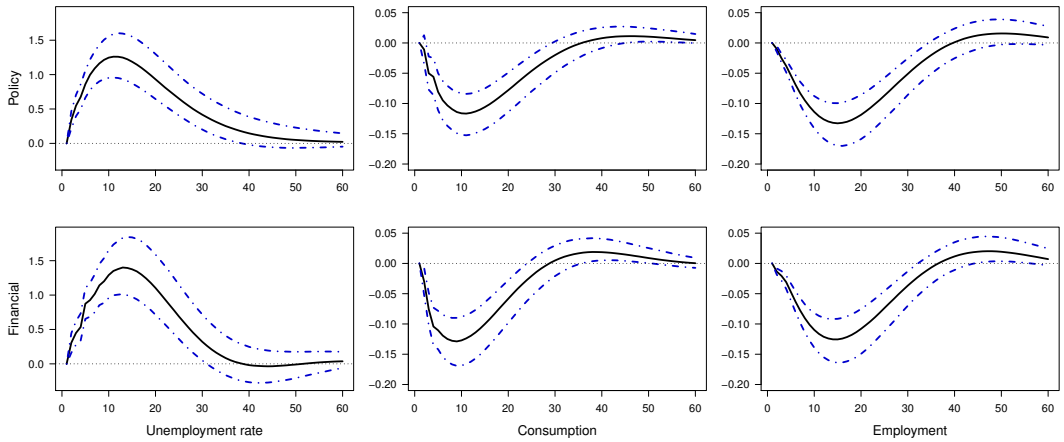

Figure 4: Impulse response functions to uncertainty shocks in the U.S. - monthly data.
Notes: the first row reports responses to economic policy uncertainty shocks. The second row reports response to financial uncertainty shocks. Solid black lines are the median responses to a one-standard deviation increase in the uncertainty variable. Blue dashed lines report the 64-percent error bands. Units of the horizontal axis are quarters. Units of the vertical axis are percentage points.

Country	Variable	Uncertainty	Quarters after the shock				
			3	12	18	24	72
France	Unemployment	Policy	0.027	0.102	0.112	0.113	0.113
		Financial	0.006	0.009	0.013	0.015	0.016
	Consumption	Policy	0.024	0.174	0.231	0.258	0.265
		Financial	0.023	0.099	0.130	0.146	0.151
U.S.	Unemployment	Policy	0.101	0.273	0.304	0.318	0.324
		Financial	0.028	0.159	0.208	0.231	0.238
	Consumption	Policy	0.037	0.189	0.228	0.235	0.229
		Financial	0.082	0.216	0.221	0.213	0.209
	Employment	Policy	0.053	0.230	0.281	0.308	0.322
		Financial	0.051	0.191	0.231	0.250	0.258

Table 2: Forecast error variance decomposition for U.S. variables.