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Uncertainty matters: evidence from close elections

Chris Redl

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Abstract

This paper uses a data-rich environment to produce direct econometric estimates of macroeconomic and financial uncertainty for 11 advanced nations. These indices exhibit significant independent variation from popular proxies. Using this new data we control for both first and second moment financial shocks in identifying the real effects of macro uncertainty shocks. We further separate the identified macro shocks from financial shocks using narrative information, requiring that macro uncertainty rises during close elections. These are events which are likely to lead to macro uncertainty but are disjoint from a weakening in financial conditions. We find that macro uncertainty shocks matter for the vast majority of countries and that the real effects of macro uncertainty shocks are generally larger conditioning on close elections. These results are robust to controlling for credit spreads, financial uncertainty, global uncertainty and a measure of the first moment of the business cycle as proxied by a composite leading indicator.

Key words: Economic uncertainty, business cycles, elections.

JEL classification: D80, E32, D72.

(1) Bank of England. Email: chris.redl@bankofengland.co.uk

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Publications and Design Team, Bank of England, Threadneedle Street, London, EC2R 8AH
Telephone +44 (0)20 7601 4030 email publications@bankofengland.co.uk

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1 Introduction

The global financial crisis (GFC) has renewed interest in two drivers of the business cycle: financial shocks and uncertainty shocks. For example, Stock and Watson (2012) find that shocks to credit spreads and uncertainty accounted for two thirds of the movements in U.S. GDP growth from 2008-2012. However, the GFC was associated with large increases in uncertainty *and* a significant deterioration of financial conditions. Thus in samples where this episode dominates, it can be very difficult to separate the effect of one shock from the other. Indeed, while there is a broad consensus that independent financial shocks can produce a recession, there is significant debate as to whether uncertainty shocks that act independently of a financial channel have significant business cycle effects (Caldara et al. (2016) and Ludvigson et al. (2018)).

This paper addresses the question of whether uncertainty shocks matter as a source of the business cycle along three dimensions. Firstly, this debate has focused almost exclusively on U.S. data[1]; here we extend this to 11 advanced nations.[2] Secondly, we improve measurement of uncertainty in the cross country context. Most cross country work on uncertainty relies on the realised volatility of financial variables (e.g. Cesa-Bianchi et al. (2014), Carriere-Swallow and Cespedes (2013)) or measures of volatility in a small number of macro series such output and inflation (Berger et al. (2016) and Croce et al. (2017)) and are thus unable to separate, or control for, (1) uncertainty about the real economy and (2) uncertainty relating to financial conditions. We produce new measures of macroeconomic and financial uncertainty for these countries following the methodology of Jurado et al. (2015), which allows us to control not only for the first moment of financial shocks through credit spreads, but also the second moment changes through financial uncertainty. Thirdly, we employ a new identification approach to separate financial and uncertainty shocks. Using traditional sign restrictions we impose that credit spreads and financial uncertainty do not rise during a macro uncertainty shock and, using narrative restrictions, we impose that macro uncertainty shocks take place during close elections. The latter are periods when macro uncertainty is less likely to act through a financial channel compared to events where large economic shocks take place.[3]

The Jurado et al. (2015) (hereafter, JLN) approach to measuring uncertainty has a number of advantages in comparison to other proxies for uncertainty that are popular in policy work, e.g. realised and implied volatility of financial variables, measures of the variance in a small number of macro variables, or news based measures found in the influential work of Baker et al. (2016). Firstly, latter do not explicitly control for a deterioration in expectations of the mean economic outcome when volatility increases, potentially conflating uncertainty shocks and confidence shocks. Secondly, they focus on measuring variability when what ought to matter for economic decision making is a deterioration in agents ability to predict economic outcomes. Thirdly, the use of a small number of proxies for uncertainty can lead to a misleading relationship between uncertainty and the real economy when, for example, one of those proxies is unusually volatile (Forbes (2016)).

[1] Popescu and Smets (2010) is an early exception studying this question using German data and in a companion paper Redl (2017) studies the case of the U.K. in detail.

[2] This is the G10 nations excluding Belgium and including Spain.

[3] Political shifts in both Europe and the U.S. in the recent past have seen a resurgence of populist leaders and parties that have performed unusually well during elections. This suggests an increased role for economic policy uncertainty where elections provide a focal point for these shifts. For evidence on the recent rise in populism in the West see, for example, Rodrik (2017); Eichengreen et al. (2017); Guiso et al. (2017).

The JLN approach measures uncertainty as the conditional variance of the unforecastable component common to a large number of macroeconomic or financial variables. However, a measure of uncertainty in each individual macro or financial time series is produced allowing the policymaker or researcher to study the underlying variables responsible for a given uncertainty episode.

We find that macro uncertainty shocks matter for all countries studied, with declines in GDP, investment and employment; even when there is no rise in credit spreads or financial uncertainty. The real effects of macro uncertainty are generally larger conditioning on close elections. A key challenge to empirical studies of uncertainty shocks is to control for the fact that uncertainty is likely to rise at times when negative first moment shocks hit or when mean expectations deteriorate (Haddow et al. (2013)). We control for first moment shocks by including the OECD composite leading indicator in the model. We impose that it does not fall at the time of a macro uncertainty shock, finding the results are robust. Finally, we test whether the real effects of macro uncertainty shocks are simply due to correlations with elevated global uncertainty (as found by Cesa-Bianchi et al. (2014), Mumtaz and Theodoridis (2015) and Berger et al. (2016)). We use a new measure of global uncertainty[4] as a control, again finding the baseline results are robust.

The remainder of this paper is structured as follows: section 2, reviews the literature on uncertainty shocks; section 3 outlines the econometric framework used to measure macro and financial uncertainty following JLN; section 4 describes the data set used in estimation; section 5 describes the estimates of uncertainty we find; section 6 describes the macroeconomic impact of uncertainty shocks; and section 7 concludes.

2 Literature

Measuring uncertainty is approached in broadly two ways in the literature: observable proxies and econometric estimates. The first approach employs realised and implied volatility of financial variables, survey measures and mentions of uncertainty in the news. The second uses econometric techniques to estimate the latent process of uncertainty from standard macro and financial variables.

The observable proxies approach was pioneered by Bloom (2009) and Baker et al. (2016), focusing on the U.S. The first paper uses large changes in realised stock market volatility as exogenous changes in uncertainty. The second aims to measure a broader concept of uncertainty, Economic Policy Uncertainty, comprised of a frequency count of news stories on uncertainty about the economy or fiscal and monetary policy, the number and revenue impact of scheduled federal taxes set to expire, and the extent of disagreement among economic forecasters over future government purchases and future inflation. These authors extend this work to multiple countries focusing on the news component for measurement.[5] Proxy approaches studying the U.S. include Leduc and Liu (2012) and Bachmann and Bayer (2013), using forecaster disagreement; Caggiano et al. (2014), Basu and Bundick (2017) and Berger et al. (2017), employing implied stock market volatility; and Gulen and Ion (2016) and Alexopoulos and Cohen (2015) who use news based measures. A number of international studies document broadly similar declines in response to employment and

[4]From Redl (2017), which applies the JLN methodology to a global data set of macro and financial variables

[5]We show below that for the countries where an EPU index is available, our results hold using this measurement of uncertainty.

production to Baker et al. (2016).[6] Cross country studies that use the proxy approach tend to rely on realised stock market volatility due to lack of other available data e.g. Carriere-Swallow and Cespedes (2013), who show that uncertainty shocks have larger impacts in emerging economies; Cesa-Bianchi et al. (2014) who argue that a significant proportion of the real effects of domestic uncertainty shocks derives from common correlation with global uncertainty; and Choi et al. (2017) who study how uncertainty can amplify external financing constraints leading to a compositional shift in investment away from productivity enhancing investment.[7]

An alternative approach to measuring uncertainty is to produce direct econometric estimates of the time varying volatility of macro and financial time series. Fernandez-Villaverde et al. (2011) employ the particle filter[8] to study time-varying volatility in the real interest rates of four emerging small open economies: Argentina, Ecuador, Venezuela, and Brazil. They find that real interest rate volatility leads to a fall in output, consumption, investment, and hours worked. Fernandez-Villaverde et al. (2015) estimate volatility of government spending and taxes and feed this series of volatility estimates into a general equilibrium model finding similar contractionary patterns for real variables. An alternative approach, pursued by Mumtaz and Zanetti (2013) and Mumtaz and Surico (2013), is to augment a standard SVAR model to allow for time variation in the volatility of identified shocks to dynamically affect the levels of endogenous variables. Studying fiscal and monetary policy in this framework they find real declines consistent with other studies. Cross country studies employing econometric estimates have provided evidence that the real effects of domestic uncertainty shocks are mostly driven by increases in global uncertainty, e.g. Berger et al. (2016), Mumtaz and Theodoridis (2017), and Ozturk and Sheng (2017). Similarly, Croce et al. (2017) document significant pass through of output volatility shocks across countries and this is especially pronounced in small countries. Contrary to these results, we find our results are robust to assuming that a measure of global uncertainty does not rise following a domestic macro uncertainty shock, see the results in section 5.1.

Identification of uncertainty shocks is challenging. Firstly, regardless of the measurement approach, it is likely that increases in measured uncertainty are correlated with a deterioration (or an expected deterioration), in the levels of many variables of interest thus conflating confidence and uncertainty shocks. Secondly, uncertainty shocks may only have real effects because they act as a propagation mechanism for financial shocks.

Popescu and Smets (2010), use a VAR with forecaster dispersion as a proxy for uncertainty and credit spreads (corporate and mortgage bond rates to government bonds rates) as a measure of financial stress. They show that the real effects of financial stress are much larger and persistent than those of uncertainty with lower inflation, GDP, and higher unemployment. Caldara et al. (2016) find that both financial and uncertainty shocks matter for real fluctuations but that uncertainty shocks matter significantly more when they coincide with a tightening of credit

[6]These include Dendy et al. (2013) and Haddow et al. (2013) for the U.K., Popescu and Smets (2010) for Germany, Zalla (2017) for Ireland, Kok et al. (2015) for the Netherlands, Arbatli et al. (2017) for Japan, Armelius et al. (2017) for Sweden, Larsen (2017) for Norway, and Redl (2015) for South Africa.

[7]An exception is Dovern et al. (2012), who gathers professional forecaster disagreement for the G7, finding that disagreement over real variables is more counter cyclical than that for nominal variables.

[8]While GARCH models have been employed since Engle (1982), the positive relationship between shocks to the mean and the estimated volatility makes them inappropriate for considering a mean preserving increase in volatility as assumed by the uncertainty literature.

spreads.

This paper is closely related to Ludvigson et al. (2018), who build on JLN by using the latter methodology to produce separate measures of macroeconomic and financial uncertainty for the US. They identify uncertainty shocks and their impact on industrial production using two sets of shock-based constraints. Firstly, narrative event constraints, requiring financial uncertainty shocks to be at least 4 standard deviations in October 1987 (Black Monday) and at some period during the 2007-2009 financial crisis while macro uncertainty shock are no larger than 2 standard deviations during the financial crisis. Secondly, correlation constraints which impose that the identified uncertainty shocks are negatively correlated with an external variable, aggregate stock market returns, but that correlation is larger (in absolute value) for financial uncertainty. The latter is based on a variety of asset pricing models implying a link between uncertainty shocks and risk premia. They find that macro uncertainty is a fully endogenous response to real shocks that cause business cycles but that financial uncertainty shocks have negative effects on real variables.

Here we pursue a related but alternative identification strategy, flexible sign restrictions and narrative restrictions on close election events, as pioneered by Antolin-Diaz and Rubio-Ramirez (2016). Ludvigson et al. (2018) employ narrative restrictions on events where financial uncertainty should play a larger role than macro uncertainty (financial crises), while we use events where macro uncertainty should play a larger role than financial uncertainty (close elections). Ludvigson et al. (2018) employ correlation with an external variable (stock returns) whereas we employ sign restrictions on the response of variables to the shocks. While the former is a novel and an appealing approach is it more challenging to use for a larger model (we have up to 10 variables rather than the 3 used in Ludvigson et al. (2018)) where finding the appropriate external variables is not straightforward. Moreover, in a larger model it is important to allow macro uncertainty shocks to compete with real and financial shocks to explain GDP movements.

Our identification relies on the positive link between macro uncertainty and close elections. Kelly et al. (2016) present a model where firm profitability depends on government policies and agents learn about the impact of those policies from political news. Elections create uncertainty by resetting agents beliefs about government policy. They show this model predicts a positive relationship between option prices and elections, and in their empirical work find evidence of a 5% premium on options that cover political events (national elections and global summits) relative to those that do not. Azzimonti (2017) develops a model where the quality of government policies influence the probability of a recession. Partisan conflict lowers the quality of those policies promoting tail risk that reduces investment spending. Agents rely on signals to learn the degree of partisan conflict where elections generate a spike in uncertainty about partisanship through resetting agents priors.

A number of papers provide empirical support to this link. Li and Born (2006) find that realised U.S. stock market volatility rises prior to the election date if there is no clear leader in election polls. Bialkowski et al. (2008) find that realised stock market volatility is 23% higher within a two month window around elections using data on 27 OECD countries. They find evidence that a small margin of victory is a significant determinant of that rise in volatility. Goodell and Vahamaa (2013) find similar evidence of increased implied volatility around elections using the VIX. Gao and Qi (2013) provide evidence that municipal bond rates rise around gubernatorial elections in the U.S. while Jens (2017) documents falls in corporate investment around these elections. Julio

and Yook (2012) and Canes-Wrone and Park (2014) document uncertainty induced declines in investment around general elections across a variety of developed and developing countries. Julio and Yook (2016) use election timing as a source of fluctuations in political uncertainty, documenting a significant drop in FDI flows to receipt countries from the U.S. around elections. They find this effect is more pronounced for closer elections. Larsen (2017) develops topic-specific measures of uncertainty using text mining tools on a corpus of articles from the major Norwegian business daily. He shows that uncertainty relating to elections is one of the most important types of uncertainty in driving investment.

3 Measuring Uncertainty: Econometric Framework

We measure uncertainty following JLN, the reader is directed to their paper for full details of that approach. That methodology ensures that measured uncertainty captures when the economy has become less predictable (rather than just more volatile) and also reduces dependencies on a one (or a small number of) observable series. Following Ludvigson et al. (2018), let $y_{jt}^C \in Y_t^C = (y_{1t}^C, y_{2t}^C, ..., y_{N_C t}^C)$ be a variable in category C for a given country. A forecast, $E\left[y_{jt+h}^C | I_t\right]$, is taken from a factor augmented forecasting model:

$$y_{jt+1}^C = \phi_j^y(L) y_{jt}^C + \gamma_j^F(L)\hat{\mathbf{F}}_t + \gamma_j^G(L)\hat{\mathbf{G}}_t + \gamma_j^W(L)\mathbf{W}_t + v_{jt+1}^y \tag{1}$$

Where $\phi_j^y(L)$, $\gamma_j^F(L)$ and $\gamma_j^W(L)$ are finite order lag polynomials. The factors, $\hat{\mathbf{F}}_t$, are drawn from the information set of agents, I_t, comprised of the full data set of macro and financial variables for that country described in the appendix. $\hat{\mathbf{G}}_t$ is drawn in the same way except that the squares of the original data are used to capture potential non-linearities. The prediction error for y_{jt+1}^C, $\hat{\mathbf{F}}_t$,$\hat{\mathbf{G}}_t$ and $\mathbf{W}_t$ are permitted to have time-varying volatility[9]. Uncertainty is then the conditional expectation of this time-varying squared forecast error, which is computed using a stochastic volatility model[10]. That model allows for shocks to the second moment of a variable to be independent of the first moment ensuring that these estimates capture a mean preserving increase in volatility rather than a rise in volatility that accompanies a deterioration in the mean (as is often seen in survey forecasts used widely in uncertainty proxies). The forecasting model can be cast as FAVAR in first order companion form with $\mathbf{Z}_t = (\hat{\mathbf{F}}_t', \hat{\mathbf{G}}_\mathbf{t}', \mathbf{W}_t^{'})$, $Y_{jt}^C = (y_{jt}^C, y_{jt-1}^C, ..., y_{jt-q+1}^C)'$ and $\mathcal{Z}_t = (\mathbf{Z}_t', ..., \mathbf{Z}_{t-q+1})'$:

$$\begin{pmatrix} \mathcal{Z}_t \\ Y_{jt}^C \end{pmatrix} = \begin{bmatrix} \Phi^Z & \mathbf{0} \\ \Lambda_j' & \Phi_j^Y \end{bmatrix} \begin{pmatrix} \mathcal{Z}_{t-1} \\ Y_{jt-1}^C \end{pmatrix} + \begin{pmatrix} \mathcal{V}_t^Z \\ \mathcal{V}_{jt}^Y \end{pmatrix} \tag{2}$$

The mean squared forecast error varies over time due to the fact that shocks in y_{jt+1}^C and $\mathbf{Z}_t$ have time varying variance, defined by

$$\Omega_{jt}(h) = \Phi_j^Y \Omega_{jt}(h-1)\left(\Phi_j^Y\right)' + E_t\left(\mathcal{V}_{jt+h}^Y\left(\mathcal{V}_{jt+h}^Y\right)'\right) \tag{3}$$

[9]JLN allow for stochastic volatility in both the estimates of the factors used to augment the VAR and the variables included in the VAR. This results in four sources of time variation in the forecast errors due to the stochastic volatility of the VAR shocks, the factors, the covariance between these two, and an autoregressive term due persistence in the volatility of the VAR shocks. Without stochastic volatility the forecast error would not vary with t but only with h. See JLN, p.1188.

[10]Using the STOCHVOL package in R as per JLN, which uses Markov Chain Monte Carlo (MCMC) methods to estimate the volatilties. The forecasting residuals are estimated with least squares and those residuals are used to estimate stochastic volatility model where volatility follows an AR(1) process with an intercept term.

Uncertainty about the variable y_{jt}^C, $\mathcal{U}_{jt}^C(h)$, at forecast horizon h, is the conditional volatility of the purely unforecastable component of the future value of the series, conditional on all information known at time t:

$$\mathcal{U}_{jt}^C(h) = \sqrt{1_j' \Omega_{jt}(h) 1_j} = \sqrt{E\left[\left(y_{jt+h}^C - E\left[y_{jt+h}^C | I_t\right]\right)^2 | I_t\right]} \tag{4}$$

This procedure results in an uncertainty measure for each series in Y_t^C. To arrive at an aggregate measure of uncertainty in that category we use the average of those indices:

$$\mathcal{U}_{Ct}(h) \equiv \text{plim}_{N_C \to \infty} \sum_{j=1}^{N_C} \frac{1}{N_c} \mathcal{U}_{jt}^C(h) \tag{5}$$

For each country, we consider two types of uncertainty, macro and financial based on which series we use to estimate the aggregate uncertainty measure.

4 Data

For each country, the forecasts above are formed on the basis of two monthly data sets, one capturing macroeconomic series and one capturing financial variables. The data sources are described in full in the appendix. The data generally covers early 1990s to early 2017. The original JLN work employed a monthly model and we do the same here to capture higher frequency changes in forecast errors which may be not captured in a quarterly model[11]. The macro series range in number from 40 (Japan) to 15 (Canada), and broadly cover the labour market (unemployment, employment, wages, vacancies), retail sales, industrial production, orders, inflation, trade (exports, imports and their prices), vehicle sales as well as business consumer confidence and a composite leading indicator. The financial series are fewer in number and range from 27 (the U.K.) to 8 (Spain), and broadly cover exchange rates, money supply, credit extension, foreign reserves, interest rates (interbank rates, government bond yields) and share price indices. The original JLN measure of financial data captures only asset returns whereas here it is defined more broadly to include credit extension - which is important in models featuring financial frictions.

For each country, the macro and financial data sets are combined to form the information set in the forecasting model from which the forecasting factors are drawn. The forecasting model uses a large set of potential predictors in the factors, $\mathbf{F}_t$, and $\mathbf{W}_t$ (which is comprised of squares of the first principal component in $\mathbf{F}_t$), and $\mathbf{G}_t$ a further set of factors drawn from the squares of the original data set. From the potential factors, $\mathbf{F}_t$ and $\mathbf{G}_t$, a subset, $\hat{\mathbf{F}}_t$ and $\hat{\mathbf{G}}_t$, are chosen based on the information criterion in Bai and Ng (2002).The set of predictors, $\left\{\hat{\mathbf{F}}_t, \hat{\mathbf{G}}_t, \mathbf{W}_t\right\}$, are selected for inclusion in the forecasting model based on their incremental predictive power using a t-test (with the threshold set at $t = 2.575$) for each y_{jt}^C [12].

[11] Experiments with a quarterly dataset for the USA, covering similar series to those used for the other countries here, showed that a quarterly model does well in capturing macro uncertainty but less well in capturing financial uncertainty when compared to the original JLN indices. However the JLN financial data focuses exclusively on asset returns where we take this measure to be broader, see above. In future research we intend to extend the country sample using quarterly data.

[12] The equations each contain four lags of their own series.

5 Estimates of Uncertainty

Figure 1: Macro Uncertainty

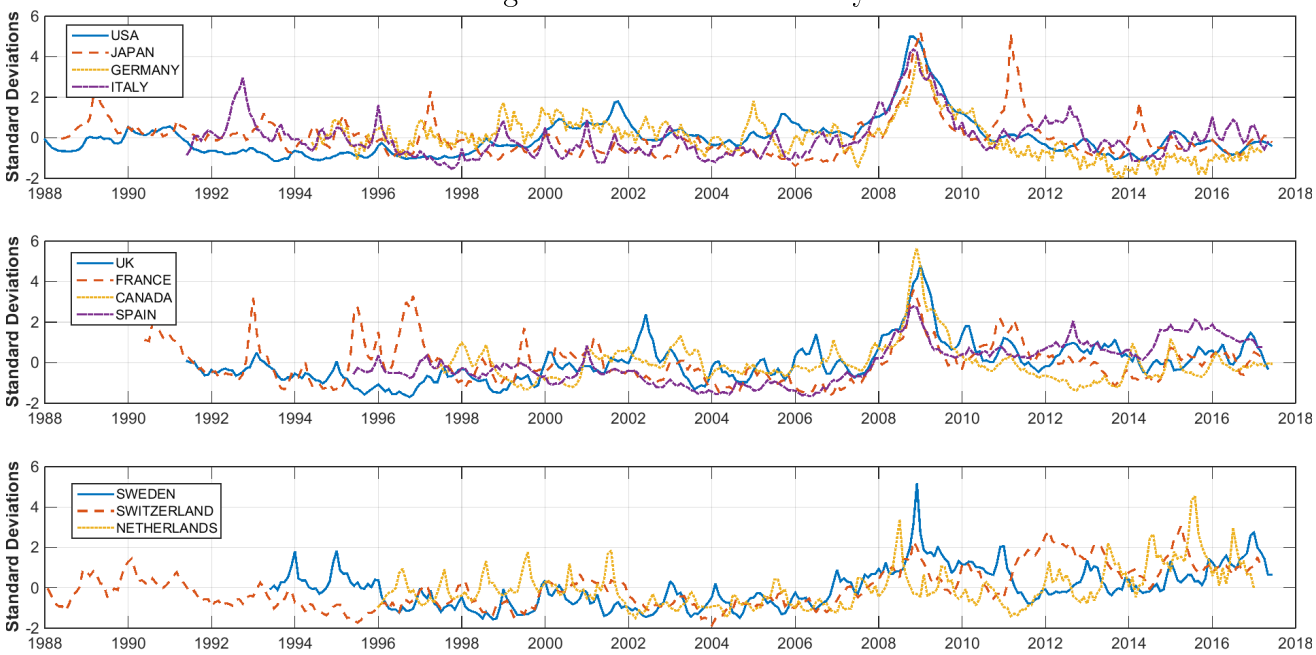


Figure (1) compares the estimates for macro uncertainty across countries. The GFC is largest uncertainty event for most countries but there remains significant idiosyncratic variation. For example, in March 2011 a 5 standard deviation rise in uncertainty took place in Japan as the 9.0 magnitude Tohoku earthquake hit the east coast. Italy experienced a significant rise in macro uncertainty during 1992 as the Amato government cut pension and benefit entitlements (Miniaci and Weber (1999)). The U.K. experienced high uncertainty around 2003 linked to poor performance in the manufacturing sector (Redl (2017)).

Table 1: Correlations across Macro and Financial Uncertainty measures

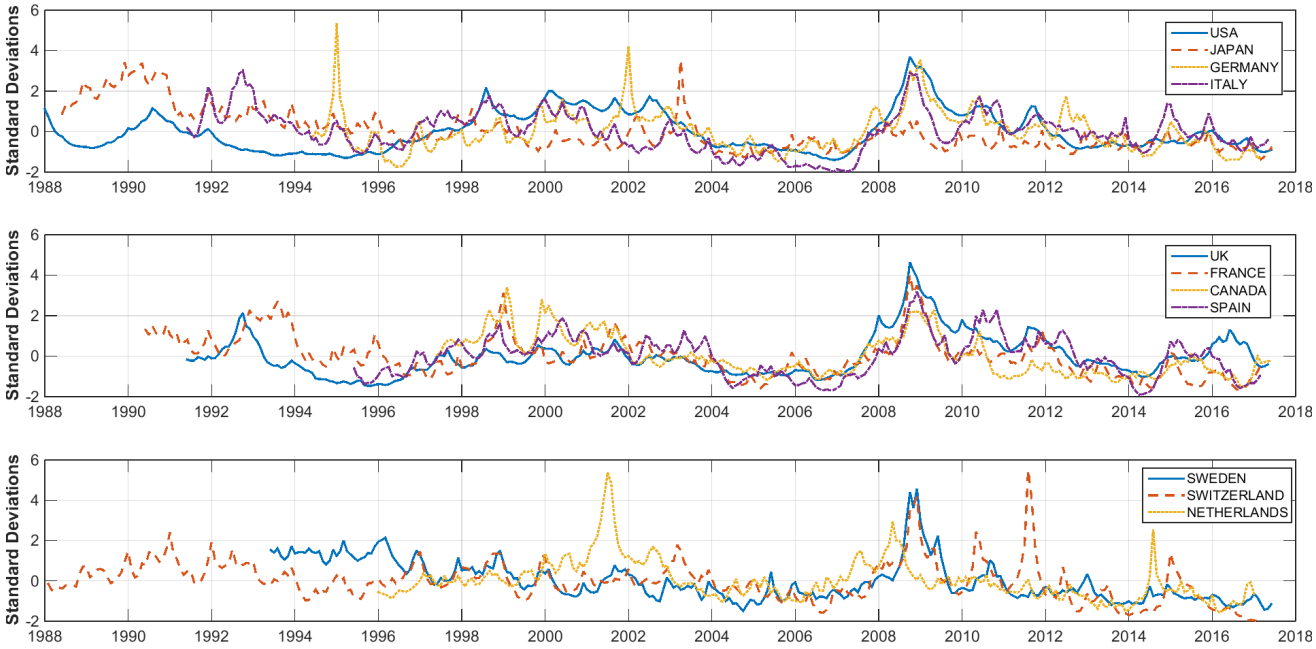
	USA	JAPAN	GERMANY	ITALY	UK	FRANCE	CANADA	SPAIN	SWEDEN	SWITZERLAND	NETHERLANDS
USA		0.47	0.64	0.60	0.68	0.33	0.70	0.21	0.38	0.28	-0.04
JAPAN	-0.01		0.37	0.55	0.51	0.51	0.61	0.43	0.49	0.30	-0.03
GERMANY	0.57	0.13		0.46	0.36	0.22	0.59	-0.08	0.20	-0.17	-0.25
ITALY	0.49	0.27	0.49		0.59	0.36	0.60	0.54	0.60	0.35	0.14
UK	0.68	0.03	0.52	0.61		0.26	0.53	0.51	0.61	0.51	0.08
FRANCE	0.45	0.41	0.54	0.57	0.49		0.37	0.43	0.34	0.30	0.11
CANADA	0.67	0.15	0.46	0.50	0.41	0.57		0.27	0.47	0.09	-0.09
SPAIN	0.71	0.13	0.68	0.71	0.61	0.56	0.57		0.67	0.72	0.55
SWEDEN	0.26	0.28	0.43	0.41	0.25	0.62	0.55	0.40		0.45	0.19
SWITZERLAND	0.51	0.39	0.50	0.56	0.50	0.61	0.50	0.61	0.47		0.34
NETHERLANDS	0.45	0.05	0.33	0.16	0.20	0.33	0.49	0.26	0.19	0.22	

Note: Below main diagonal are financial uncertainty correlations, above main diagonal are macro uncertainty correlations.

Similar patterns are present in the financial uncertainty measures. Switzerland experiences very high financial uncertainty around the announcement of the Swiss Franc-Euro exchange rate floor in September 2011 and the ending of the floor in January 2015. The Netherlands experience a significant increase in financial uncertainty in 2001 as share prices collapses following the dot-com

bust in the US. Germany experienced high financial uncertainty as interest rates rose and credit growth declined sharply in 1993.

Figure 2: Financial Uncertainty



The macro uncertainty measures exhibit significant independent variation from the news based indices of Baker et al. (2016) labeled as BBD in figure (3). The indices computed in this paper show less short term volatility and greater persistence for uncertainty spikes, and register larger increases in uncertainty around the GFC. The JLN based indices also do not accord with the recent increases in EPU seen in the UK, Germany, France and Canada. This may be due to coverage of political events that have not resulted in greater inability to forecast the path of real macro variables.

Table (1) presents the cross-correlations in macro and financial uncertainty across countries. There are higher levels of correlation for financial compared to macro uncertainty, as one might expect given open capital accounts. The G7 have stronger links on both measures however Japan's financial uncertainty is largely uncorrelated with uncertainty in the rest of the countries with the exception of the US. The Netherlands is an outlier in terms of the independence of its experience of uncertainty relative to the other nations.

6 Macroeconomic Impact of Uncertainty Shocks

The benchmark VAR model estimated below is:

$$\mathbf{Y}_t = \mathbf{c} + \mathbf{B}(\mathbf{L})\mathbf{Y}_{t-1} + \mathbf{u}_t \tag{6}$$

Where $\mathbf{B}(\mathbf{L})$ is a matrix of lag polynomial coefficients and $\mathbf{u}_t \sim \mathcal{N}(0, \mathbf{\Sigma})$. This reduced form VAR is estimated with Bayesian methods using a Normal inverse Wishart Prior[13]. We estimate the

[13]The Normal inverse Wishart prior assumes a normal prior for the VAR coefficients and a inverse Wishart prior for the covariance matrix, see Blake and Mumtaz (2012).

above model for each country. The variables included in the matrix $\mathbf{Y}_t$ are a measure of short term interest rates typically the policy rate, Consumer Price Index, hours or if unavailable employment, investment, consumption, GDP, credit spreads and a measure of uncertainty. All variables are the cyclical component from a HP filter[14] except for credit spreads, bank rate and the uncertainty measure. The VAR is run country by country. Structural shocks, $\epsilon_t = A_0\mathbf{u}_t$ are defined by identifying restrictions on the matrix A_0. Below we present results using identification using traditional sign restrictions to isolate a macro from financial shocks and those results augmented with narrative information based on close elections.

Traditional sign restrictions are implemented by considering admissible relationships between the reduced form shocks, $\mathbf{u}_t$ and the structural shocks, ϵ_t. This relationship is captured in the matrix Q which is the orthonormal matrix taken from the QR decomposition of a random standard normal matrix. The A_0 matrix is then defined as $A_0 = Q\tilde{A}_0$, where $\tilde{A}_0'\tilde{A}_0 = \Sigma$, the Cholesky decomposition of the variance-covariance matrix of $\mathbf{u}_t$. If the signs assumed for the structural shocks shocks in A_0 are not met then then Q is redrawn until they are. Antolin-Diaz and Rubio-Ramirez (2016) provide two types of narrative restrictions, those on the shocks and using the historical decomposition. Here, I use only restrictions on the shocks themselves[15]. This means checking the narrative restriction is simply calculating the time series of the structural shocks, ϵ_t (using the $A_0\mathbf{u}_t$ which accords with the traditional sign restrictions on the variable responses) and checking if the series meets the required sign at a given date. If it does not then it is discarded from the set of A_0 used to calculate statistics of interest e.g. Impulse Response Functions (IRFs).

6.1 Results

The majority of empirical studies of macro uncertainty employ simple recursive identification schemes (for example, Baker et al. (2016); Leduc and Liu (2012)). However, recursive ordering imposes a rigid structure on the response of the VAR system requiring that the timing of each variable to a shock is known. We employ a partial identification approach, identifying only the uncertainty shock, and imposing more flexible timing assumptions using sign restrictions. Moreover, the use of dynamic sign restrictions allows us to impose that financial conditions do not deteriorate for more than one period following an uncertainty shock. Our baseline results use the restrictions outlined in table (2). These restrictions impose that hours and investment fall following a macro uncertainty shock in line with a number of empirical and theoretical results (see for example, Bloom (2009); Basu and Bundick (2017); Baker et al. (2016); Fernandez-Villaverde et al. (2015)). The response of inflation is less clear, theoretical models focusing on a precautionary demand channel indicate that inflation should fall (Leduc and Liu (2012); Basu and Bundick (2017)) but others find evidence that uncertainty can create an upward pricing bias in firms price setting decision (Fernandez-Villaverde et al. (2015)) similarly there is empirical evidence that this can go either way (for inflationary see Popescu and Smets (2010); Redl (2015, 2017); for dis-inflationary see Leduc and Liu (2012); Basu and Bundick (2017)). Hence we remain agnostic on the response of inflation. The focus of this paper is to control for financial shocks: credit spreads (first moment) and financial uncertainty (second moment) are assumed not to rise when a macro uncertainty shock hits.

[14] Qualitatively similar results hold with a quadratic or cubic detrending

[15] If restrictions are placed on the historical decomposition then additional steps to re-weight the likelihood function are required (using weights inversely proportional to the probability of satisfying the narrative restrictions) as this procedure truncates the likelihood function, see Antolin-Diaz and Rubio-Ramirez (2016), p.10-14

The assumption that both credit spreads and financial uncertainty fall following a macro uncertainty shock is counter-intuitive, in general we expect these variables to move together. However, in principle, there may be particular events that trigger macro uncertainty shocks that are largely independent from financial stress[16], this identification scheme aims to identify those macro uncertainty shocks (rather than spikes in uncertainty which correlate with financial stress). This is similar in spirit to Ludvigson et al. (2018), who impose that macro uncertainty shocks are no more than half the size of financial uncertainty shocks around the financial crisis, but stronger in that the sign restriction is imposed across the entire sample. If macro uncertainty shocks are contractionary without any financial channel acting to reduce real activity then this is evidence that an increase in macro uncertainty matters.

We also explore minimal use of traditional sign restrictions, in additional to the baseline assumptions, in order to put more weight on the narrative restrictions in identifying the shocks. This is referred to as "Weak" in table (2). This imposes only that macro uncertainty rises and investment falls (a widely documented effect of uncertainty shocks in the empirical and theoretical literature) and a zero impact restriction on the response of financial uncertainty.

Table 2: Baseline sign restrictions for 2 quarters

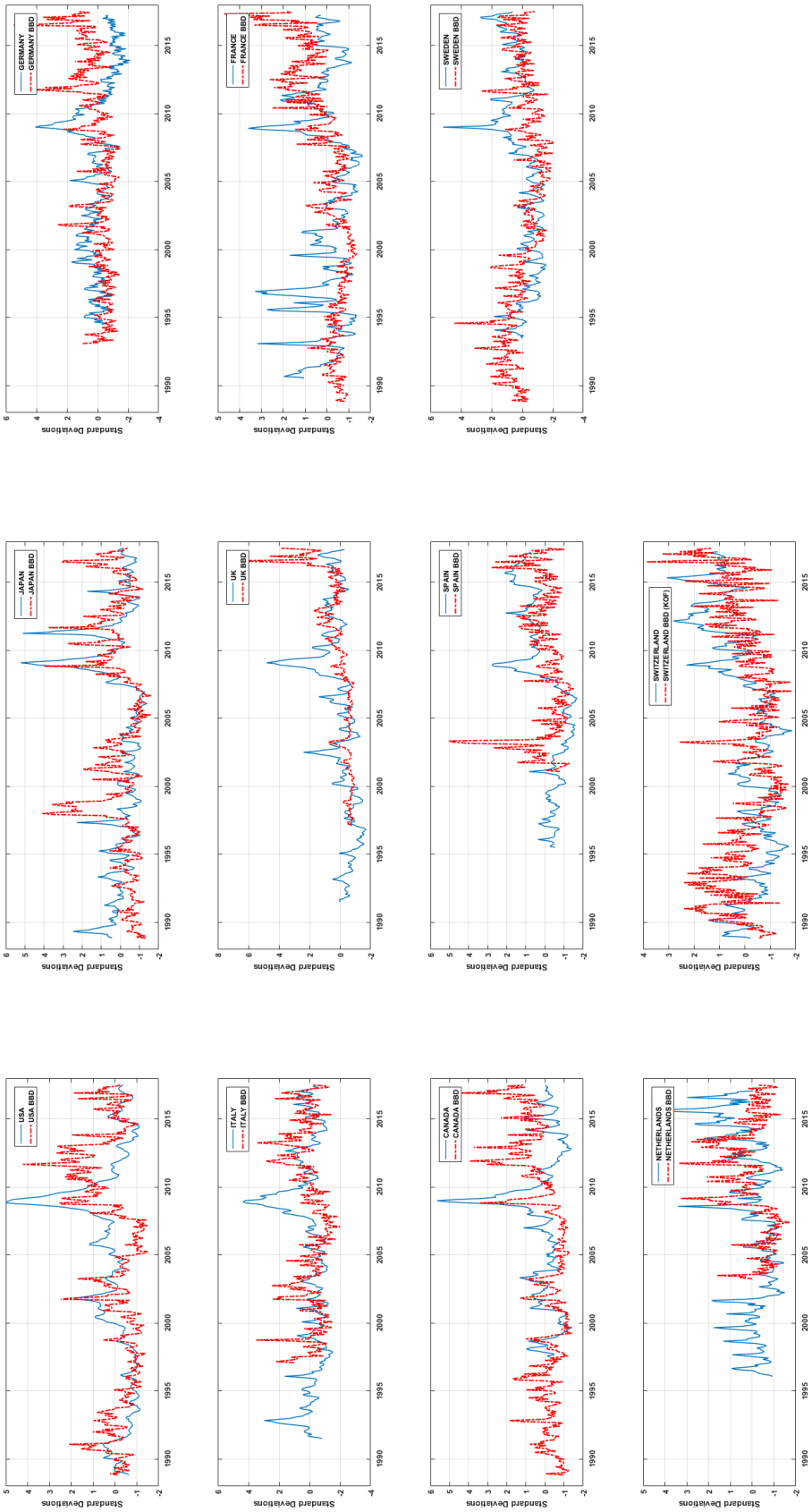
Baseline		Weak	
Short term interest rate	-	*Short term interest rate*	?
CPI	?	*CPI*	?
Hours or Employment	-	*Hours or Employment*	?
Investment	-	*Investment*	-
Consumption	?	*Consumption*	?
GDP	?	*GDP*	?
Credit Spreads	-	*Credit Spreads*	?
Macro Uncertainty	+	*Macro Uncertainty*	+
Financial Uncertainty	-	*Financial Uncertainty*	0*

*Zero restriction holds for first period after shock only.

In addition, to the above standard sign restrictions we impose narrative sign restrictions on the macro uncertainty shocks which require a positive shock takes place around close general elections, following the framework of Antolin-Diaz and Rubio-Ramirez (2016). Table (3) outlines which general elections we have selected as close and presents some ex-post evidence that these were close elections. This includes the results of the election in terms of popular vote which would represent a broad measure of the voter disagreement in the country. However, what matters for the ability of politicians to affect the business environment is the split in the legislature, this is provided in the percentage of seats. On average, these metrics are both very close for the selected elections. A new ruling party may bring more potential changes in economic policies thus more uncertainty. This takes place in about half the elections here (15/28). Further narrative evidence around these events is outlined in appendix II.

[16]The election of Donald Trump in the US and the vote to leave the European Union are two events where significant uncertainty took place over trade policies, as just one for example, yet financial conditions remained stable and credit spreads did not significantly deteriorate

Figure 3: Comparing Macro Uncertainty Indices to Baker, Bloom & Davis (2016) EPU



All indices are standardised. BBD style news index for Switzerland is provided by KOF Swiss Economic Institute, available at https://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-uncertainty-indicator.html.

A key source of ex-ante macro uncertainty around close elections is the difference in the policy plans of the leading parties. To measure this we construct an economic policy analogue to the RILE measure of left-right sentiment in party manifestos used widely in political science (Budge et al. (2001)). This measure uses the Manifesto Project Database (Volkens et al. (2017)) which uses human coders to assign codes to each sentence (or part sentence) in each manifesto which express a positive or negative sentiment in a variety of categories: external relations, freedom and democracy, the political system, the economy, etc. The database then expresses these coded sentences as a proportion of all coded sentences in the manifesto. For example, in the USA presidential election of 2008 (with Barrack Obama as candidate), in the Democratic party manifesto 2.91% of all coded sentences expressed support for market regulation (a subsection of the economy section of the codes). The original right-left position or RILE measure adds code score relating to left leaning sentences and subtracts the right leaning ones. This is done for a selection of codes across all topics in the database. For our purposes I focus on the economy topic to measure left-right position in terms of market policies. I add all the codes that express support for free market policies and subtract all the codes expressing support for greater intervention in the free market, within the economy modules[17]. I label this EconRILE. Thus a positive value suggests the party promotes policies that are pro-free market and a negative value indicates greater focus on market intervention. I present the gap between the two leading parties EconRILE measures as an indicator of the difference in their planned policies, as the more pro-free market party less the more interventionist or socialist party. The greater this gap (in absolute value) the larger the disagreement in policy and the more plausible it is that a close election should cause greater macroeconomic uncertainty. If there was little disagreement this value would be close to zero, however it is typical for their to be significant differences between parties based on this gap.

Two key results are illustrated in figure (4), showing the impact of a macro uncertainty shock on GDP: (1) macro uncertainty shocks have significant effects on the cyclical component of GDP even without a rise in credit spreads or financial uncertainty[18], and (2) conditioning on electoral uncertainty implies a larger real effects of uncertainty shocks. Looking first at the results using only the traditional sign restrictions (blue median line with Grey bands in figure 4), the impact of macro uncertainty shocks is heterogeneous with peak annualised quarterly decline in GDP growth ranging from -0.5% (Canada) to -2% (Germany and the Netherlands). Using the pooled mean group estimator of Pesaran et al. (1999), which is simply an average of the impulse response functions for each country, the average peak response is around -1% for GDP (see figure (5)). The effects tend to be expressed in a larger drop in investment and employment or hours as emphasised by Baker et al. (2016).

[17]More details are provided in Appendix II

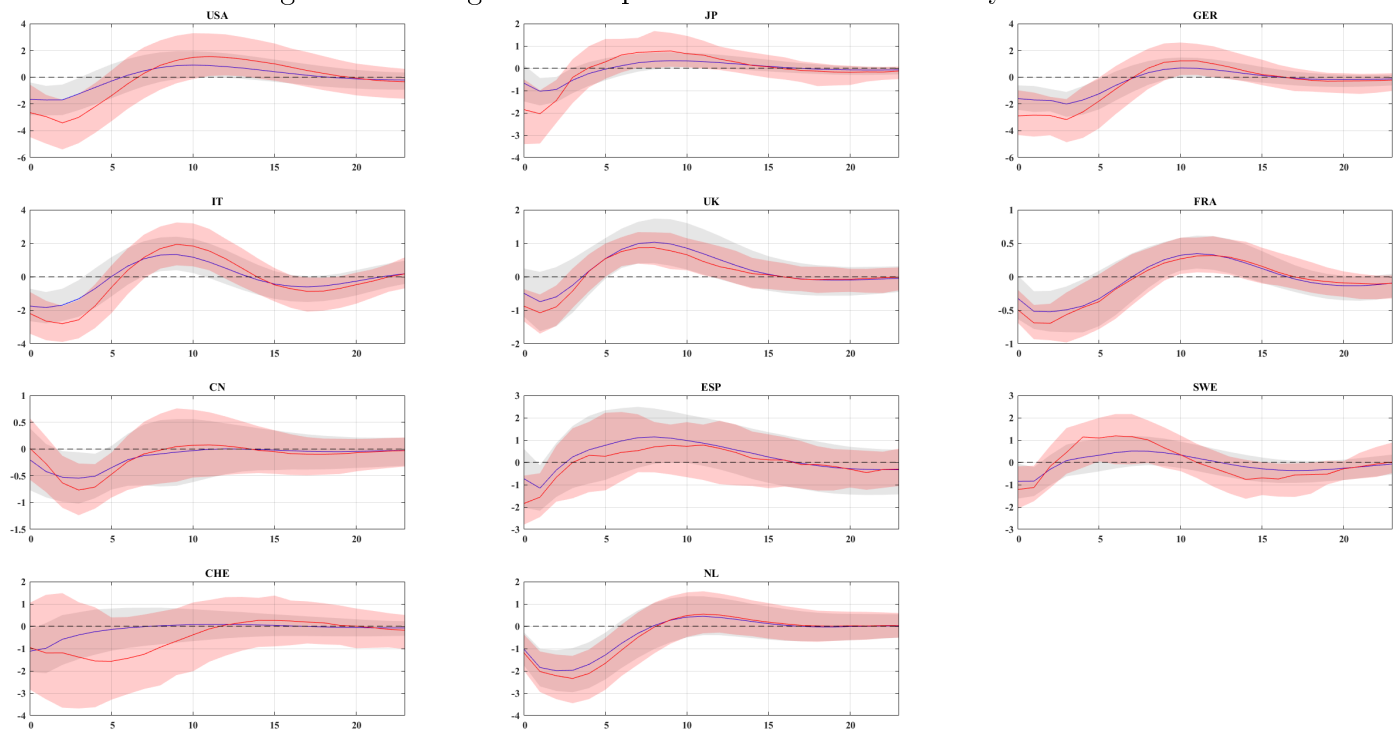
[18]The UK is the exception where no significant drop in GDP obtains without conditioning on close elections, see Redl (2017) for a detailed discussion.

Table 3: Close Election Events

Country	Elections	Winner (runner-up)	% Popular vote	% Seats$^{\triangledown}$	New Ruling Party	EconRILE Gap$^{\diamond}$ (average gap)
USA	2000	Bush (Gore)	47.9 (48.4)	50.4 (49.4)	Yes	4.8 (6.3)
	2004	Bush (Kerry)	50.7 (48.3)	53.2 (46.7)	No	9.5 (6.3)
	2016	Trump (Clinton)	46.1 (48.2)	56.5 (42.2)	Yes	-
Japan	2000	Mori (Hatoyama)	28.3 (25.2)	48.5 (26.5)	No	3.1 (5.5)
	2003	Koizumi (Kan)	35 (37.4)	49.4 (36.9)	No	12.1 (5.5)
Germany	2002	Schröder (Stoiber)	38.5 (38.5)	41.6 (41.1)	No	3.9 (4.1)
	2005	Merkel (Schröder)	35.2 (34.2)	36.8 (36.2)	Yes	6.4 (4.1)
Italy†	1996	Prodi (Berlusconi)	42.6 (40.3)	52.0 (38.3)	Yes	-
	2006	Prodi (Berlusconi)	49.4 (50.0)	53.5 (46.2)	Yes	15.1 (9.0)
	2013	Bersani (Berlusconi)	30.6 (30.0)	49.5 (25.6)	Yes	19.2 (10.8)
UK	1992	Major (Kinnock)	41.9 (34.4)	51.6 (41.6)	No	13.9 (9.8)
	2010	Cameron (Brown)	36.1 (29.0)	47.1 (39.7)	Yes	0.4 (9.8)
	2015	Cameron (Miliband)	36.8 (30.4)	50.8 (35.7)	No	6.4 (9.8)
France*	1995	Chirac (Jospin)	52.6 (47.4)	Pres. election	Yes	-
	2007	Sarkozy (Royal)	53.1 (46.9)	Pres. election	Yes	7.6 (-)
	2012	Hollande (Sarkozy)	51.6 (48.4)	Pres. election	Yes	12.1 (-)
Canada	2004	Martin (Harper)	36.7 (29.6)	54.5 (32.1)	No	-4.4 (0.41)
	2006	Harper (Martin)	36.3 (30.2)	40.3 (33.4)	Yes	3.8 (0.41)
Spain‡	1996	Aznar (González)	38.8 (37.6)	48.0 (39.8)	Yes	1.9 (5.5)
	2008	Zapatero (Rajoy)	43.9 (39.9)	46.1 (45.7)	No	5.2 (5.5)
	2015	Rajoy (Sánchez)	28.7 (22.0)	44.3 (24.6)	No	6.0 (5.5)
Sweden	2006	Reinfeldt (Persson)$^{\vee}$	26.3 (35.0)	27.8 (37.2)	No	9.6 (16.2)
	2010	Sahlin (Reinfeldt)	30.7 (30.1)	32.1 (30.7)	No	3.1 (16.2)
Switzerland*	2003	Maurer (C.Brunner)	26.7 (23.3)	26.0 (25.1)	Yes	16.1 (14.3)
	2011	T.Brunner (Levrat)	26.6 (18.7)	24.0 (23.2)	No	24.8 (14.3)
Netherlands	2002	Balkenende (Fortuyn)	27.9 (17.0)	28.7 (17.3)	Yes	1.1 (4.6)
	2010	Rutte (Cohen)	20.5 (19.6)	20.7 (20.0)	Yes	11.3 (4.6)
	2012	Rutte (Samsom)	26.6 (24.8)	27.3 (25.3)	No	14.8 (4.6)

$\triangledown$ All elections require approximately 50% of seats to form a government.$*$Second round run-off.$\dagger$ Italy popular votes data taken as an average of popular vote from the chamber of Deputies and the Italian Senate .$\ddagger$ Spain data used for both congress of deputies (350 seats) and the Senate (266 seats however only 208 seats were up for election).$\star$ Switzerland data used for both National Council (200 seats) and council of States (46 seats). $\vee$ Reinfeldt received fewer votes but lead government by forming a coalition with smaller parties.$\diamond$Author calculations using Manifesto Project Database, gap defined as more free market party less more socialist party. The average gap is the EconRILE gap between leading parties in postwar data (where available).

Figure 4: GDP growth Response to Macro Uncertainty Shock



Responses in blue (with 68% credible set in Grey) are results with baseline sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

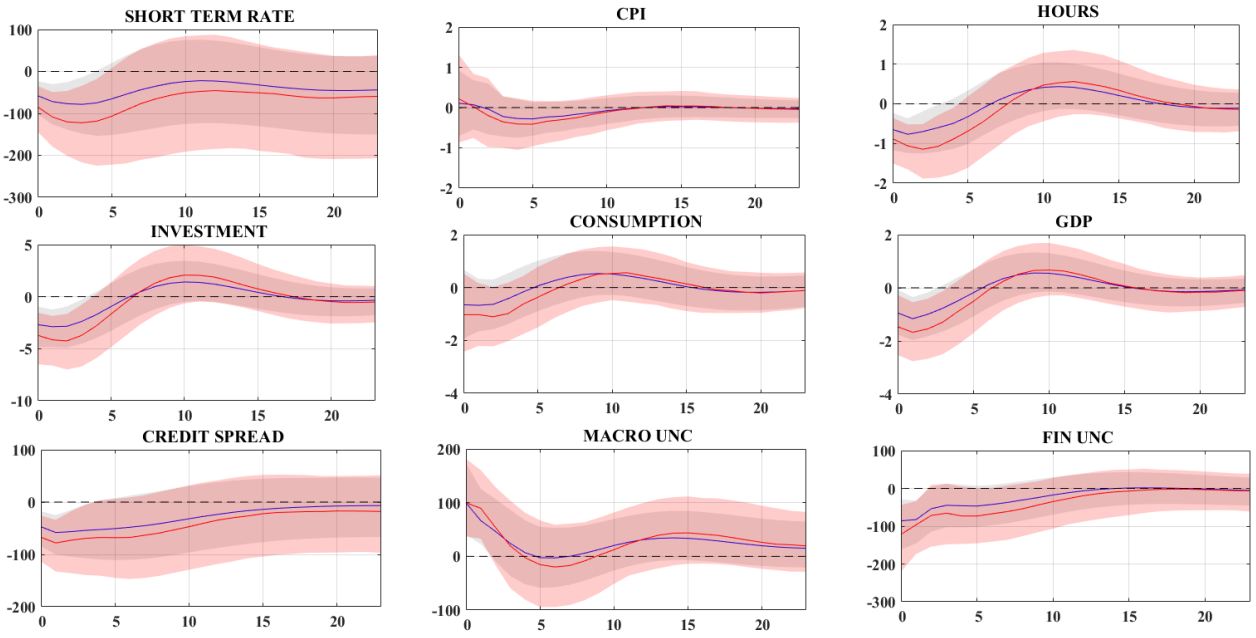
Conditioning on close elections indicates that macro uncertainty has larger effects on GDP, on the order of an additional -0.5pp on average (figure 6). These effects are most pronounced in the USA, Japan, Germany, Italy, the U.K., Spain and France, but is less pronounced in Canada, Sweden, Switzerland and the Netherlands. While a number of those countries see an amplification of same decline in investment, hours and consumption (USA, Japan and Italy), the additional decline in GDP is driven primarily by a very large response of investment in Germany, and in a larger decline in consumption in France, Spain and the U.K. The stronger response of consumption is noteworthy as it shows that macro uncertainty shocks acting through a channel more closely associated with political uncertainty can lead to a response from households alongside the more typical cutting back of inputs by firms. This can lead to a substantially larger GDP response.

We check this result with a placebo test by imposing that uncertainty shocks take place one year after the election events outlined above. Since uncertainty should typically peak on or before election events (when that uncertainty is resolved), consistent with evidence in Julio and Yook (2016) and Larsen (2017), this should not lead strong real effects. Indeed this is the case with a response close to zero, see figure (6).

A significant challenge to using uncertainty indices in policy is that positive uncertainty shocks (second moment) are typically correlated with negative confidence shocks (first moment), as highlighted by Haddow et al. (2013). To control for first moment shocks we include the OECD composite leading indicator in the VAR and impose that it *rises* on impact[19]. The results are robust with a very similar additional decline in GDP following the macro uncertainty shock (see figure 6). Figure (6) presents the impact from using the weak sign restrictions on variables where the

[19]The results are also robust to assuming that the composite leading indicator doesn't respond on impact to the uncertainty shock. The sign restriction used in the main text is stricter in that it does not permit the leading indicator to deteriorate for at least two periods after the uncertainty shock.

Figure 5: Mean group estimates



Responses in blue (with 68% credible set in Grey) are results with baseline sign restrictions given in table (2). Responses in red show the effect of adding narrative information. All IRFs are mean group estimates across all countries.

results are qualitatively the same but somewhat weaker in the first few quarters. Full IRFs for the weak signs identification are in the appendix.

Figure 6: Mean group estimate of the average impact of narrative information on the response of GDP growth to a macro uncertainty shock

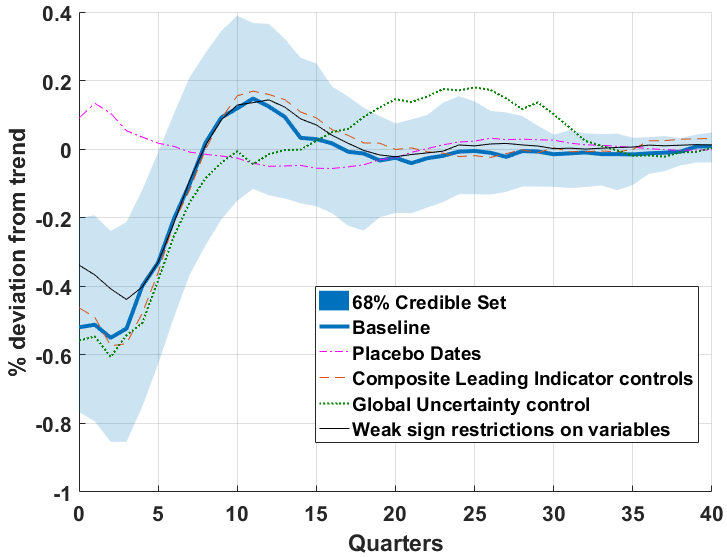


Chart shows difference in mean group estimate IRF for GDP under identification using narrative information on close election events *less* the IRF under baseline sign restrictions without using narrative information.

Conditioning on close elections suggests a more benign financial environment with lower credit spreads, financial uncertainty and interest rates, and yet, a stronger real effect of macro uncertainty

shocks. The additional impact on GDP is broad based covering inputs (investment and hours) but also consumption. Why would this be the case? The standard sign restrictions on financial shocks have reduced the role of macro uncertainty shocks in propagating those shocks thus weakening their impact in a sample where the global financial crisis is the dominant macro uncertainty event[20]. Conditioning on tight elections helps to identify events when macro uncertainty acts independently of the financial channel and thus can have real effects even without a deterioration in financial conditions.

6.2 Controlling for Global Uncertainty

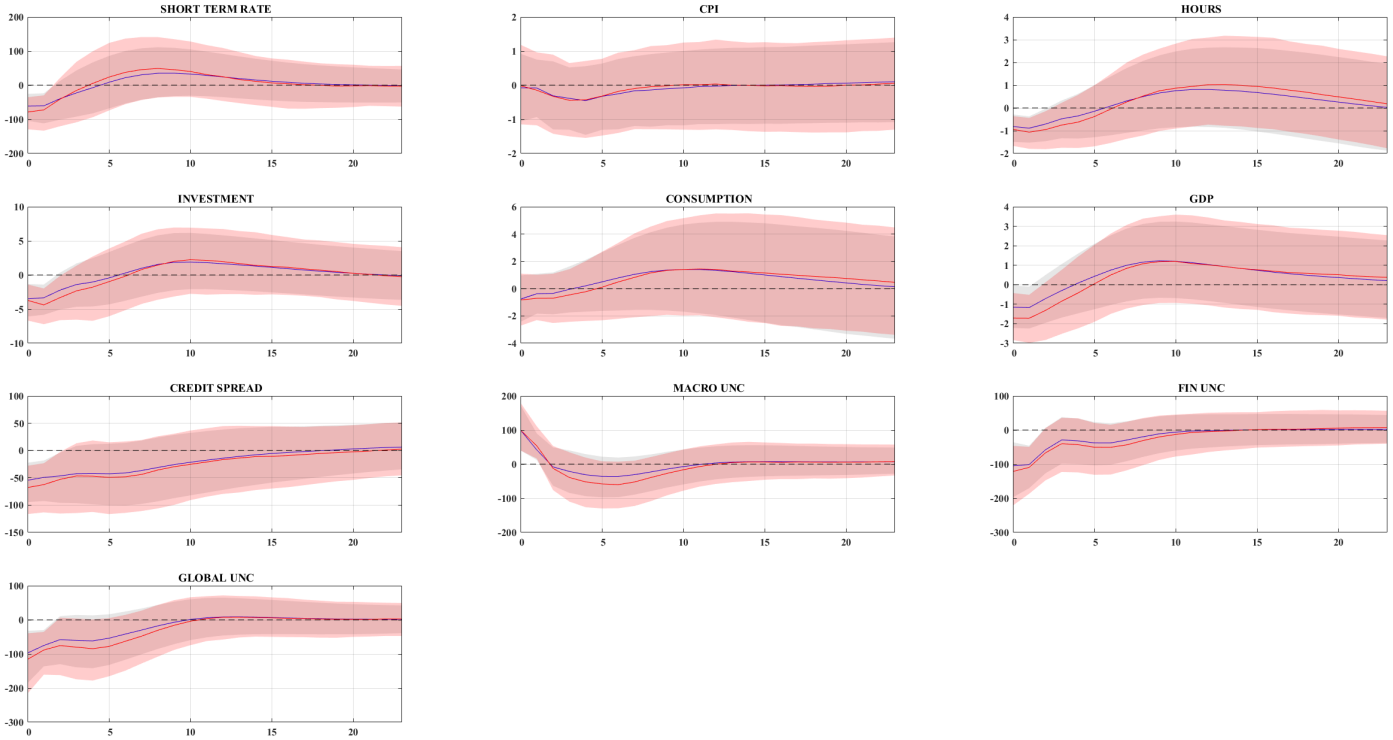
Even if macro uncertainty shocks matter without a financial channel, it may be that the effects are not due to domestic developments but rather through correlation with global uncertainty shocks (Cesa-Bianchi et al. (2014), Mumtaz and Theodoridis (2015) and Berger et al. (2016)). We employ a measure of global uncertainty developed in Redl (2017) to test this hypothesis[21]. That measure of global uncertainty applies the JLN methodology to a wide set of global macro and financial variables. The index uses global macro and financial data covering stock market returns, sovereign bonds yields, exchange rates, commodity prices, trade volumes, retail sales, consumer and business confidence from emerging and advanced economies. We identify domestic uncertainty shocks as before but now we also impose that the global uncertainty index falls when a domestic macro uncertainty shock hits.

We find that the results above are not driven exclusively by correlation with global uncertainty (figure 6 and 7), however the robustness differs across countries (figure 8). The mean group responses show that the impact of a domestic macro uncertainty shock, conditioning on tight elections, is broadly unchanged with more accommodating financial conditions and stronger real effects across hours, investment and consumption. Looking at individual countries, we continue to see that conditioning on close elections implies larger real effects in the USA, Japan, Germany, Italy and the UK, and in the case of the USA and Japan the domestic macro shocks are significant only when conditioning on close elections. The results for the remaining countries, France, Canada, Spain, Sweden, Switzerland and the Netherlands, are broadly consistent with the baseline results in that these countries (with the exception of France and Spain) had relatively more muted responses to conditioning on electoral uncertainty. Global uncertainty appears to be an important driver of the response to domestic uncertainty in these regions. Conditioning close elections, which are a country specific, leads to a slightly smaller impact of domestic macro uncertainty (esp. for Canada). This is consistent with the narrative information from close elections isolating domestic uncertainty that is uncorrelated with global uncertainty (and that global uncertainty has stronger real effects as documented by, for example, Cesa-Bianchi et al. (2014); Berger et al. (2016)).

[20] As shown above the GFC was a very large macro uncertainty event for a majority of countries in our sample, nonetheless, adding cross sectional information should help to reduce the role of GFC relative to studies that only use USA or UK data

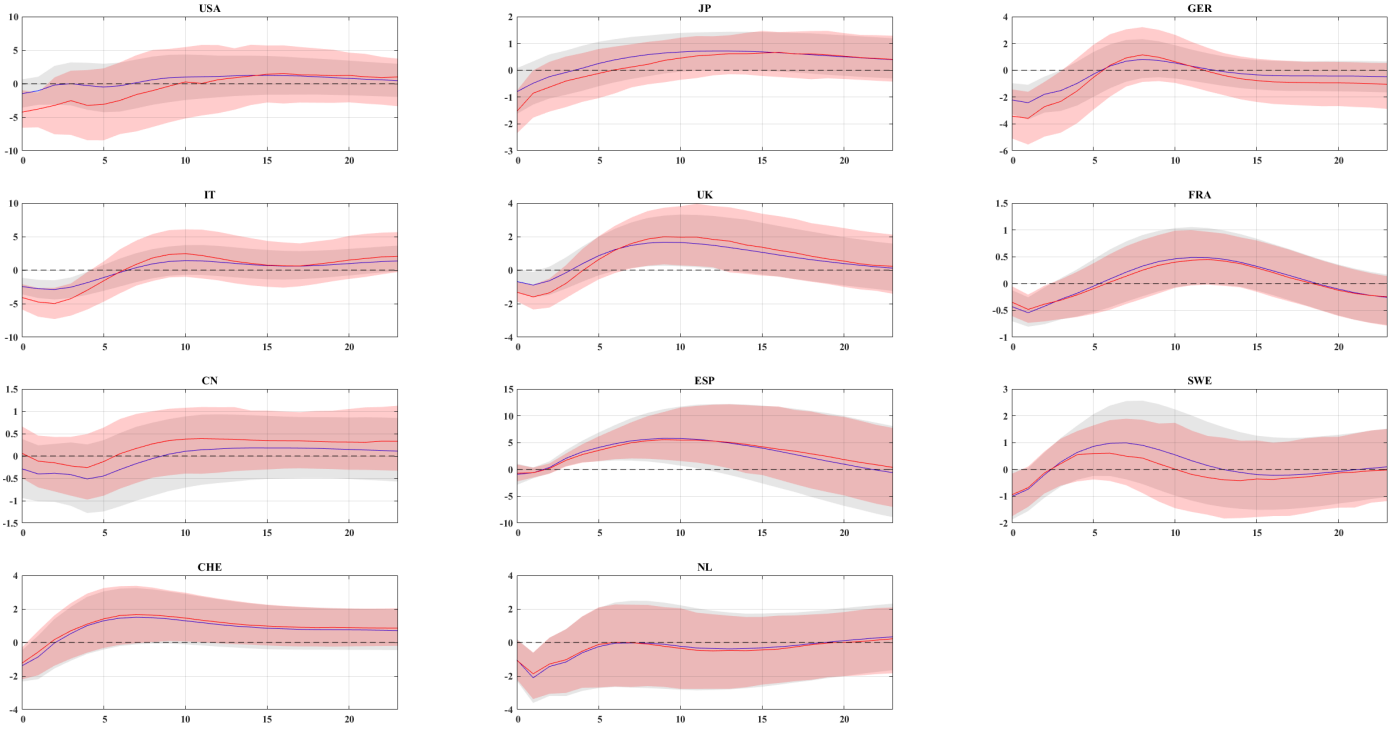
[21] That paper used global variables excluding the UK as it focused exclusively on the UK. In constructing this global index we use all global data including the UK.

Figure 7: Mean group estimates of response to (Domestic) Macro Uncertainty Shock



Responses in blue (with 68% credible set in Grey) are results with baseline sign restrictions given in table (2) and imposing that gloabl uncertainty does not rise with domestic macro uncertainty shocks. Responses in red show the effect of adding narrative information. All IRFs are mean group estimates across all countries.

Figure 8: GDP growth Response to (Domestic) Macro Uncertainty Shock

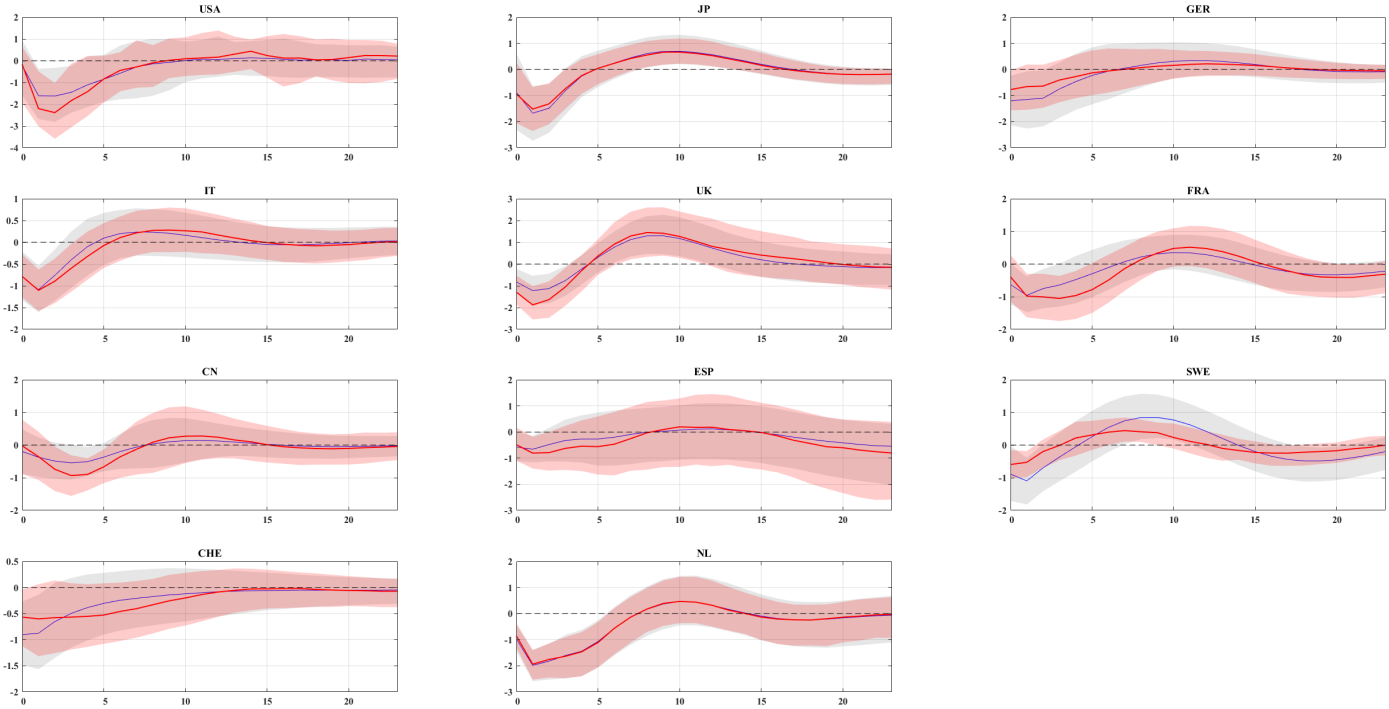


Responses in blue (with 68% credible set in Grey) are results with baseline sign restrictions given in table (2) and imposing that gloabl uncertainty does not rise with domestic macro uncertainty shocks.. Responses in red show the effect of adding narrative information.

6.3 Results using Baker, Bloom and Davis (2016) to measure Macro Uncertainty

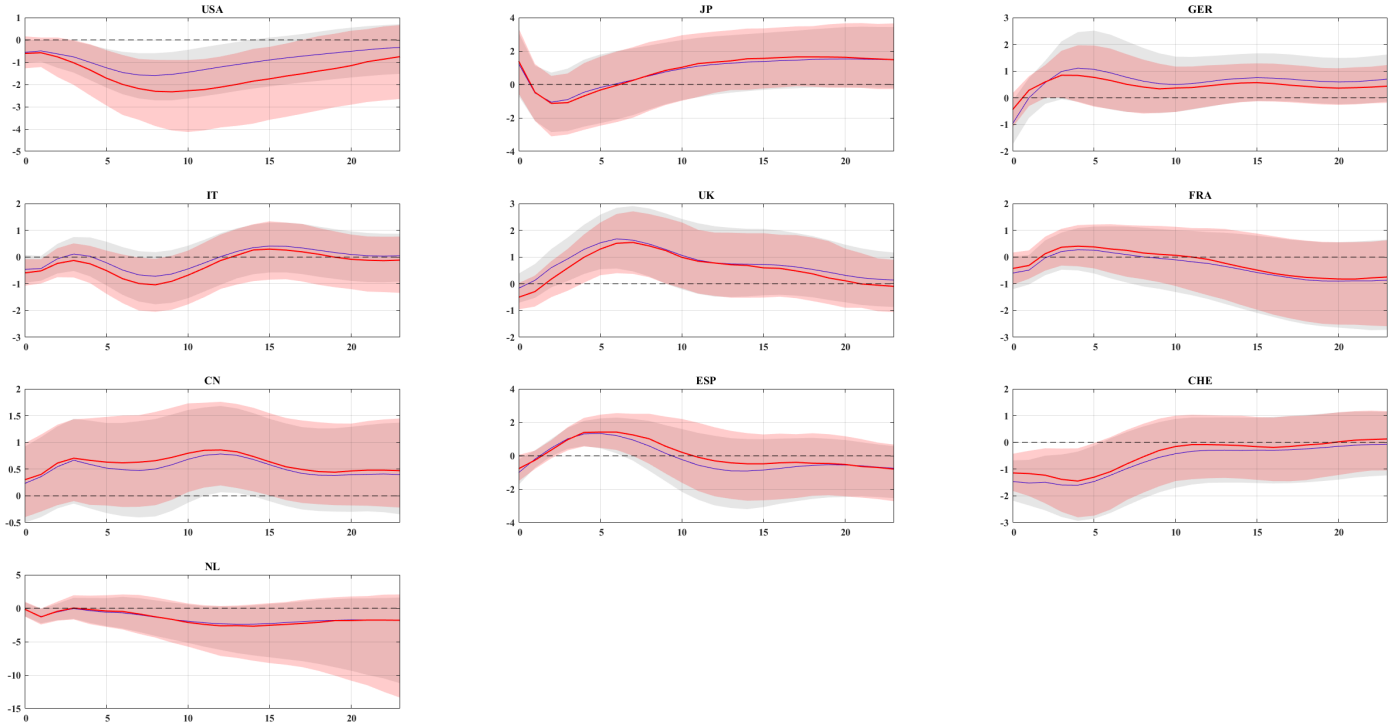
We repeat our results using the baseline specification (see table 2) as well as the case where we control for the first moment of the business cycle using a composite leading indicator using the Baker et al. (2016), hereafter BBD, EPU index for each country where it is available (all except Switzerland). The results using the baseline specification are weaker than using the JLN based measures especially for Japan and Germany (see figure 9). However the response of USA, Italy, UK, France, Spain are consistent. Repeating the baseline specification but adding a composite leading indicator to the model and imposing that it doesn't rise in response to the macro uncertainty shock we see a broadly similar gap between the responses with and without narrative information (see figure 10). However, controlling for the first moment of the business cycle substantially alters the impact of macro uncertainty shocks, with the exception of the USA, all show no significant decline in GDP and some indicate a *positive* response (UK, GER, Spain). This difference is likely due to differences in the methodology of JLN vs BBD. JLN explicitly forecast the mean of each series underlying the aggregate uncertainty index whereas the BBD index is based, typically, on news article counts and does not explicitly control for this. This mean dependence in the BBD indices is important if used alongside a mean forecast by a policymaker since it will entail double counting of the effect of a mean deterioration on the economy.

Figure 9: GDP growth Response to Macro Uncertainty Shock using BBD



Responses in blue (with 68% credible set in Grey) are results with baseline sign restrictions given in table (2). Responses in red show the effect of adding narrative information. BBD index for Switzerland is provided by KOF Swiss Economic Institute, available at https://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-uncertainty-indicator.html.

Figure 10: GDP growth Response to Macro Uncertainty Shock using BBD with no rise in Composite Leading Indicator

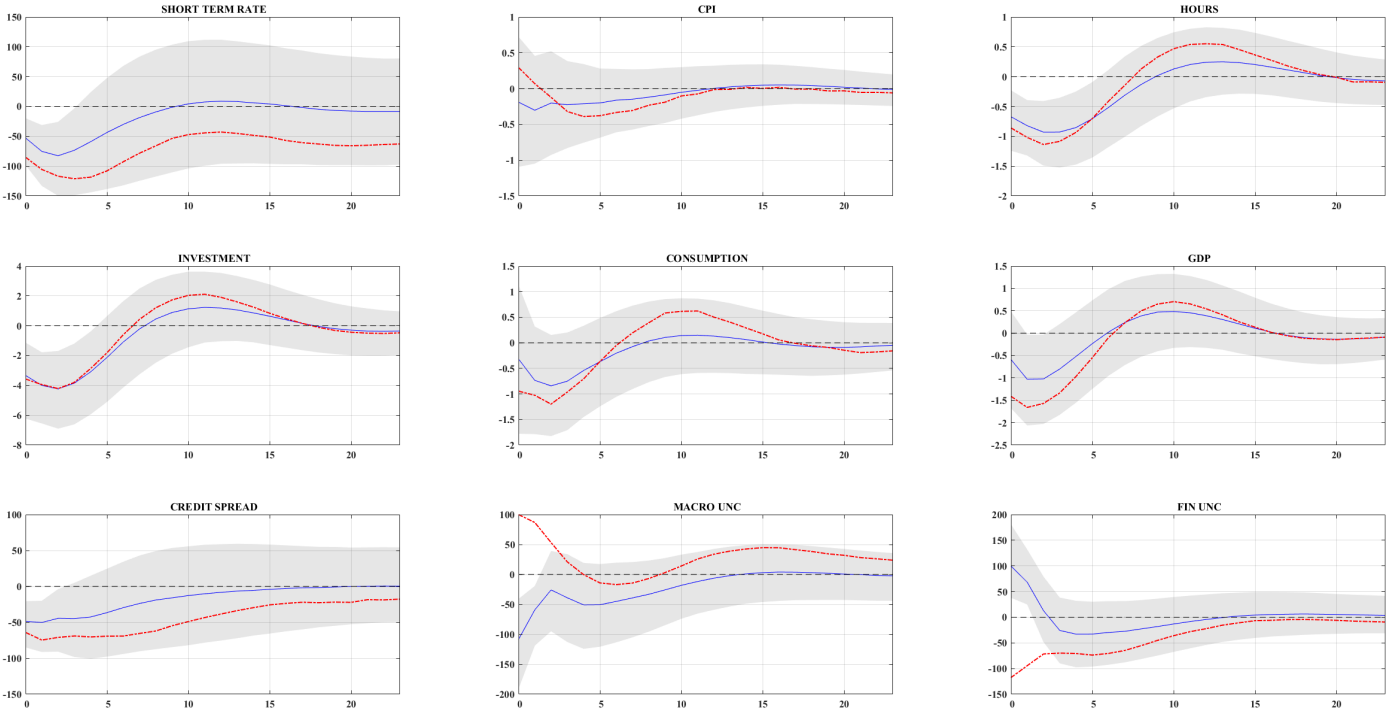


Responses in blue (with 68% credible set in Grey) are results with baseline sign restrictions given in table (2) and imposing that the OECD composite leading indicator does not rise with domestic macro uncertainty shocks.. Responses in red show the effect of adding narrative information.. BBD index for Switzerland is provided by KOF Swiss Economic Institute, available at https://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-uncertainty-indicator.html.

6.4 Financial Uncertainty

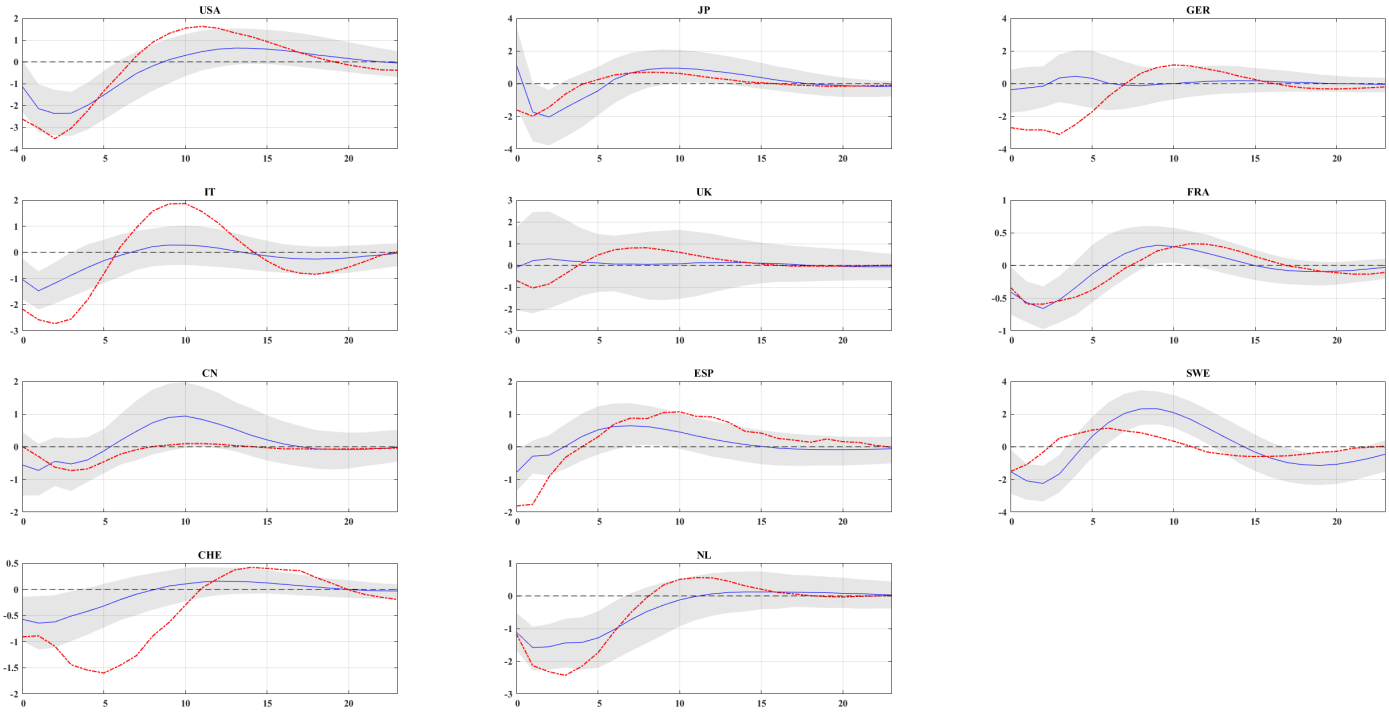
We document the impact of financial uncertainty shocks without (1) credit spreads and (2) macro uncertainty as additional propagation mechanisms. These results do not use narrative information but simply assume the sign restrictions of table 2 with the change that financial uncertainty rises and macro uncertainty falls for the first 2 quarters following the shock. Thus this identification attempts to isolate a pure second moment financial shock in that credit spreads and macro uncertainty do not aid the propagation of the shock. On average, financial uncertainty shocks that are not accompanied by a deterioration in credit spreads or a rise in macro uncertainty have similar size effects on investment and hours to the baseline macro uncertainty shocks analysed above (figure 11). However, the impact on consumption is weaker and not significant leading to a more muted effect on GDP. The average effect masks heterogeneous effects on GDP across countries (figure 12), with an impact ranging from insignificant (Germany, UK and Canada) to peak effects of around -2% for the USA and Sweden.

Figure 11: Mean group estimates of response to Financial Uncertainty shock



Blue lines are median response from financial uncertainty shock, red line is median response from macro uncertainty shock conditional on close elections (baseline)

Figure 12: GDP growth Response to Financial Uncertainty Shock



Blue lines are median response from financial uncertainty shock, red line is median response from macro uncertainty shock conditional on close elections (baseline)

7 Conclusion

This paper uses a data rich environment to produce new econometric measures of macroeconomic and financial uncertainty for 11 advanced nations. These new macro uncertainty measures show significant independent variation from other popular proxies such as those of Baker et al. (2016), with more persistent episodes of high uncertainty and less short term volatility. These new measures of financial uncertainty go beyond narrow measures of share price or interest rate implied volatility to also capture credit extension and the external environment.

We apply these measures to study the impact of macro uncertainty shocks controlling for the both first moment (credit spreads) and second moment (financial uncertainty) financial shocks. We find that real macro uncertainty shocks matter for the vast majority of the G10. We further isolate the macro uncertainty channel by employing narrative information from closely contested elections. We find that this induces a larger real effect of macro uncertainty shocks even when financial conditions *improve*. We argue that this is likely to be because this narrative information helps identify macro uncertainty shocks that do not act primarily through the financial channel (which has been shut down with traditional sign restrictions). We find that these results are robust to controlling for the first moment of the business cycle (through a composite leading indicator) and global uncertainty. We provide novel estimates of the effects of financial uncertainty shocks finding that they have similar effects on inputs (investment, hours) but no impact on consumption.

The JLN approach could be used to estimate macro economic uncertainty in developing countries where news search is not viable and the narrative approach used to isolate macro uncertainty shocks using elections. This is planned future work.

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8 Appendix I - Data Sources

Country	Macro Series	Financial Series
U.K.	33	27
U.S.A*	134	147
Germany	37	13
France	17	12
Spain	23	8
Italy	21	11
Canada	37	15
Japan	40	13
Sweden	19	12
Netherlands	19	12
Switzerland	15	10

*Taken from Ludvigson et al. (2018), available at: https://www.sydneyludvigson.com/data-and-appendixes

Transformations:

1. Levels
    2. First difference.
    3. Second difference.
    4. Natural log
    5. Log first difference
    6. Log second difference.

    For data sources for the USA see Ludvigson et al. (2018).

8.1 UK

Figure 13:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
Industrial Production	ONS	5
Manufacturing Production	ONS	5
Real Retail Sales ex Fuel	ONS	5
Real Retail Sales ex Food	ONS	5
BOP Total Exports (Goods)	ONS	5
Exports Volume (Goods)	ONS	5
BOP Total Imports (Goods)	ONS	5
Imports Volume (Goods)	ONS	5
UK CBI SURVEY - BELOW CAPACITY UTILIZATION	Thomson Reuters	2
CBI Industrial Trends: Current Total Order Book	Confederation of British Industry	2
CBI - vol of stocks bal	Confederation of British Industry	2
New Cars Registrations	The Society of Motor Manufacturers & Traders	5
LFS Unemployment Rate	ONS	1
LFS Number of Employees (Total)	ONS	5
Claimant Count Rate	ONS	1
UK LFS: TOTAL ACTUAL WEEKLY HOURS WORKED, ALL	ONS	5
UK WEEKLY EARN: PRIVATE SECTOR	Main Economic Indicators,copyright OECD	5
PPI	ONS	5
CPI all items	ONS	5
RPI all items	ONS	5
RPI ex Mortgages Interest Payments (RPIX)	ONS	5
Nationwide House Price MoM	Housing and Construction	5
RICS House Price Balance	RICS - The Royal Institution of Chartered Surveyors, Unit	2
UK PSNCR Public Sector Net Cash Requirement	ONS	2
New Cars Registrations	The Society of Motor Manufacturers & Traders	5
GfK Consumer Confidence	European Commission	1
European Commission Consumer Confidence	European Commission	1
CBI Distributive Trades: Retail Volume of Sales vs Year Ago	Confederation of British Industry	1
CBI Industrial Trends: Current Total Order Book	Confederation of British Industry	1
CBI Industrial Trend: Expected Selling Prices	Confederation of British Industry	1
Gfk/EC consumer conf, current financial situation of HH	European Commission	1
Gfk/EC consumer conf, current financial situation of HH over next 12m	European Commission	1
CBI MT expectations	Confederation of British Industry	1
FINANCIAL DATA		
Name	**Source**	**Transformation**
3m LIBOR	Bloomberg	2
10yr nom implied fwd	Bank of England	2
10yr real implied fwd	Bank of England	2
5yr nom implied fwd	Bank of England	2
5yr real implied fwd	Bank of England	2
FTSE all share	Bloomberg	5
SHORT STERLING IMPLIED VOL 12 MO	Probability Density Function	2
OIL (WTI) 12mo implied vol	Probability Density Function	2
Sterling exchange rate index	Financial Statistics	5
FTSE 250 INDEX	Bloomberg	5
UK CHANGE IN LENDING TO UK PRIVATE SECTOR- LOANS & ADVANCES	BBA - British Bankers' Association	1
UK MONEY SUPPLY M4	Bank of England	5
UK UK MONEY SUPPLY M3	Bank of England	5
UK MONEY SUPPLY M1	Bank of England	5
UK MONEY SUPPLY M2: RETAIL DEPOSITS AND CASH IN M4	Bank of England	5
GBP TO USD - EXCHANGE RATE	Bank of England	5
GBP TO EUR - EXCHANGE RATE	Bank of England	5
SMALL LoBM	Fama French	1
ME1 BM2	Fama French	1
ME1 BM3	Fama French	1
ME1 BM4	Fama French	1
SMALL HiBM	Fama French	1
UK BANK OF ENGLAND BASE RATE	Long-run dataset	1
bank rate libor spread	Bank of England	1
bank rate 5yr spread	Bank of England	1
bank rate 10 yr spread	Bank of England	1
Oil Brent	Thomson Reuters	5

8.2 Germany

Figure 14:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
BUSINESS EXPECTATIONS	Ifo - Institute for Economic Research, University of Munich	5
COMPOSITE LEADING INDICATOR	OECD	5
BOP CAPITAL & FINANCIAL ACCOUNT BALANCE	Deutsche Bundesbank	1
CURRENT ACCOUNT BALANCE	Deutsche Bundesbank	1
BOP: EXPORTS FOB	Deutsche Bundesbank	5
BOP: IMPORTS CIF	Deutsche Bundesbank	5
BOP: VISIBLE TRADE BALANCE	Deutsche Bundesbank	5
EM EFFECTIVE EXCH.RATE - REAL CPI	ECB - European Central Bank	5
CONSUMER CONFIDENCE INDICATOR	DG ECFIN - Directorate General for Economic and Financial Affairs	2
NEW PASSENGER CAR REGISTRATIONS	KBA - Federal Motor Transport Authority, Germany	5
RETAIL SALES EXCL CARS	Federal Statistical Office, Germany	5
RETAIL SALES EXCLUDING CARS INDEX	Federal Statistical Office, Germany	5
EMPLOYED PERSONS	Bundesagentur fur Arbeit, Germany	5
UNEMPLOYMENT LEVEL	Deutsche Bundesbank	5
UNEMPLOYMENT REGISTERED	Deutsche Bundesbank	5
UNEMPLOYMENT: % CIVILIAN LABOUR	Bundesagentur fur Arbeit, Germany	1
UNEMPLOYMENT: % CIVILIAN LABOUR	Deutsche Bundesbank	1
EG UNEMPLOYMENT RATE, REGISTERED	Deutsche Bundesbank	1
WG UNEMPLOYMENT RATE, REGISTERED	Deutsche Bundesbank	1
VACANCIES	Deutsche Bundesbank	5
WAGE & SALARY,OVERALL ECONOMY-ON A MTHLY BASIS	Deutsche Bundesbank	5
WAGE & SALARY: ON HRLY. BASIS - PRDG. SECTOR	Deutsche Bundesbank/Thomson Reuters	5
PRODUCTIVITY: OUTPUT PER MAN-HOUR WORKED	Deutsche Bundesbank	5
WAGES & SALARIES: PER UNIT OF OUTPUT	Federal Statistical Office, Germany	5
TRADE & IND: BUS CLIMATE	Ifo - Institute for Economic Research, University of Munich	5
INDL PROD: INDUSTRY INCL CNSTR	Federal Statistical Office, Germany	5
INDL PROD: MANUFACTURING	Federal Statistical Office, Germany	5
NEW ORDERS RECD: CNSTR - RESL CNSTR	Deutsche Bundesbank	5
MANUFACTURING ORDERS	Deutsche Bundesbank	5
MANUFACTURING ORDERS	Deutsche Bundesbank	5
INSOLVENCIES - BUSINESS ENTERPRISES	Federal Statistical Office, Germany	5
CPI	Deutsche Bundesbank	5
EXPORT PRICE INDEX	Deutsche Bundesbank	5
IMPORT PRICE INDEX	Deutsche Bundesbank	5
TERMS OF TRADE	Deutsche Bundesbank	5
PPI: INDL. PRODUCTS, TOTAL, SOLD ON THE DOMESTIC MARKET	Federal Statistical Office, Germany	5
FINANCIAL DATA		
Name	**Source**	**Transformation**
GERMAN MARKS TO US$	Bank of England	5
US $ TO 1 EURO	Bank of England	5
EM BOE EURO TRADE WEIGHTED INDEX	Bank of England	5
MONEY SUPPLY M0	Thomson Reuters	5
MONEY SUPPLY-GERMAN CONTRIBUTION TO EURO M1	Deutsche Bundesbank/Thomson Reuters	5
MONEY SUPPLY- M2	Deutsche Bundesbank/Thomson Reuters	5
MNY.SUPL-M3	Deutsche Bundesbank/Thomson Reuters	5
DISCOUNT RATE / SHORT TERM EURO REPO RATE	ECB - European Central Bank	1
FIBOR - 3 MONTH	EBF - European Banking Federation/ACI - The Financial Markets Association	1
BANK PRIME LENDING RATE / ECB MARGINAL LENDING FACILITY	Deutsche Bundesbank	1
LONG TERM GOVERNMENT BOND YIELD - 9-10 YEARS	Datastream	1
DAX SHARE PRICE INDEX, EP	Reuters	5
LENDING TO ENTERPRISES & INDIVIDUALS	Deutsche Bundesbank	5

8.3 France

Figure 15:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
COMPOSITE LEADING INDICATOR - TREND RESTORED	Main Economic Indicators,copyright OECD	5
EXPORTS FOB	Direction generale des douanes et droits indirects, France	5
IMPORTS FOB	Direction generale des douanes et droits indirects, France	5
VISIBLE TRADE BALANCE FOB-FOB	Direction generale des douanes et droits indirects, France	1
EM BOE EURO TRADE WEIGHTED INDEX	Bank of England	5
SURVEY - HOUSEHOLD CONFIDENCE INDICATOR	INSEE - National Institute for Statistics and Economic Studies, France	5
HOUSEHOLD CONSUMPTION - ENGINEERED PRODUCTS	INSEE - National Institute for Statistics and Economic Studies, France	5
NEW CAR REGISTRATIONS	Ministere de l'Ecologie du Developpement et de l'Amenagement durables, France	5
NEW CAR REGISTRATIONS	CCFA - Comite des Constructeurs Francais d'Automobiles	5
POPULATION: METROPOLITAN	INSEE - National Institute for Statistics and Economic Studies, France	5
SURVEY: MANUFACTURING OUTPUT LEVEL - GENERAL OUTLOOK	INSEE - National Institute for Statistics and Economic Studies, France	1
SURVEY: MANUFACTURING - SYNTHETIC BUSINESS INDICATOR	INSEE - National Institute for Statistics and Economic Studies, France	5
INDUSTRIAL PRODUCTION	INSEE - National Institute for Statistics and Economic Studies, France	5
INDUSTRIAL PRODUCTION - MANUFACTURING	INSEE - National Institute for Statistics and Economic Studies, France	5
INDUSTRY BANKRUPTCIES	INSEE - National Institute for Statistics and Economic Studies, France	5
CPI	INSEE - National Institute for Statistics and Economic Studies, France	5
CPI - ALL ITEMS LESS ENERGY	INSEE - National Institute for Statistics and Economic Studies, France	5
FINANCIAL DATA		
Name	**Source**	**Transformation**
OFFICIAL RESERVES	MINEFI - Ministere de l'Economie, des Finances et de l'Industrie, France	5
FRENCH FRANCS TO US $	Bank of England	5
US $ TO 1 EURO	Bank of England	5
MONEY SUPPLY - M1	Banque de France	5
MONEY SUPPLY - M2	Banque de France	5
MONEY SUPPLY - M3	Banque de France	5
AVERAGE COST OF FUNDS FOR BANKS / EURO REPO RATE	ECB - European Central Bank	1
PIBOR / EURIBOR - 3-MONTH	Main Economic Indicators,copyright OECD	1
CAPITAL MARKET YIELDS-13-WEEK TREASURY BILLS,MO.WGHTD.AVG.	Banque de France	1
GOVERNMENT GUARANTEED BOND YIELD	Banque de France	1
SHARE PRICE INDEX - SBF 250	Main Economic Indicators,copyright OECD	5
MFI LOANS TO RESIDENT PRIVATE SECTOR	Banque de France	5

8.4 Italy

Figure 16:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
COMPOSITE LEADING INDICATOR - TREND RESTORED	Main Economic Indicators,copyright OECD	5
EXPORTS OF GOODS FOB	Istat - National Institute of Statistics, Italy	5
IMPORTS OF GOODS CIF	Istat - National Institute of Statistics, Italy	5
VISIBLE TRADE BALANCE	ITVISGDSA Italy Istat - National Institute of Statistics, Italy	2
STATE BUDGET: BALANCE (CMLV)	Bank of Italy	2
HOUSEHOLD CONFIDENCE INDEX	Istat - National Institute of Statistics, Italy	2
NEW PASSENGER CAR REGISTRATIONS	ANFIA - Italian Association of the Automotive Industry	5
RETAIL SALES	Istat - National Institute of Statistics, Italy	5
CONTRACTUAL HOURLY WAGE: ALL WORKERS	Istat - National Institute of Statistics, Italy	5
BUSINESS CONFIDENCE INDICATOR	Istat - National Institute of Statistics, Italy	5
BUS.SVY.: ECONOMY IN NEXT 3MOS- FAVOURABLES PLUS STABLES	Istat - National Institute of Statistics, Italy	5
INDUSTRIAL PRODUCTION	Istat - National Institute of Statistics, Italy	5
INDUSTRIAL PRODUCTION: MANUFACTURING	Istat - National Institute of Statistics, Italy	5
NEW ORDERS	Istat - National Institute of Statistics, Italy	5
CPI INCLUDING TOBACCO - NIC (LINKED & REBASED)	Istat - National Institute of Statistics, Italy	5
INFLATION RATE	Istat - National Institute of Statistics, Italy	1
EXPORT UNVALUE INDEX	Istat - National Institute of Statistics, Italy	5
IMPORT UNVALUE INDEX	Istat - National Institute of Statistics, Italy	5
TERMS OF TRADE	Istat - National Institute of Statistics, Italy	5
PPI	Istat - National Institute of Statistics, Italy	5
NEW ORDERS	Istat - National Institute of Statistics, Italy	5
FINANCIAL DATA		
Name	**Source**	**Transformation**
ITALIAN LIRE TO US $	Bank of England	5
US $ TO 1 EURO (ITALIAN LIRE DERIVED HISTORY PRIOR 1999)	Bank of England	5
EM BOE EURO TRADE WEIGHTED INDEX	Bank of England	5
EM EFFECTIVE EXCH.RATE: BROAD GROUP(38 PARTNERS) - REAL CPI	ECB - European Central Bank	5
MONEY SUPPLY: M1 - ITALIAN CONTRIBUTION TO THE EURO AREA	Bank of Italy	5
MONEY SUPPLY: M2 - ITALIAN CONTRIBUTION TO THE EURO AREA	Bank of Italy	5
MONEY SUPPLY: M3 - ITALIAN CONTRIBUTION TO THE EURO AREA	Bank of Italy	5
DISCOUNT RATE / SHORT TERM EURO REPO RATE	ECB - European Central Bank	1
INTERBANK DEPOSRATE-AVERAGE ON 3-MONTHS DEPOSITS	Bank of Italy	1
GOVERNMENT BOND GROSS YIELD (RENDISTATO)	Bank of Italy	1
MILAN COMGENERAL SHARE PRICE INDEX	Borsa Italiana	5

8.5 Japan

Figure 17:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
LEADING DIFFUSION INDEX	Cabinet Office, Japan	2
COINCIDENT DIFFUSION INDEX	Cabinet Office, Japan	2
GOLD AND FOREIGN EXCHANGE RESERVES	Ministry of Finance, Japan	5
JAPANESE YEN EFFECTIVE EXCHANGE RATE INDEX	Bank of England	5
MOTOR VEHICLE NEW REGISTRATIONS: PASSENGER CARS EXCL.BELOW 66	Japan Automobile Dealers Association	5
RETAIL SALES	METI - Ministry of Economy, Trade and Industry, Japan	5
MONTHLY WORKERS SAVINGS & INSURANCE RATE	Ministry of Internal Affairs and Communications, Japan	2
LABOUR FORCE PARTICIPATION RATE	Ministry of Internal Affairs and Communications, Japan	1
EMPLOYED PERSONS	Ministry of Internal Affairs and Communications, Japan	5
EMPD PERS. - NON AGL. INDS.	Ministry of Internal Affairs and Communications, Japan	5
UNEMPLOYMENT LEVEL	Ministry of Internal Affairs and Communications, Japan	5
UNEMPD SEEKING EMPL	Ministry of Internal Affairs and Communications, Japan	5
UNEMPLOYMENT RATE	Ministry of Internal Affairs and Communications, Japan	1
UNEMPLOYMENT RATE	Ministry of Internal Affairs and Communications, Japan	1
UNFILLED VACANCIES: NEW JOB OFFERS	Ministry of Health, Labour and Welfare, Japan	5
RATIO OF EFFECTIVE JOB OFFERS PER ONE APPLICANT	The Japan Institute for Labour Policy and Training	5
AVERAGE MONTHLY CASH EARN. - MANUFACTURING	Ministry of Health, Labour and Welfare, Japan	5
WAGE INDEX: CASH EARNINGS - MANUFACTURING	Ministry of Health, Labour and Welfare, Japan	5
WAGE INDEX: CASH EARNINGS - ALL INDUSTRIES	Ministry of Health, Labour and Welfare, Japan	5
WAGE INDEX: CONTRACT CASH EARN-MFG.	Ministry of Health, Labour and Welfare, Japan	5
OPERATING RATIO - MANUFACTURING	METI - Ministry of Economy, Trade and Industry, Japan	5
INDUSTRIAL PRODUCTION - MINING & MANUFACTURING	METI - Ministry of Economy, Trade and Industry, Japan	5
INDUSTRIAL PRODUCTION - MANUFACTURING	METI - Ministry of Economy, Trade and Industry, Japan	5
MACHINERY ORDERS	Cabinet Office, Japan	5
NEW HOUSING CONSTRUCTION STARTED	Ministry of Land, Infrastructure, Transport and Tourism, Japan	5
CPI: NATIONAL MEASURE	Thomson Reuters/Statistics Bureau, Ministry of Internal Affairs & Communication, Japan	5
CPI: TOKYO-ALL ITEMS LESS FOOD(LESS ALCOHOL BEV)& ENERGY	Ministry of Internal Affairs and Communications, Japan	5
CPI: NATIONAL MEASURE - ANNUAL INFLATION RATE	Thomson Reuters/Statistics Bureau, Ministry of Internal Affairs & Communication, Japan	1
CPI (%YOY)	National Sources	1
EXPORT PRICE INDEX - ALL COMMODITIES	Bank of Japan	5
IMPORT PRICE INDEX - ALL COMMODITIES	Bank of Japan	5
TERMS OF TRADE INDEX	Bank of Japan	5
PRODUCER PRICE INDEX	Bank of Japan	5
TERTIARY INDUSTRY ACTIVITY INDEX	METI - Ministry of Economy, Trade and Industry, Japan	5
TERTIARY INDUSTRY ACTIVITY INDEX	METI - Ministry of Economy, Trade and Industry, Japan	5
ALL INDS. ACTIVITY INDEX	METI - Ministry of Economy, Trade and Industry, Japan	5
ALL INDS. ACTIVITY INDEX	METI - Ministry of Economy, Trade and Industry, Japan	5
WORKERS HOUSEHOLD LIVING EXPENDITURE	Ministry of Internal Affairs and Communications, Japan	5
EXPORTS	Ministry of Finance, Japan	5
IMPORTS	Ministry of Finance, Japan	5
FINANCIAL DATA		
Name	**Source**	**Transformation**
JAPANESE YEN TO US $	Bank of England	5
MONEY SUPPLY: M0 - CASH CIRCL	Bank of Japan	5
MONEY SUPPLY: M1	Bank of Japan	5
MONEY SUPPLY: M2	Bank of Japan	5
MONEY SUPPLY: M2	Bank of Japan	5
MONEY SUPPLY: M4 BROAD LIQUIDITY	Bank of Japan	5
MONEY SUPPLY: L	Bank of Japan	5
BANK OF JAPAN MAIN POLICY RATE	Bank of Japan	1
BASIC DISCOUNT & LOAN RATE	Bank of Japan	1
PRIME RATE - LONG TERM	Bank of Japan	1
INTEREST-BEARING GOVERNMENT BONDS - 10-YEAR	Thomson Reuters	1
TOKYO STOCK EXCHANGE - TOPIX	Reuters	5
BUSINESS FAILURES	Tokyo Shoko Research, Ltd.	5

8.6 Spain

Figure 18:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
COMPOSITE LEADING INDICATOR - TREND RESTORED	Main Economic Indicators,copyright OECD	5
BOP: CURRENT ACCOUNT BALANCE	Banco de Espana	1
BOP: CAPITAL & FINANCIAL ACCOUNT BALANCE	Banco de Espana	1
EXPORTS	Banco de Espana	5
IMPORTS	Banco de Espana	5
VISIBLE TRADE BALANCE	Banco de Espana	1
EM BOE EURO TRADE WEIGHTED INDEX	Bank of England	5
REGISTRATIONS: PASSENGER CAR	Ministry of the Economy and Finance, Spain	5
RETAIL SALEXCLUDING SERVICE STATION	INE - National Statistics Institute, Spain	5
RETAIL SALEXCLUDING SERVICE STATION - DEFLATED	INE - National Statistics Institute, Spain	5
UNEMPLOYMENT: REGISTERED	Ministry of the Economy and Finance, Spain	5
UNEMPLOYMENT RATE: REGISTERED	Ministry of the Economy and Finance, Spain	1
JOB VACANCI$METHODOLOGY	INEM - Instituto de Empleo, Servicio Publico de Empleo Estatal, Spain	5
ECONOMIC SENTIMENT INDICATOR	Ministry of Industry, Tourism and Trade, Spain	1
INDUSTRIAL PRODUCTION	INE - National Statistics Institute, Spain	5
INDUSTRIAL PRODUCTION - MANUFACTURING INDUSTRY	INE - National Statistics Institute, Spain	5
HOUSCONSTRUCTION COMMENCED	Ministry of Housing, Spain	5
CPI	INE - National Statistics Institute, Spain	5
CPI - HARMONISED EUROPEAN UNION BASIS	INE - National Statistics Institute, Spain	5
EXPORT UNIT VALUE INDEX	Ministry of the Economy and Finance, Spain	5
IMPORT UNIT VALUE INDEX	Ministry of the Economy and Finance, Spain	5
TERMS OF TRADE	Ministry of the Economy and Finance, Spain	5
PPI	INE - National Statistics Institute, Spain	5
FINANCIAL DATA		
Name	**Source**	**Transformation**
OFFICIAL RESERVE ASSETS	Banco de Espana	5
SPANISH PESETAS TO US $	Bank of England	5
US $ TO 1 EURO	Bank of England	5
EM EFFECTIVE EXCH.RATE - REAL CPI	ECB - European Central Bank	5
DISCOUNT RATE/SHORT TERM EURO REPO RATE	ECB - European Central Bank	1
CENTRAL GOVERNMENT BOND - 10-YEAR YIELD	Banco de Espana	1
MADRID S.E - GENERAL INDEX	Ministry of the Economy and Finance, Spain	5
LOANS TO RESIDENTS BY MFI	Banco de Espana	5

8.7 Sweden

Figure 19:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
COMPOSITE LEADING INDICATOR - TREND RESTORED	Main Economic Indicators,copyright OECD	5
EXPORTS TRND	SCB - Statistics Sweden	5
IMPORTS TRND	SCB - Statistics Sweden	5
VISIBLE TRADE BALANCE TRND	SCB - Statistics Sweden	2
CENTRAL GOVERNMENT BUDGET - BALANCE	The Swedish National Financial Management Authority	2
CONSUMER SURVEY: CONSUMER CONFIDENCE INDICATOR	NIER - National Institute of Economic Research, Sweden	2
NEW MOTOR VEHICHLE REGISTRATION - PASSENGER CARS	SCB - Statistics Sweden	5
RETAIL SALES EXCL.MOTOR VEHICLES & REPAIR SHOPS	SCB - Statistics Sweden	5
RETAIL SALES EXCL. MOTOR VEHICLES & REPAIR SHOPS	SCB - Statistics Sweden	5
POPULATION	SCB - Statistics Sweden	5
JOB VACANCIES	Swedish Public Employment Service	2
NEW ORDERS - MINING, QUAR & MANUFACTURING	SCB - Statistics Sweden	5
CPI	SCB - Statistics Sweden	5
CPI: SPECIAL INDEXES,UNDERLYING INFLATION CPIF	SCB - Statistics Sweden	5
OFFICIAL RATE OF INFLATION	SCB - Statistics Sweden	2
EXPORT PRICE INDEX	SCB - Statistics Sweden	5
IMPORT PRICE INDEX	SCB - Statistics Sweden	5
TERMS OF TRADE	SCB - Statistics Sweden	5
PPI	SCB - Statistics Sweden	5
FINANCIAL DATA		
Name	**Source**	**Transformation**
BANK OF SWEDEN: ASSETS - GOLD & FOREIGN EXCHANGE RESERVE	Sveriges Riksbank	5
SWEDISH KRONOR TO US $	Sveriges Riksbank	5
SWEDISH KRONA TRADE WEIGHTED INDEX	Bank of England	5
SWEDISH KRONA TRADE WEIGHTED INDEX	Sveriges Riksbank	5
MONEY SUPPLY - M0	SCB - Statistics Sweden/Sveriges Riksbank	5
MONEY SUPPLY - M3	SCB - Statistics Sweden/Sveriges Riksbank	5
REPO RATE	Sveriges Riksbank	2
DISCOUNT RATE - OFFICIAL	Sveriges Riksbank	2
TREASURY BILL RATE - 3 MONTH	Sveriges Riksbank	2
INTERBANK MONEY RATE: 3 MONTHS	Sveriges Riksbank	2
GOVERNMENT BOND YIELD - 10 YEAR MATURITIES	Sveriges Riksbank	2
BANKRUPTCIES - ENTERPRISES	SCB - Statistics Sweden	5

8.8 Netherlands

Figure 20:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
COMPOSITE LEADING INDICATOR - TREND RESTORED	Main Economic Indicators,copyright OECD	5
EXPORTS - FOB	CBS - Statistics Netherlands	5
IMPORTS - CIF	CBS - Statistics Netherlands	5
VISIBLE TRADE BALANCE	CBS - Statistics Netherlands	5
CBS CONSUMER CONFIDENCE SURVEY: INDEX	CBS - Statistics Netherlands	2
PERSONAL SAVINGS	CBS - Statistics Netherlands	2
HOURLY WAGE RATES	CBS - Statistics Netherlands	5
HOURLY WAGE RATES - MANUFACTURING	CBS - Statistics Netherlands	5
CBS MFG. SVY.: PRODUCER CONFIDENCE INDEX	CBS - Statistics Netherlands	2
INDUSTRIAL PRODUCTION EXCLUDING CONSTRUCTION	CBS - Statistics Netherlands	5
INDUSTRIAL PRODUCTION - MANUFACTURING	CBS - Statistics Netherlands	5
CPI	CBS - Statistics Netherlands	5
CPI - ALL ITEMS	CBS - Statistics Netherlands	5
CPI CORE-ALL ITEMS EXCL.ENERGY,FOOD, ALCOHOL AND TOBACCO	CBS - Statistics Netherlands	5
EXPORT UNIT VALUE INDEX	CBS - Statistics Netherlands	5
IMPORT UNIT VALUE INDEX	CBS - Statistics Netherlands	5
TERMS OF TRADE	CBS - Statistics Netherlands	5
RETAIL SALES VALUE INDEX (%YOY)	Thomson Reuters	2
NEW PASSENGER CAR REGISTRATIONS	ACEA - European Automobile Manufacturers' Association	5
FINANCIAL DATA		
Name	**Source**	**Transformation**
NETHERLANDS GULDEN TO US$	Bank of England	5
US $ TO 1 EURO(NETHERLANDS GUILDER DERIVED HISTORY PRIOR 1999	Bank of England	5
EM BOE EURO TRADE WEIGHTED INDEX	Bank of England	5
EM EFFECTIVE EXCH.RATE: BROAD GROUP - REAL CPI	ECB - European Central Bank	5
CURRENCY IN CIRCULATION	DNB - De Nederlandsche Bank	5
MONEY SUPPLY - M1	DNB - De Nederlandsche Bank	5
MONEY SUPPLY - M2	DNB - De Nederlandsche Bank	5
MONEY SUPPLY - M3	DNB - De Nederlandsche Bank	5
CREDIT ADVANCES / SHORT TERM EURO REPO RATE	ECB - European Central Bank	1
INTERBANK THREE MONTH: OFFERED RATE	DNB - De Nederlandsche Bank	1
YIELD LATEST 10-YEAR CENTRAL GOVERNMENT BONDS	DNB - De Nederlandsche Bank	1
AMSTERDAM SE ALL SHARE STOCK PRICE INDEX	CBS - Statistics Netherlands	5

8.9 Canada

Figure 21:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
GDP - ALL INDUSTRIES	CANSIM - Statistics Canada	5
GDP - INDUSTRIAL PRODUCTION	CANSIM - Statistics Canada	5
GDP - MANUFACTURING	CANSIM - Statistics Canada	5
EXPORTS (BOP)	CANSIM - Statistics Canada	5
IMPORTS (BOP)	CANSIM - Statistics Canada	5
VISIBLE TRADE BALANCE	CANSIM - Statistics Canada	2
OFFICIAL INTERNATIONAL RESERVES:TOTAL	Department of Finance Canada	5
FEDERAL GOVERNMENT BUDGETARY SURPLUS OR DEFICIT	Department of Finance Canada	2
RETAIL SALES: TOTAL	CANSIM - Statistics Canada	5
RETAIL SALES: TOTAL EXCL. MOTOR VEHICLE & PARTS DEALERS	CANSIM - Statistics Canada	5
EMPLOYMENT - CANADA	CANSIM - Statistics Canada	5
FULL-TIME EMPLOYMENT	CANSIM - Statistics Canada	5
EMPLOYMENT- INDUSTRIAL AGGREGATE INCL. UNCLASSIFIED	CANSIM - Statistics Canada	5
UNEMPLOYMENT	CANSIM - Statistics Canada	5
UNEMPLOYMENT RATE	CANSIM - Statistics Canada	1
AVG.HOURLY EARN- INDUSTRIAL AGGREGATE EXCL. UNCLASSIFIED	CANSIM - Statistics Canada	5
AVG.WEEKLY EARN- INDUSTRIAL AGG. EXCL. UNCLASSIFIED	CANSIM - Statistics Canada	5
AVERAGE HOURLY EARNINGS - MANUFACTURING	CANSIM - Statistics Canada	5
HOUSING STARTS	CMHC - Canada Mortgage and Housing Corporation	5
BUILDING PERMITS: TOTAL	CANSIM - Statistics Canada	5
NEW HOUSING PRICE INDEX	CANSIM - Statistics Canada	5
NEW ORDERS: ALL MANUFACTURING INDUSTRIES	CANSIM - Statistics Canada	5
NEW ORDERS:DURABLE GOODS INDUSTRIES	CANSIM - Statistics Canada	5
MANUFACTURING SHIPMENTS	CANSIM - Statistics Canada	5
INVENTORY OWNED:ALL MANUFACTURING INDUSTRIES	CANSIM - Statistics Canada	5
INVENTORY OWNED/SHIPMENTS RATIO:ALL MFG.INDS.	CANSIM - Statistics Canada	1
UNFILLED ORDERS:ALL MANUFACTURING INDUSTRIES	CANSIM - Statistics Canada	5
WHOLESALE TRADE SALES: TOTAL	CANSIM - Statistics Canada	5
WHOLESALE TRADE INVTRY: TOTAL	CANSIM - Statistics Canada	5
CPI	CANSIM - Statistics Canada	5
CPI (%YOY)	CANSIM - Statistics Canada	1
CPI LESS 8 TILE COMPONENTS & EFFECT OF INDIRECT TAXES	CANSIM - Statistics Canada	5
EXPORT UNIT VALUE PRICE INDEX	CANSIM - Statistics Canada	5
IMPORT UNIT VALUE PRICE INDEX	CANSIM - Statistics Canada	5
TERMS OF TRADE	Thomson Reuters	5
RAW MATERIALS PRICE INDEX:TOTAL	CANSIM - Statistics Canada	5
INDUSTRIAL PRODUCT PRICE INDEX (IPPI)	CANSIM - Statistics Canada	5
FINANCIAL DATA		
Name	**Source**	**Transformation**
MONETARY BASE	CANSIM - Statistics Canada	5
MONEY SUPPLY M1 PLUS GROSS.	Bank of Canada	5
MONEY SUPPLY M2	CANSIM - Statistics Canada	5
MONEY SUPPLY M3	CANSIM - Statistics Canada	5
TARGET RATE	CANSIM - Statistics Canada	1
OVERNIGHT MONEY MARKET FINANCING RATE	CANSIM - Statistics Canada	1
INTEREST RATE: 3 MONTH TREASURY BILLS	CANSIM - Statistics Canada	1
CHARTERED BANKS PRIME RATE	Bank of Canada	1
GOVERNMENT BOND YIELD - OVER 10 YEARS	CANSIM - Statistics Canada	1
TORONTO STOCK EXCHANGE COMPOSITE SHARE PRICE INDEX	Reuters	5
SECURITIES BOUGHT BY NON-RESIDENTS:TOTAL	CANSIM - Statistics Canada	2
CONSUMER CREDIT:TOTAL	CANSIM - Statistics Canada	5
CHARTERED BANKS: CN$ BUSINESS LOANS	CANSIM - Statistics Canada	5
TOTAL BUSINESS CREDIT	CANSIM - Statistics Canada	5
CHARTERED BANKS: CN$ BUSINESS LOANS (SHORT-TERM)	CANSIM - Statistics Canada	5

8.10 Switzerland

Figure 22:

MACROECONOMIC DATA		
Name	**Source**	**Transformation**
COMPOSITE LEADING INDICATOR - TREND RESTORED	Main Economic Indicators,copyright OECD	5
EXPORTS FOB	FCA - Federal Customs Administration, Switzerland	5
IMPORTS CIF	FCA - Federal Customs Administration, Switzerland	5
VISIBLE TRADE BALANCE	FCA - Federal Customs Administration, Switzerland	2
CAR REGISTRATIONS - NEW	FSO - Federal Statistical Office, Switzerland	5
UNEMPLOYMENT - REGISTERED	KOF - Swiss Economic Institute	5
UNEMPLOYMENT RATE	SECO - State Secretariat for Economic Affairs, Switzerland	2
JOB VACANCIES - UNFILLED	SECO - State Secretariat for Economic Affairs, Switzerland	5
KOF INDUSTRY SURVEY: BUSINESS CLIMATE	KOF - Swiss Economic Institute	2
CPI	KOF - Swiss Economic Institute	5
ANNUAL INFLATION RATE	FSO - Federal Statistical Office, Switzerland	1
IMPORT PRICE INDEX	KOF - Swiss Economic Institute	5
TERMS OF TRADE	KOF - Swiss Economic Institute	5
PPI	KOF - Swiss Economic Institute	5
INDUSTRIAL PRODUCTION (%YOY)	IMF - International Financial Statistics	1
FINANCIAL DATA		
Name	**Source**	**Transformation**
SWISS FRANCS TO USD	SNB - Swiss National Bank	5
SWISS FRANC REAL EFFECTIVE EXCHANGE RATE	SNB - Swiss National Bank	5
MONEY SUPPLY: M1	SNB - Swiss National Bank	5
MONEY SUPPLY: M2	SNB - Swiss National Bank	5
MONEY SUPPLY: M3	SNB - Swiss National Bank	5
MONEY SUPPLY: CENTRAL BANK MONEY	SNB - Swiss National Bank	5
THREE MONTH INTERBANK RATE: BID RATE	SNB - Swiss National Bank	1
CONFEDERATION BOND YIELD - 10 YEARS	SNB - Swiss National Bank	1
SPI SHARE PRICE INDEX	SNB - Swiss National Bank	5
BANK LOANS GRANTED	SNB - Swiss National Bank	5

9 Appendix II - Narrative Account of Close Elections

EconRILE Measure of Economic Policy Disagreement

The EconRILE measure is based on the popular RILE measure and simply adds and subtracts different code scores from the Manifesto Project Database data. The formula for the EconRILE using that database is:

$$(per401 + per402 + per407) \; - \; (per403 + per406 + per409 + per412 + per413 + per415 + per416)$$

These codes are fully explained in the database code book[22]. The first terms in brackets are the proportion of sentences expressing a positive view on: (1) Free markets, (2) Supply side interventions, (3) Anti-protectionism. These are taken to be pro-free market views. These are set against positive views for: (1) Market regulation, (2) Protectionism, (3) Keynesian demand management, (4) Direct control of the economy, (5) Nationalisation of industry, (6) Marxist policies, (7) Lower growth to promote equality or welfare (sustainability). To illustrate the index we plot the resultant index for the two leading parties in the U.S.A. and the U.K. The index clearly recognises Republicans (Conservatives) as having more free market polices than the Democrats (labour). For the UK this gap was largest during the decade of Margaret Thatchers rule in the UK, which is widely acknowledged as a shift toward greater free market economic polices in the U.K. For the U.S.A the index shows an upward trend in free market polices across both parties but a significant gap between the extend of this endorsement of free markets.

Narrative around election events

In some cases, typically only available after 2000, polling data indicates high levels of ex-ante uncertainty for the elections outlined in table 3.

USA

For the USA, fivethirtyeight.com document that an average of national polls were around an absolute polling error in each of the election events selected[23]. Polling data for 2004 showed 2 large reversals with Bush leading until July, Kerry until august then Bush from September onwards with the gap narrowing to within 1% in the last few polls prior to the election event[24]. While Clinton lead Trump for the 6 months prior to the election in November 2016, the polls narrowed substantially in September and again in the 2 weeks prior to the event[25].

Germany

The 2005 German election saw Angela Merkel come to power with the CDU defeating the Schroders SPD which had lead the Bundestag since 1994. 5 months prior to the event CDU held a large lead in polls but this consistently narrowed to within 10% by the election in December 2005.

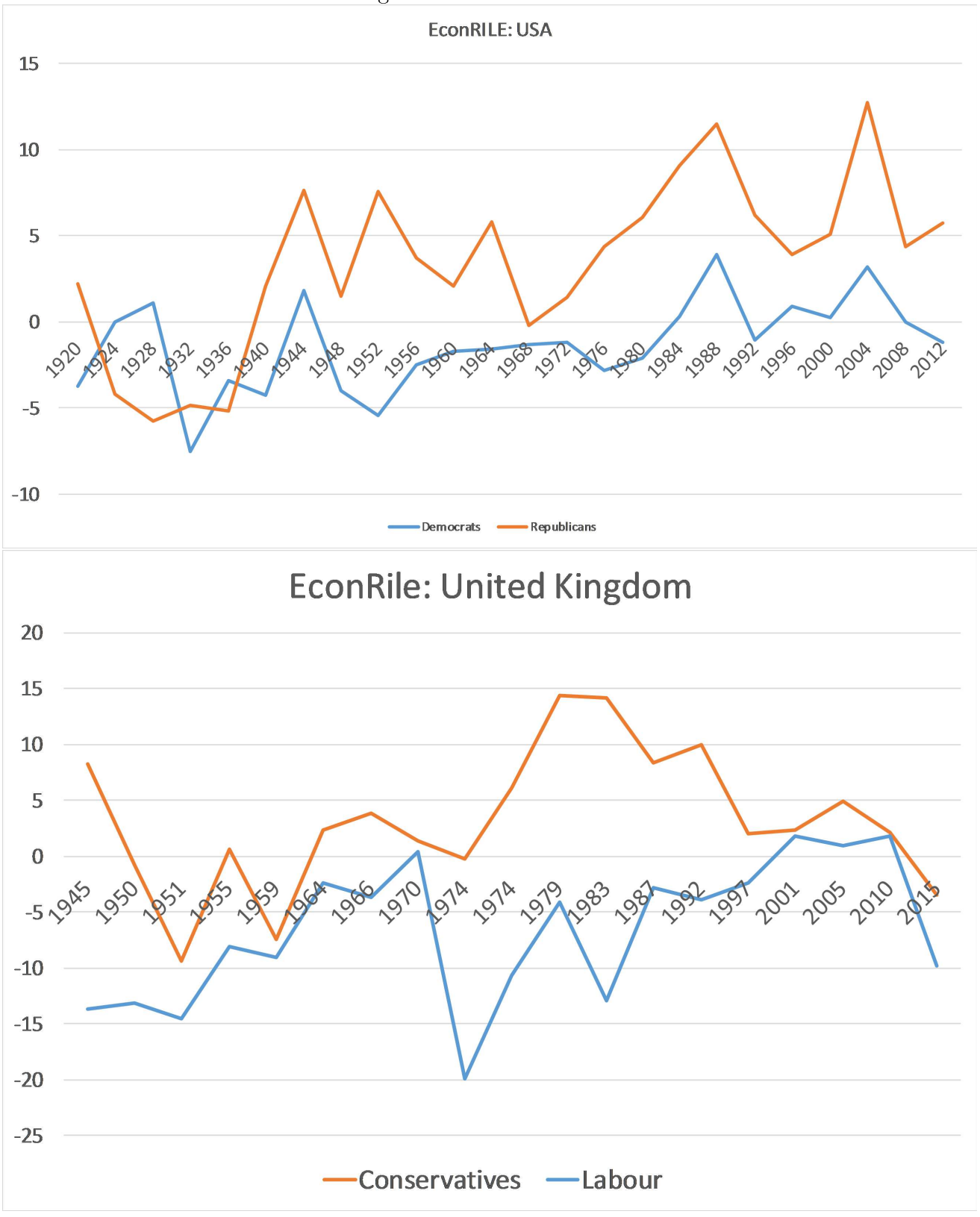
[22] See https://manifestoproject.wzb.eu/datasets

[23] https://fivethirtyeight.com/features/trump-is-just-a-normal-polling-error-behind-clinton/. The Bush-Gore election was the closest in US history with a winning margin of only 537 votes in the deciding state of Florida requiring a recount and triggering litigation in both federal and state courts. This uncertainty resolved in December 12 2000 when the Florida high court ruled in favour of Bush.

[24] https://uselectionatlas.org/USPRESIDENT/GENERAL/CAMPAIGN/2004/polls.php

[25] https://uselectionatlas.org/POLLS/PRESIDENT/2016/polls.php

Figure 23: EconRILE Index



Italy

Callegaro and Gasperoni (2005) show that polls tightened around 4 months prior to the 2006 election in Italy but then indicated a Prodi victory, however politicians on the right regularly challenged the accuracy of the poll data casting doubt creating a sense of greater competition. The 2013 race saw a tight contest in the polls over the year prior to the Bersani victory in February 2013, with some widening in favour of Bersani in the last two months prior to the event[26].

UK

See Redl (2017) for a full description of the events surrounding the UK elections. The 1992 election saw Margaret Thatcher lose a leadership battle for the conservative party to John Major, polls and exit polls predicted a hung parliament however the conservatives won a four term. The 2010 election resulted in a hung parliament with polls seeing a surge in support for a 3rd party, the Liberal Democrats who eventually became members of the coalition government with the conservatives under David Cameron. The 2015 election saw a large number of polls and professional forecasters expected a hang parliament and the need to form a coalition government[27]. The conservative party won a surprise, but slim, majority.

France

The 2007 French election saw a run-off between Sarkozy and Royal with Sarkozy leading in the but by less than 10% in April and May[28]. The same is true of the Hollande-Sarkozy 2nd round in 2012[29].

Canada

The Canadian election of 2004 saw Liberals re-elected under new Prime Minister Paul Martin to a minority government. They defeated the new Conservative Party, led by Stephen Harper, ex-leader of the Canadian Alliance, who merged that party with the Progressive Conservatives. Bloc Québécois experiences a revival due to a Liberal sponsorship scandal. Polls prior to the event were tight with 1-4% lead for eventual winners the Liberal party[30]. January 2006 saw an unusual winter general election, caused by a motion of no confidence passed by the House of Commons on November 28, 2005, with Canada's three opposition parties contending that the Liberal government of Prime Minister Paul Martin was corrupt. Polls reflected this uncertain environment with small liberal lead until December of around 5% then reversing in favour of Harper's conservatives through January [31].

[26] https://en.wikipedia.org/wiki/Opinion_polling_for_the_Italian_general_election,_2013

[27] For a summary of the pre-election poll results see https://en.wikipedia.org/wiki/Opinion_polling_for_the_2015_United_K see http://electionforecast.co.uk/2015/index.html for an example of the election forecast predicting a hang parliament.

[28] https://en.wikipedia.org/wiki/French_presidential_election,_2007

[29] https://www.sondages-en-france.fr/sondages/Elections/Pr%C3%A9sidentielles%202012

[30] https://en.wikipedia.org/wiki/Opinion_polling_in_the_Canadian_federal_election,_2004

[31] https://en.wikipedia.org/wiki/Opinion_polling_in_the_Canadian_federal_election,_2006

Spain

The Spanish election of 1996 saw Jose Maria Aznar's People's party (PP) displace the incumbent Socialist Workers Party (PSOE) in an extremely close election result with polls tightening to near parity in the last week prior to the event. The election of 2008 saw close polling within PSOE leading PP but remaining within 10pp and high volatility and closing of the gap in the weeks prior to the event . Rajoy (PP) defeated Sanchez (PSOE) in December 2014 but with very few seats and an unprecedented number of seats going to a third party, Podemos. Polls show the rise of Pablo Iglesias' Podemos party which rose from obscurity in 2014 to leading the polls (albeit briefly) by November 2014. They also show the late surge of Albert Riveria's Citizen's Party (C's) with a rise from around 2% in early 2014 to parity with PSOE near 20% in the polls by November 2015[32].

Sweden

Sweden's election in September 2006 saw the Goran Persson's Social Democrats lose power to a majority coalition led by the Moderates Fredrik Reinfeldt. This was achieved by Fredrik Reinfeldt by forming a governing coalition, the Alliance, with three other parties (Centre, Liberal Peoples and Christian Democrats). The Alliance contested the election against the Red-Green Bloc (Social Democrats, Left Party and Green Party). The Alliance remained very close to the Red Green Bloc in the year leading up to the election, within 5%. This ended the dominance of the Social Democrats in the Swedish parliament (Riksdag), a position which they have held since the 1930s. The same coalitions contested the September 2010 election with the Alliance losing its majority but retaining power. However, polls had the Red-Green coalition leading until the month prior to the election, this reversal coincided with violence at a Social Democrats election rally and tensions relating to the immigrant Muslim population.

Switzerland

Swiss elections are unusual in that all four major parties form a coalition therefore changes of government are difficult. Nonetheless the rise in anti-EU and anti-immigration parties is a noteworthy shift with the Swiss Peoples Party SVP becoming the largest party in 2003.

The Netherlands

The Dutch election of 2010 saw significant uncertainty in polls with a close competition between the top 3 parties until Mark Rutte's conservative liberal Peoples Party for Freedom and Democracy (VVD) rallied in the last week to take the largest share of votes [33]. However, it took 3 months toss form a working government with Rutte joining with Balkenede's Christian Democratic Appeal (CDA). Rutte again won the largest share votes but closely followed by Samsom's Labour Party (PvdA) as the latter had a very strong performance in opinion polls in the month prior to the election[34]. After 2 months a new government was formed between the CDA and the PvdA.

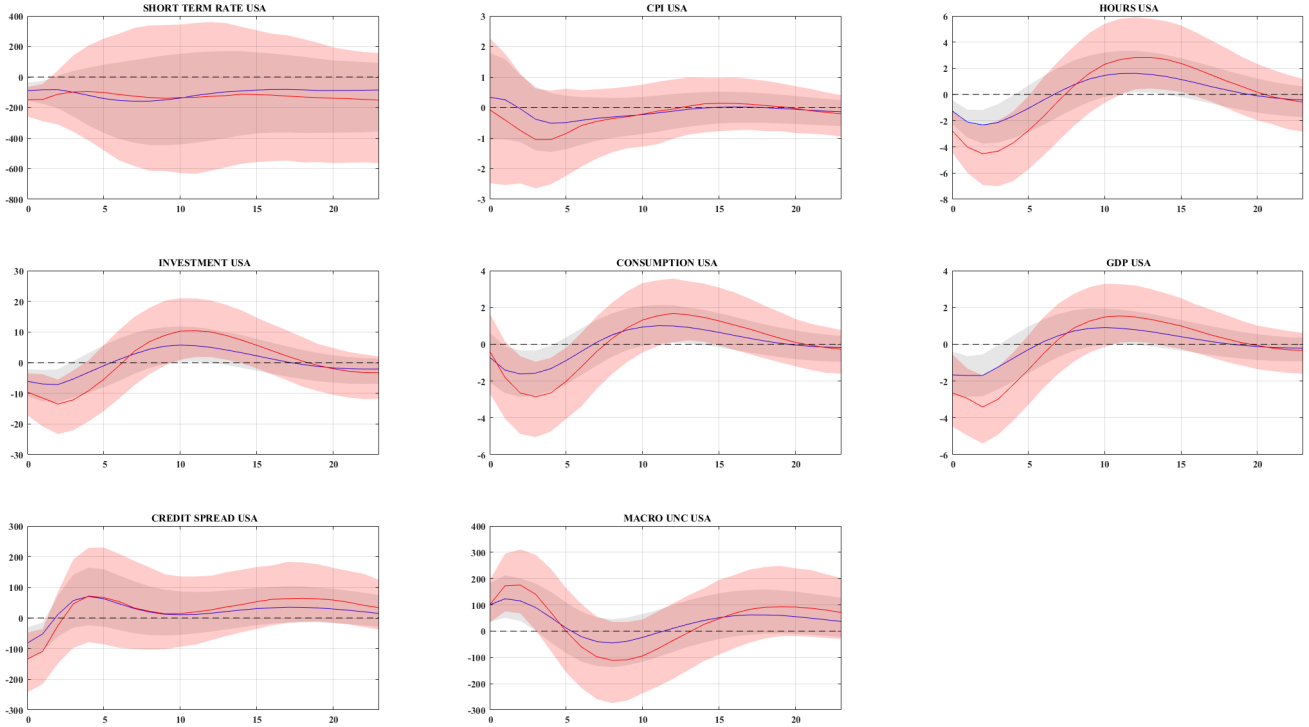
[32]Polling data for these elections can be found at:
https://en.wikipedia.org/wiki/Spanish_general_election,_1996#Opinion_polls
https://en.wikipedia.org/wiki/Spanish_general_election,_2008#Opinion_polls
https://en.wikipedia.org/wiki/Spanish_general_election,_2015#Opinion_polls
[33]https://en.wikipedia.org/wiki/Dutch_general_election,_2010
[34]https://en.wikipedia.org/wiki/Dutch_general_election,_2012

10 Appendix III - Full Impulse Response Functions

10.1 Baseline specification

10.1.1 USA

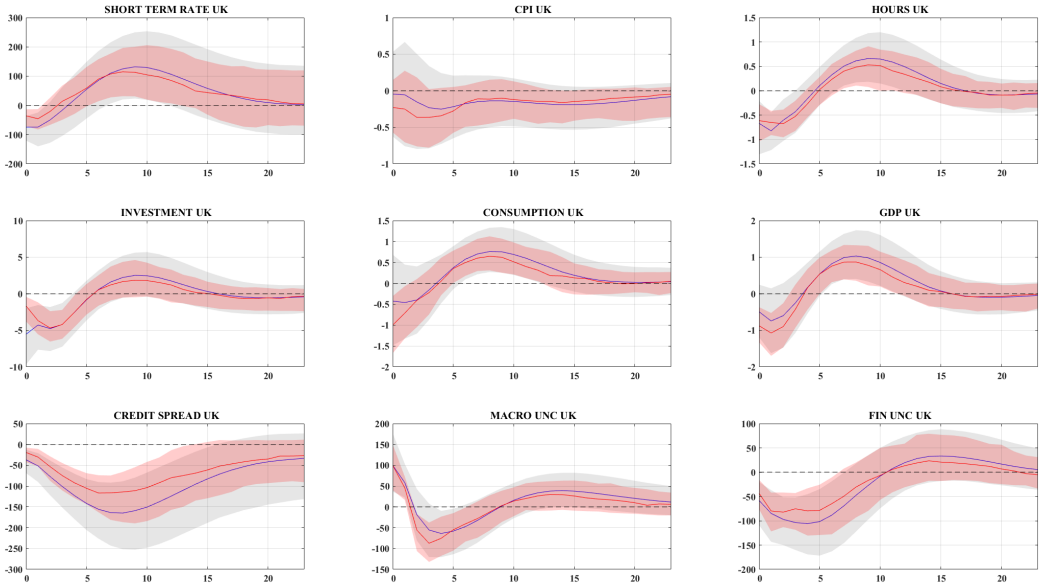
Figure 24:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.2 UK

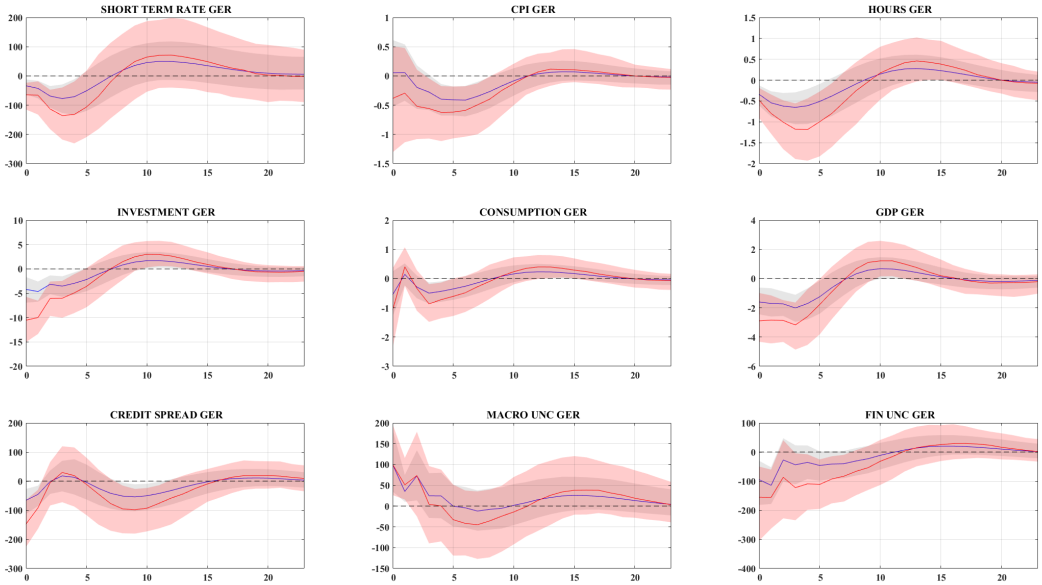
Figure 25:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.3 Germany

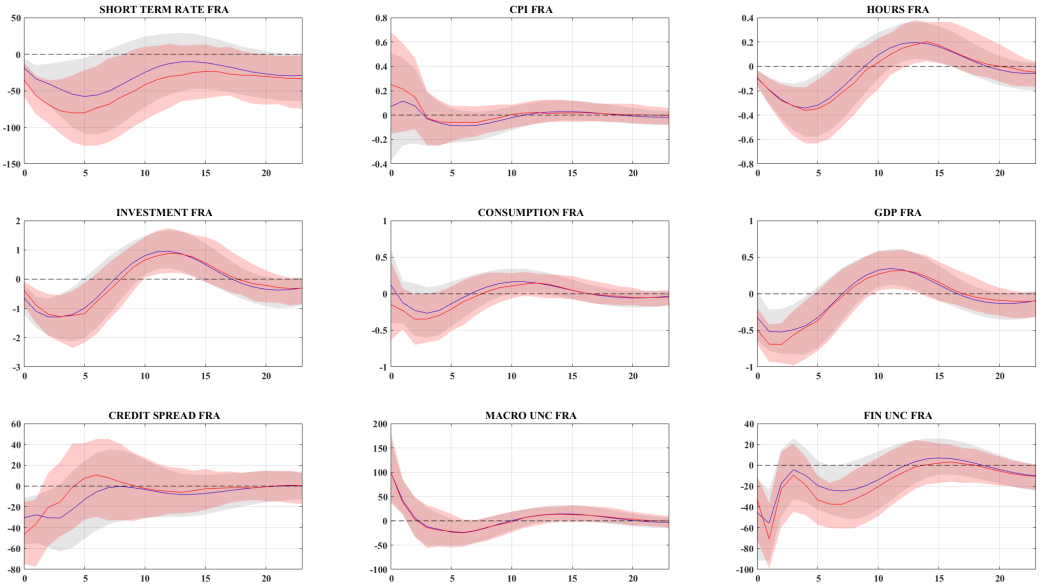
Figure 26:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.4 France

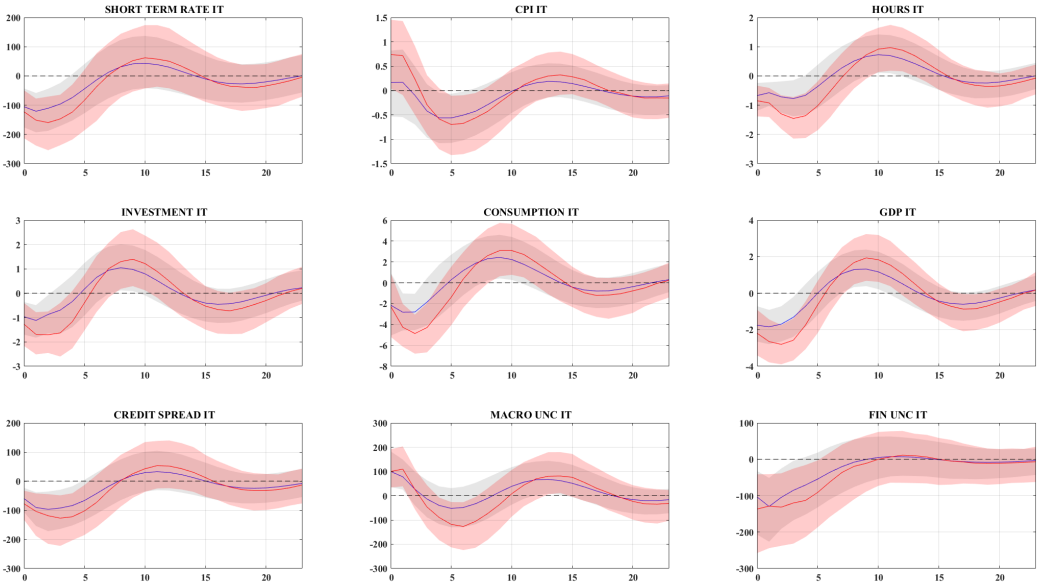
Figure 27:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.5 Italy

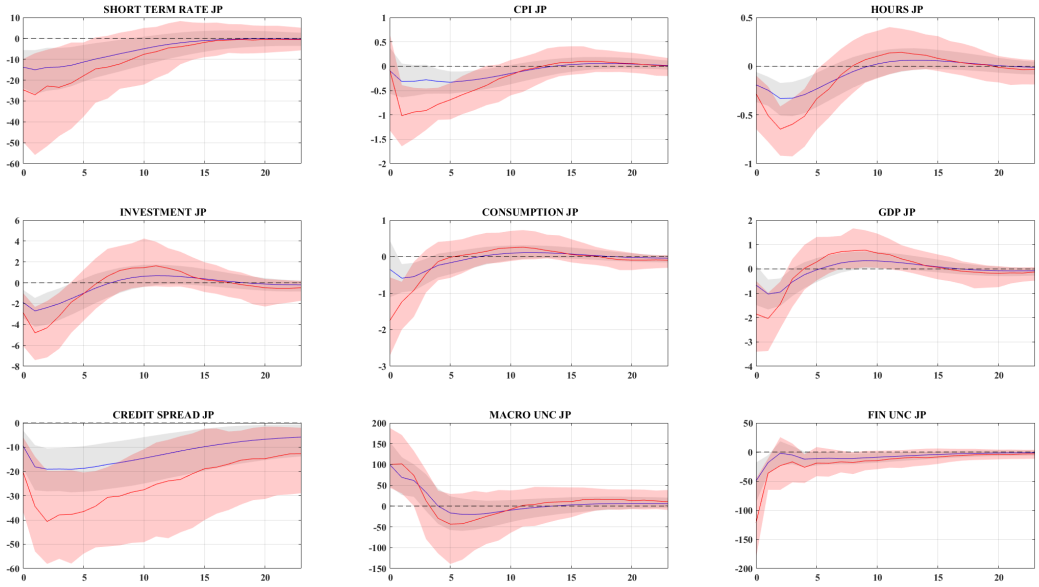
Figure 28:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.6 Japan

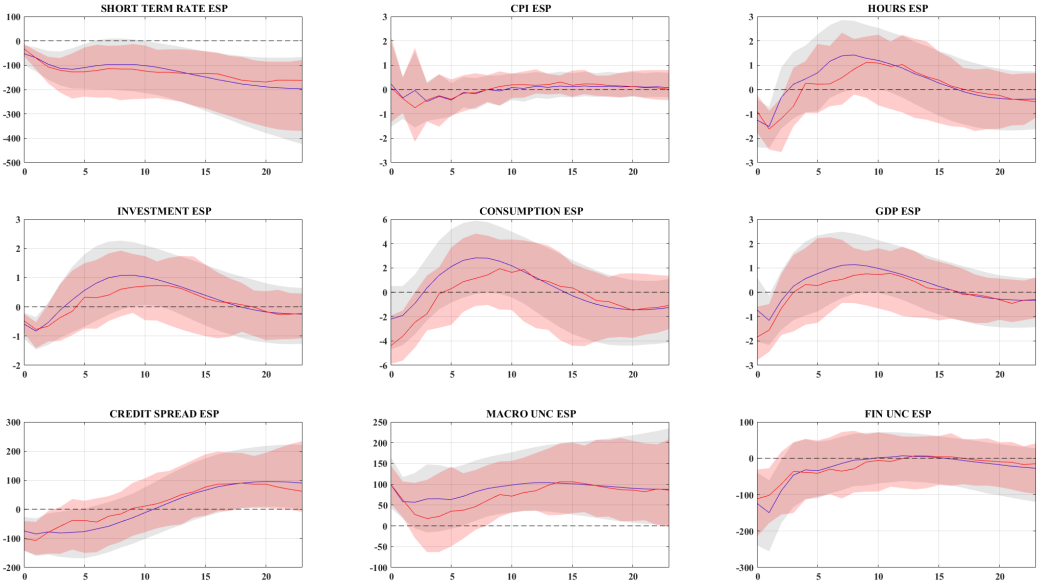
Figure 29:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.7 Spain

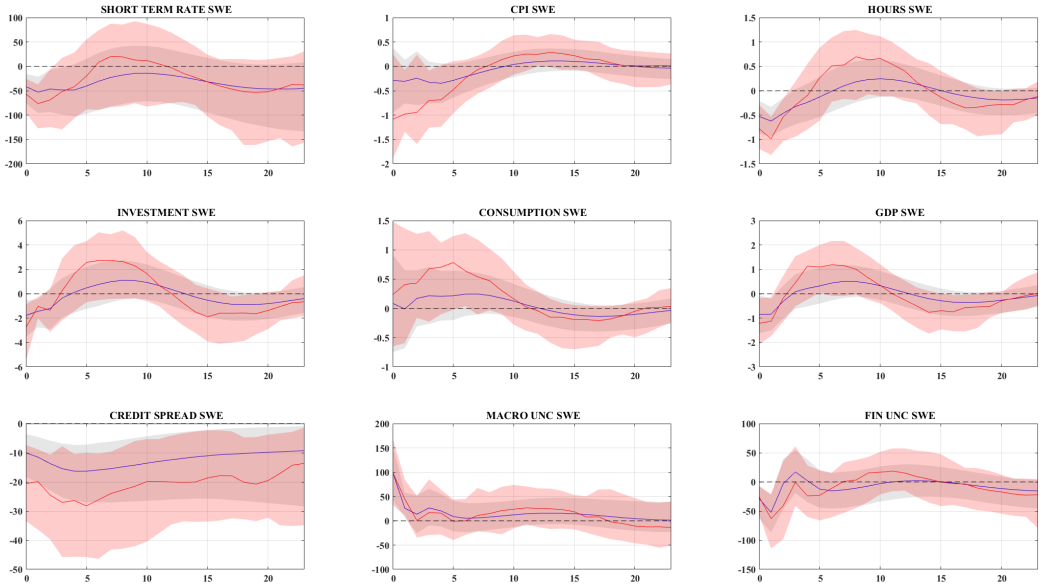
Figure 30:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.8 Sweden

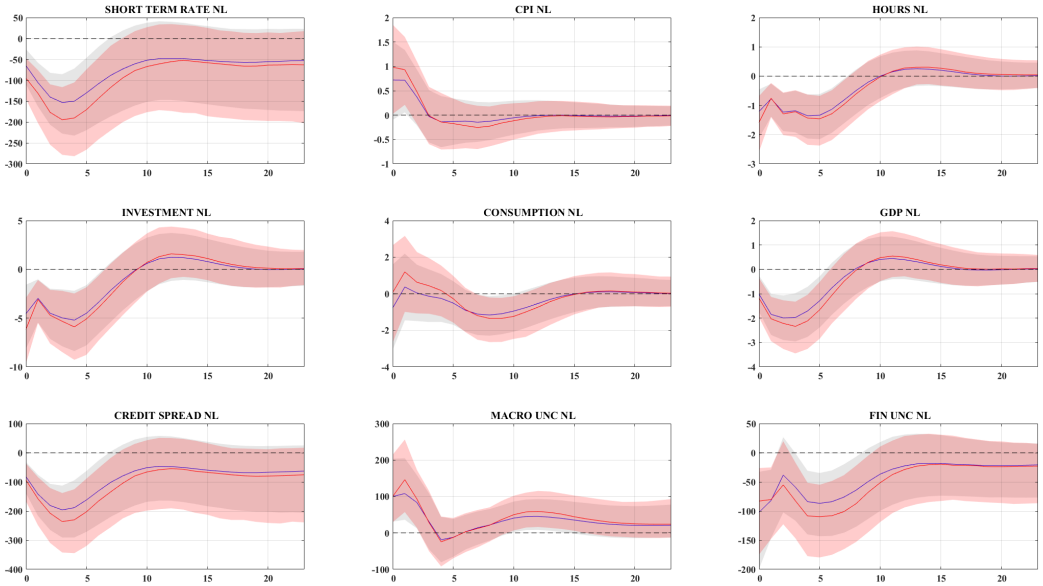
Figure 31:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.9 Netherlands

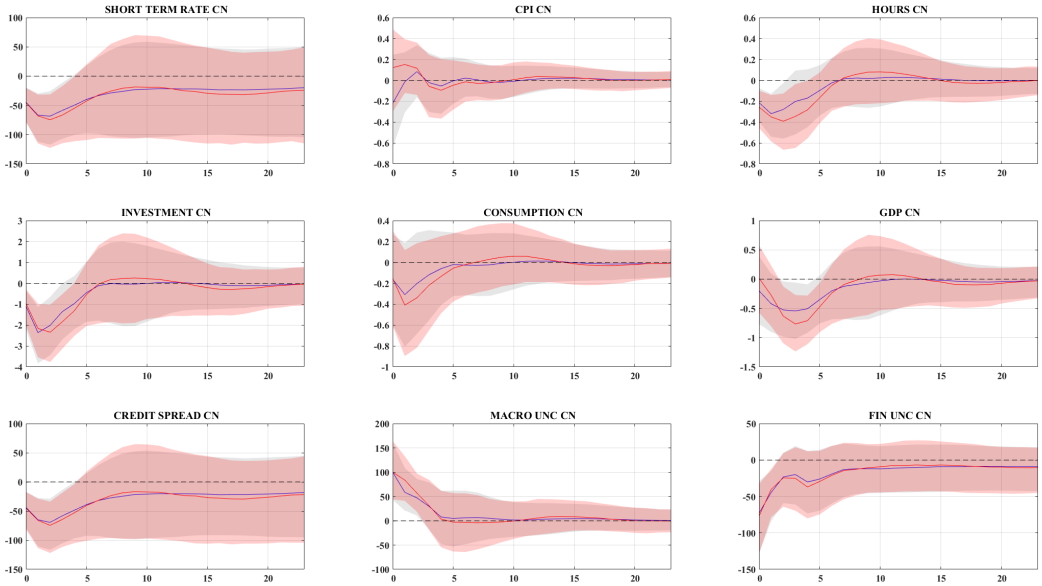
Figure 32:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.10 Canada

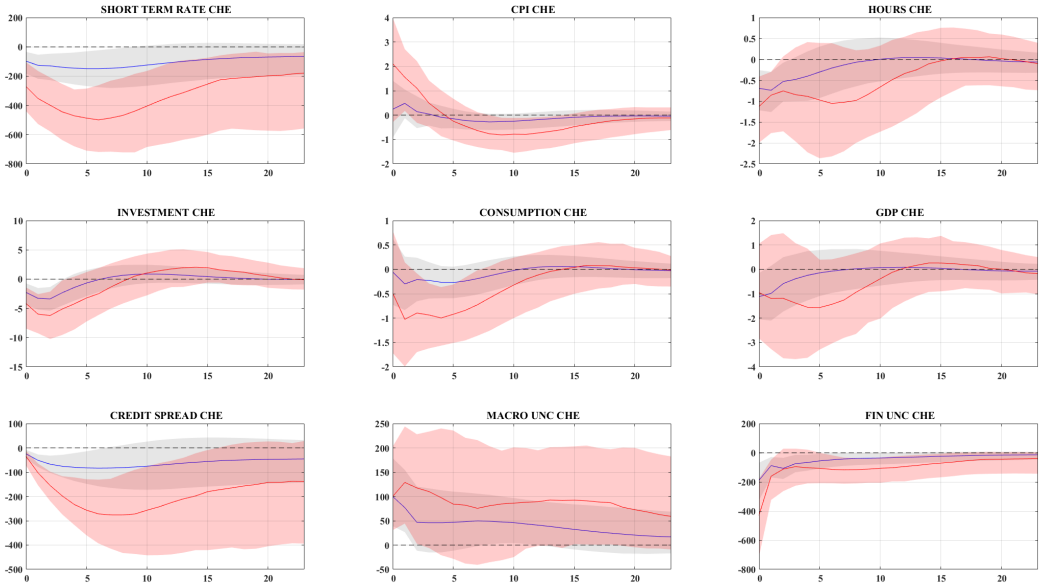
Figure 33:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.1.11 Switzerland

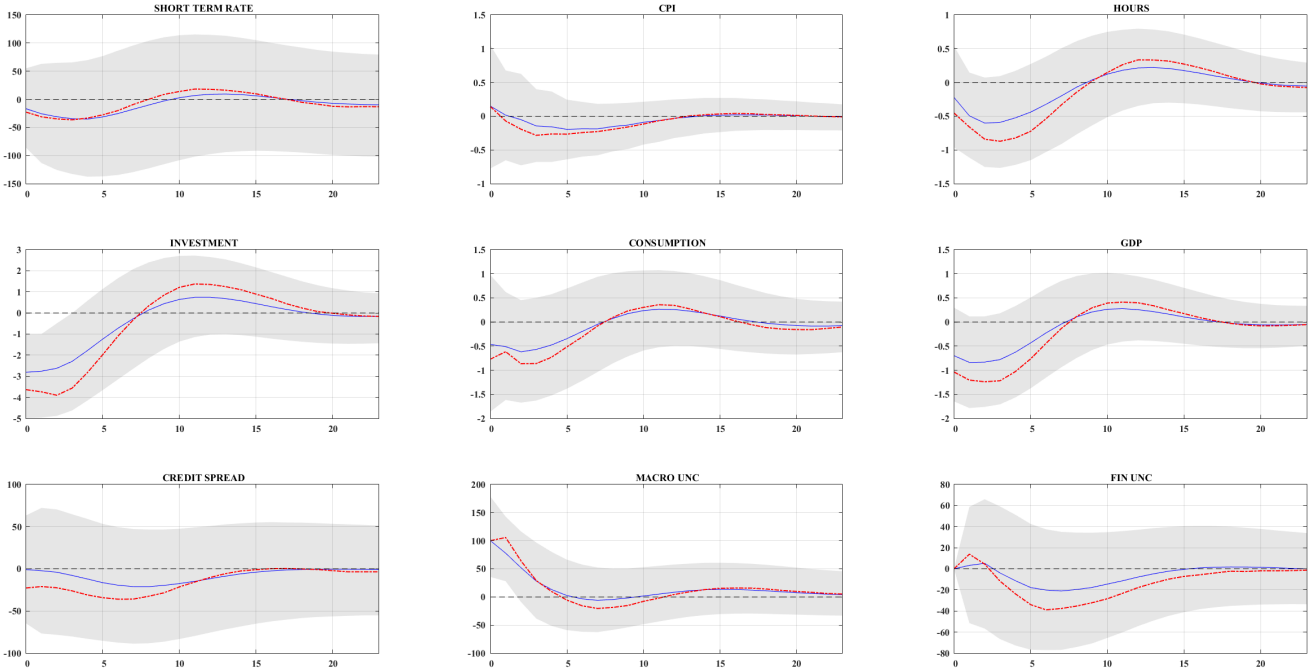
Figure 34:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.

10.2 Weak sign restrictions on variables full IRFs

Figure 35:



Responses in blue (with 68% credible set in Grey) are results with standard sign restrictions given in table (2). Responses in red show the effect of adding narrative information.