

MEASURING GLOBAL AND COUNTRY-SPECIFIC UNCERTAINTY*

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Abstract: Using individual survey data from the *Consensus Forecast* over the period of 1989-2014, we propose a monthly index of macroeconomic uncertainty for 46 countries. Our country-specific uncertainty measure reflects the uncertainty perceived by market participants and has two components: common uncertainty, defined as the conditional volatility of median forecast errors and idiosyncratic uncertainty, captured by the disagreement among professional forecasters. Common uncertainty shocks produce the large and persistent response in activity characterized in Jurado et al. (2015), whereas the contributions of idiosyncratic uncertainty shocks are negligible.

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1. Introduction

The recent global recession in 2009 lasted only one year. However, this one year of painful experience has successfully proved that high economic uncertainty, at both national and global levels, shapes the speed of the subsequent recovery. Five years after the end of the global recession, there is still no sign of a complete global recovery. Advanced economies are still uncertain about the effects of their monetary policy normalization and emerging market economies are uncertain about the related growth challenges awaiting them. Surrounded with elevated uncertainty, many economists have a renewed interest in understanding time-varying economic uncertainty and analyzing its impacts on real economy.

In this paper, we construct a new monthly measure of uncertainty, composed of idiosyncratic and common components, for 46 countries over the period of 1989 to 2014. We estimate the common component as the perceived variability of future aggregate shocks and idiosyncratic component as the forecast disagreement using survey data from Consensus Forecasts for a large group of indicators at three different layers. At the first layer, we introduce variable-specific uncertainty for eight nominal and real macroeconomic indicators, which might be used for analysis in different sectors of the economy. Inflation uncertainty, for instance, may be a good indicator in explaining the effectiveness of monetary policies. At the second layer, we present the country-specific uncertainty, which is estimated as the simple average of standardized components of the variable-specific uncertainty. This measure is comparable to many uncertainty estimates proposed in the literature. Unlike the previous studies that focus on a single economy, our dataset includes a total of 46 advanced and emerging market economies and therefore provides a rich source of data for empirical research. At the third layer, we propose an index of global uncertainty, which is rather a new concept in

the literature. Constructed using a large set of countries which correspond to more than 90 percent of the world economy, this global measure is more comprehensive than the previously proposed measures, e.g. Berger and Herz (2014).

The main findings can be summarized as follows. All three layers of uncertainty measures are countercyclical and at all layers, the combined uncertainty is more countercyclical than their idiosyncratic or common components. A comparison of our country-specific uncertainty measures with alternative leading uncertainty measures for a subset of countries show that our measure outperforms the other measures by having fewer peaks, all around the recessions, and by having persistent heightened uncertainty during these recession episodes. Using the VAR analysis we find that shocks to country-specific uncertainty are associated with moderate but persistent drops in real activity but do not lead to any overshooting behavior as documented in Bloom (2009). A further investigation shows that common uncertainty shocks produce the large and persistent response in activity characterized in Jurado et al. (2015), whereas the contributions of idiosyncratic uncertainty shocks are negligible.

Our paper makes three contributions to the uncertainty literature. First, we propose a new monthly index of uncertainty which has both common and idiosyncratic components, namely, perceived variability of future aggregate shocks and the disagreement among forecasters. Including these two components, the uncertainty measure can capture macroeconomic uncertainty at different dimensions. Second, we use actual forecasts of market analysts instead of making the forecasts using statistical models. As such, this uncertainty measure captures what is really uncertain for the market participants, who usually do not share the same information or have homogeneous models, and can be estimated for any countries

with economic survey data available. Third, we find that the two components of economic uncertainty exhibit strikingly different behavior. Common uncertainty shocks account for a large fraction of fluctuations in economic activity at business cycle frequencies, whereas idiosyncratic uncertainty shocks play a small role. This result is in sharp contrast with Bijapur (2014) and Choi and Loungani (2015) that sectoral (or idiosyncratic) uncertainty shocks derived from financial markets have persistent and dominant effects on real activity.

The rest of the paper is organized as follows. Section 2 briefly summarizes the recent literature on measuring uncertainty. Section 3 introduces the data used in this paper. Section 4 provides the methodology on measuring uncertainty and describes the properties of economic uncertainty measures. Section 5 presents the dynamic relationship between uncertainty and economic activity and Section 6 concludes.

2. Uncertainty Measures: A Brief Review

Although the conceptual definition of the economic uncertainty is widely known as the situation of “little or nothing is known about the future state of the economy,” quantitatively, it is still hard to measure, e.g. Bloom et al. (2013). Since there is no objective measure of uncertainty, the economics literature basically relies on numerous different proxies. This section briefly overviews some leading proxies in the literature.

The first proxy is the implied volatility in stock market, such as VXO or VIX, e.g. Bloom (2009). Since stock market volatility can change over time despite no change in economic uncertainty, this measure may not always be a good proxy. For instance, the change

in VXO might be due to leverage changes or movements in risk aversion although the level of economic uncertainty is not high; see Bekaert et al. (2013).

Jurado, et al. (2015) develop an alternative measure of economic uncertainty as the common variation in uncertainty across hundreds of economic series. Their measure reflects uncertainty around objective statistical forecasts, rather than the perceived uncertainty by market participants. Moreover, as they focus on common, not idiosyncratic, uncertainty, there is no role for private information and heterogeneous models in interpreting public information; see Lahiri and Sheng (2008).

Another leading uncertainty measure is proposed by Baker, et al. (2013). They combine the frequency of references to policy-related uncertainty in the newspapers, the number and revenue impact of federal tax code provisions set to expire in future years, and the extent of disagreement among economic forecasters over future government purchases and future inflation. This is a model-free approach, but replicating this measure requires a lot of resources. Moreover, this news-based uncertainty measure puts a high bar for the attentiveness of reporters and editors, who might miss uncertainty events if they neglect to file a story on that; see Hansen (2015).

The fourth proxy for uncertainty is the forecast disagreement, calculated as the dispersion in directional or point forecasts, e.g. Doornik et al. (2012) and Bachmann et al. (2013). When disagreement is taken to indicate uncertainty, the underlying assumption is that this inter-personal dispersion measure is an acceptable proxy for the average dispersion of intra-personal uncertainty. As pointed out by Lahiri and Sheng (2010), however, disagreement

is only a part of uncertainty and the difference between these two are the volatility of aggregate shocks.

To address some of the limitations mentioned above, we develop a comprehensive measure of economic uncertainty for a large group of countries. Similar to Scotti (2013) and Jo and Sekkel (2015), our measure is based on subjective forecasts of market participants and reflects their perceived uncertainty. In contrast to these two papers, our uncertainty measure includes both components: common uncertainty as emphasized in Jurado et al. (2015) and idiosyncratic uncertainty as documented in Mankiw et al. (2004). This enables us to study the separate effects of these two components on business cycle fluctuations.

3. Data

We use a survey-based forecast dataset to compute uncertainty measures. This is a very comprehensive dataset with a large coverage of advanced and emerging market economies. This section first describes the survey forecasts and explains the adjustments we make in our analysis. Then we discuss the actual series used to calculate forecast errors and the properties of survey forecasts.

The forecast data in this study are from the Consensus Forecasts, publications of the Consensus Economics Inc., a private macroeconomic survey firm based in London. The survey asks similar questions to a panel of 10-30 professional forecasters on the first week of each month. For some countries, the definition of the variables slightly changes (i.e. manufacturing production instead of industrial production) and for some, some questions are omitted because of possible data limitations. Other than these, the surveys have almost a uniform design in all countries in the sample, which makes the results comparable across countries.

This study covers all 46 countries with monthly forecasts available for the annual growth rates of GDP, consumption, investment, industrial production, and levels of inflation, short-term and long-term interest rates, and unemployment rate. This selection of eight variables enables the study to capture uncertainty both in nominal and real macroeconomic indicators, where inflation, short-term and long-term interest rates are in nominal and the rest are real terms. Table A.1 in the appendix provides detailed information on the country, time and the variable coverage of the dataset.

Forecasts for all variables except the interest rates are fixed event forecasts. Specifically, every month, each forecaster provides forecasts for the growth rate (or level) of the variables for both the current and the next calendar year. Therefore, these are fixed event forecasts with various horizons. The fixed event forecasts have high seasonality since these forecasts get closer to the actual values when the forecast horizon is shorter and the forecasters have a larger set of information to use as the target date gets closer. Instead of directly using these fixed event forecasts, following Doornik, et al. (2012), we transform the fixed event forecasts of all variables into fixed horizon forecasts with the following adjustment:

$$x_{t+12|t} = \frac{k}{12} x_{t+k|t} + \frac{12-k}{12} x_{t+12+k|t} \quad (1)$$

where $x_{t+k|t}$ and $x_{t+12+k|t}$ are the two forecasts based on the information set at time t with horizons of $k \in \{1, \dots, 12\}$ and $k + 12$ months, respectively. The average of two fixed event forecasts weighted by their share in the forecasting horizon approximates the fixed horizon forecast, $x_{t+12|t}$, for the next 12 months. For the interest rates, each month forecasters provide both three-month and twelve-month ahead forecasts. To be consistent with the horizon of the

forecasts for other variables, we use the twelve-month ahead forecasts for both short-term and long-term interest rates.

Monthly series are available for industrial production, inflation, unemployment, short-term and long-term interest rates. For real GDP, consumption, and investment, we use quarterly series as they are not available in monthly frequency. The main sources of these series are Global Data Source of IMF, Haver Analytics, OECD Analytical databases and country statistical offices. To match the actual values with the fixed-horizon forecast, we perform the following data transformation. Taking the survey conducted in January 1991 as an example: at the beginning of January, the survey asks forecasts for industrial production and inflation for 1991. For these two monthly variables, we calculate the actual values as the growth rate between December 1990 and December 1991. Similarly, for real GDP, consumption and investment, we calculate the respective actual values as the growth rate between the fourth quarter of 1990 to the fourth quarter of 1991. For the unemployment rate, the actual value reflects the rolling 12-month window average, and in this example equals the average of the unemployment rates of 12 months from January to December 1991. The forecasts of the two interest rates in this study are easily comparable to the actual values. For both the short and long-term interest rates, the actual values reflects the monthly data released for the target date.

We explore the properties of forecasts of market participants. Let A_t^i be the actual value at time t , for variable i and F_t^i be the median forecast. Then $e_t^i = A_t^i - F_t^i$ defines the median forecast error at time t . Following the forecasting literature, e.g. Pesaran and Weale (2006) and Davies, et al. (2011), we employ the following model to test for biasedness and inefficiency

$$e_t^i = \alpha + \beta F_t^i + \varepsilon_t^i \quad (2)$$

The intercept, α , of this model identifies the bias and is expected to be zero for an unbiased forecast. If forecasters efficiently incorporate publicly available information, β is expected to be zero. Table A.2 in the appendix shows that almost all forecasts are biased and often inefficient in incorporating new information. Despite their mostly being inefficient and biased, we choose to use these forecast because they reflect the market participants' perception of the economic development in the future and thus capture their perceived uncertainty in the economy; see also Scotti (2013) and Jo and Sekkel (2015).

4. Economic Uncertainty

This section first explains how we estimate variable-specific uncertainty, country-specific uncertainty and global uncertainty measures and then we document the properties of the three layers of economic uncertainty.

4.1 Estimation of Uncertainty

Let $F_{it} = E(Y_t | I_{i,t-h})$ be the forecast made by individual i at time $t - h$. Then individual i 's uncertainty in predicting a typical variable Y_t is given by U_{ith} :

$$U_{ith} = E \left\{ [Y_t - E(Y_t | I_{i,t-h})]^2 | I_{i,t-h} \right\} \quad (3)$$

Given a panel of forecasts, we define the overall forecast uncertainty as the simple average of individual forecast uncertainties, e.g. Zarnowitz and Lambros (1987). Following Lahiri and Sheng (2010), we decompose overall forecast uncertainty in predicting a typical macro variable into two components:

$$U_{th} \equiv \sum_{i=1}^n U_{ith} = \sigma_{\lambda_{th}}^2 + D_{th} \quad (4)$$

where $\sigma_{\lambda_{th}}^2$ is the perceived variability of future aggregate shocks and D_{th} is the disagreement

among professional forecasters. Equation (4) states that the overall uncertainty can be decomposed into two parts: uncertainty that is common to all forecasters and uncertainty that arises from heterogeneity of individual forecasters. The first component is the empirical variance of the consensus forecast that is conventionally taken as the common uncertainty; see Clements (2014).

The conditional volatility of common shocks has long been estimated using GARCH-type models, dating back to Engle (1982). Under such a framework, the estimates of conditional volatility depend on the innovations to Y_t and therefore cannot be separated from first-moment shocks. For this reason, we adopt the stochastic volatility model to estimate the common uncertainty. The stochastic volatility models permit the construction of a shock to the second moment that is independent of innovation to Y_t , consistent with the theoretical literature which presumes the existence of an uncertainty shock that independently affects real activity. Estimation of the common uncertainty using a stochastic volatility model has the following specification:

$$\ln \sigma_{\lambda_t}^2 = \alpha + \beta \ln \sigma_{\lambda_{t-1}}^2 + \tau v_t \quad (5)$$

where v_t is an independently and identically distributed random variable. The estimation of the parameters can be done using Markov Chain Monte Carlo methods as in Kim et al. (1998). To prevent the impacts of the outliers, we apply the stochastic volatility model (and also the GARCH model) to median forecast errors instead of mean forecast errors. For the same logic, we use interquartile range to calculate forecast disagreement. As these two components of uncertainty measure have different scales, we standardize them using the min-max

normalization rule. Applying this rule, both common and idiosyncratic uncertainty components are scaled between 0 and 1, and the sum of these two is scaled between 0 and 2 for all variables.

To estimate the country-specific economic uncertainty, we take the weighted average of eight variable-specific uncertainty estimates for each country. We present the results using equal weights in the paper. As an alternative, we also estimate the country-specific uncertainty as the first principal component of eight variable-specific uncertainty measures and find that the results are very similar.

Unlike the variable-specific and country-specific uncertainty measures, the global uncertainty has not been studied much in the literature. One reason is the lack of enough data to provide a global analysis and as a result, most of the analysis is based on a single economy. Although there are some efforts aimed at getting a measure for global uncertainty, the country coverages are too limited to have a global dimension, e.g. Hirata et al. (2013) and Berger and Herz (2014). The former constructs a measure of global uncertainty based on 7 economies and the latter estimates global uncertainty using 9 advanced economies and two variables: output growth and inflation. To address this limitation, we use the dataset for 46 advanced and emerging market economies, with the total size of these economies representing more than 90 percent of the world economy today, and 8 variables for each country, covering both real and nominal variables. Taking advantage of this rich dataset, we construct a measure of global uncertainty as the PPP-weighted average of the country-specific uncertainties.

4.2 Properties of Uncertainty

We estimate variable-specific uncertainty (VSU) for eight indicators: rates of inflation, unemployment, short-term and long term interest, and growth rates of output, investment, consumption, and industrial production. For most of the economies in the sample, the VSU is

countercyclical for all series. Moreover, some VSU estimates are highly correlated. **Table 1** shows that for the United States, the pairwise correlations are quite high for most of the VSU estimates. Interestingly, pairwise correlations between all VSU estimates except long-term interest rate are higher for the common than the idiosyncratic component. For instance, the correlation between inflation and investment growth is 0.27 for idiosyncratic uncertainty, but it is 0.78 for common uncertainty. If one estimates uncertainty at the country level using only forecast disagreement, then there would be too many spikes due to idiosyncratic shocks of the individual series. On the other hand, if one estimates uncertainty using its common component only, then most of idiosyncratic uncertainty shocks could not be captured. This also supports that a combined estimate of these two reflects the uncertainty in the entire economy better than any individual estimate.

For all countries, the common uncertainty is less volatile and on average, higher than the idiosyncratic uncertainty. There are very few peaks in the common uncertainty and those peaks are usually around the recession periods. During the recession episodes, the level of uncertainty increases for most of the variables. For instance, in the United States, the uncertainty for output, consumption, investment, unemployment rate, and short-term interest rates increases during all three recession periods covered in this paper.

Interestingly, some regional recession episodes are associated with higher uncertainty for almost all series than global recession episodes. For instance, in Indonesia and South Korea, some of the VSU peaks around the 1997 Asian financial crisis are higher than those around the 2009 global recession. This is consistent with the findings of Hirata, et al. (2013) that since the mid-1980s the importance of regional factors has increased and global factors play a lesser role in explaining international business cycles.

Turning to the country-specific uncertainty (CSU), **Figure 1** plots the uncertainty estimates for 46 advanced and emerging market economies. The CSU is usually high around the recession episodes, and the close relationship between the CSU and recessions is further illustrated during the recent global recession. Almost in all countries, the CSU peaked around 2009, even though the country itself did not experience any recession (i.e. China and Australia). For some emerging market economies, the uncertainty during earlier recessions has been higher than the uncertainty during the latest global recession. For instance, the largest uncertainty peak for Argentina is around 2001-2002, when there was a deep financial crisis in the country, whereas for Hong Kong it is around 1997-1998 Asian financial crisis. There are a few exceptions, however. For example, the uncertainty in Japan misses capturing the recession in early 2000s. As is well known, deflation has been a major problem for the last two decades in Japan. Inflation-specific uncertainty, which was supposed to have the largest increase due to continuous deflation, did not peak around this episode. The uncertainty also did not increase around the 2011 recession, which followed the devastating earthquake and tsunami. Variable-specific uncertainties for real variables (GDP, consumption, investment, and industrial production) increased, but were not enough to raise the uncertainty at the aggregate level.

The uncertainty at the national level influences the variable-specific uncertainty. To explore this impact, **Table 2** presents how much of the variable-specific uncertainty can be explained by country-specific counterpart for the entire sample and subsamples of recessions and expansions. For the entire sample, on average, the explanatory power of the CSU for the VSU is almost the same during recessions ($R^2 = 0.585$) and expansions ($R^2 = 0.576$). For the advanced economies, however, it is higher during recessions ($R^2 = 0.51$) than during expansions ($R^2 = 0.46$). Shorter time coverage of the emerging market economies makes it

difficult to compare the explanatory power at different phases of the business cycle.

For eight out of fifteen advanced economies, the CSU explains output growth uncertainty the most. Furthermore, the explanatory power varies over business cycles. For instance, in the United Kingdom, the CSU explains investment growth uncertainty the most during recessions but the least during expansions. In Japan, the variable that the CSU explains the most is inflation uncertainty during recessions but output growth uncertainty during expansions. For emerging market economies, the evidence is rather mixed. For instance, R^2 is highest for industrial production uncertainty in China, Poland, and Czech Republic; for consumption uncertainty in Argentina, Brazil, Colombia, Peru, South Korea, Philippines, Lithuania, and Romania; for investment uncertainty in Bulgaria, Croatia and Russia. These results are consistent with the sources of economic growth in these economies. For instance, industrial production plays a key role in the Chinese economy and investment is crucial for the Russian economic growth.

To summarize, our country-specific uncertainty measure complements the uncertainty estimate proposed by Jurado, et al. (2015) in two ways. First, the forecasts in their paper are based on a very large set of information for the United States, which is not readily available for other countries. Furthermore, they generate forecasts from augmented autoregressive models and measure uncertainty around objective statistical forecasts. In contrast, we use surveys of professional forecasters available for many countries and focus on market participants' perceived uncertainty. Second, they measure macroeconomic uncertainty as the common factor of all uncertainty estimates of hundreds of financial and macroeconomic

variables. In contrast, our uncertainty measure captures both common and idiosyncratic uncertainties, which are shown later to have separate effects on economic activities.

With the uncertainty at the national level, we estimate global uncertainty as the weighted average of country-specific uncertainties. **Figure 2** shows that global uncertainty is strongly countercyclical and rises during the global recessions, 1991 and 2009, identified by Kose and Terrones (2015). The country-specific uncertainty is potentially influenced by global uncertainty because of large trade and financial interconnectedness between economies. **Table 3** shows how much of the country-specific uncertainty can be explained by global uncertainty. In some of the Asian economies, parallel to the earlier observations, global uncertainty explains only a small fraction of the country-specific uncertainty. For instance, R^2 is 0.435 in Hong Kong and 0.079 in Thailand. On the other hand, in some of the Eastern European economies, global uncertainty can explain a large fraction of the country-specific uncertainty, e.g. $R^2 = 0.925$ in Lithuania, 0.904 in Latvia and 0.886 in Bulgaria. Although the coefficients from bivariate regressions might be misleading in the absence of other control variables, **Table 3** also shows that global uncertainty amplifies the country-specific uncertainty for almost half of the sample, where the coefficient is larger than 1. This amplification is less evident for its common component than idiosyncratic component. Finally, the idiosyncratic component of global uncertainty explains country-specific idiosyncratic uncertainty less than the common component of global uncertainty explains country-specific common uncertainty. Furthermore, global uncertainty has the largest explanatory power compared to its two components. Parallel

to other layers of uncertainty, global uncertainty as the sum of two components has a better reflection of worldwide uncertainty than any individual component.

5. Uncertainty and Economic Activity

Table 4 presents the correlations between the uncertainty, its two components, and other measures for the United States. Our uncertainty measure has the highest correlation (0.79) with the uncertainty measure proposed by Jurado et al. (2015) and the lowest correlation (0.18) with the news-based policy uncertainty proposed by Baker, et al. (2013). Interestingly, the measure of Jurado et al. (2015) has a higher correlation with the combined uncertainty than with its idiosyncratic (0.59) or common component (0.75). The low correlation with idiosyncratic uncertainty reflects that disagreement captures other information, such as heterogeneous models and differential interpretation of public information, which are ignored by the common uncertainty.

Figure 3 compares our country-specific uncertainty with other uncertainty measures from the literature, where all measures are standardized to have zero mean and unit variance for an easy comparison. For almost all twelve countries included in this comparison, the increases in our uncertainty measures are more persistent during recessions compared to alternative uncertainty measures. For the United States, all uncertainty measures are countercyclical. Only our uncertainty and economic policy uncertainty measures exceed the 1.65 standard deviation line for all three recession periods. However, the policy uncertainty exceeds this line many times after the end of the latest recession. In contrast, the uncertainty measure of Jurado et al. (2015) exceeds the line only once during the latest recession, and the VXO exceeds the line six times, covering the three recessions and three non-recession periods. For the United Kingdom, the policy uncertainty exceeds the 1.65 standard deviation line five times, whereas

our measure exceeds the lines in two recessions out of three. For France, Germany and Canada, our measure usually performs better than the policy uncertainty in capturing the recessionary episodes. For the other countries, the comparison is between our measure and the news-based uncertainty index of Baker et al. (2013). Based on uncertainty-related keyword search on main national newspapers, the news-based indexes experience heightened episodes in non-recessionary episodes, implying that part of uncertainty they cover is not related to the economy-wide uncertainty. On the other hand, our uncertainty measures for these countries exceed the 1.65 standard deviation line during most of the recessionary episodes and remain low during expansions.

Next, we analyze the economic uncertainty and macroeconomic dynamics. One of the most pronounced reasons for the slow recovery has been the elevated macroeconomic uncertainty during and after the global recession. To explain the slow recovery, some studies pointed to the demand side impacts of uncertainty via consumption and investment. With high uncertainty, households save more and postpone their consumption, especially for durable goods. Similarly, companies delay their investment decisions and choose to “wait and see” until high economic uncertainty is resolved (Bernanke, 1983; Dixit and Pindyck, 1994). Other studies investigated the supply side impacts of uncertainty through credit provision and productivity growth. When the economic uncertainty is high, banks are reluctant to provide loans, and credit conditions for companies get tightened, especially for the new start-up companies which are good sources of innovation and high productivity growth, e.g. Gilchrist, et al. (2014).

The dynamics between uncertainty and economic activity has long been analyzed using the vector autoregression (VAR) models. For an easy comparison with the results in the

literature, we employ the VAR analysis as well. We use an eight-variable VAR model and present the results for the United States only. Our VAR model has the following specification:

$$\begin{bmatrix} \log(S\&P500\ index) \\ \textit{Uncertainty\ measure} \\ \textit{Federal\ funds\ rate} \\ \log(wages) \\ \log(CPI) \\ \textit{Hours} \\ \log(employment) \\ \log(industrial\ production) \end{bmatrix}$$

Following Jurado, et al. (2015), we did not detrend any of the series using the HP filter. **Figure 4** plots the impulse responses of industrial production and employment to a one standard deviation uncertainty shock. There is a clear evidence of overshooting when VXO or the economic policy uncertainty is used as the proxy. In the middle of the third year after the hit of the VXO shock, both industrial production and employment increase over their initial levels. The overshooting is even faster when the policy uncertainty is used as a proxy. Industrial production (employment) increases over its initial level at the end of the first year (towards the middle of the second year) after the hit of the policy uncertainty shock. This result is in line with Bloom (2009) but not with Jurado et al. (2015) and Scotti (2013), both of which replicate the analysis in Bloom (2009) and find that there is no evidence of overshooting when variables are not HP-filtered. Both employment and industrial production decline sharply as a response to a one standard deviation shock to the uncertainty of Jurado et al. (2015) and these declines remain persistent for the five years following the initial shock.

We also analyze the impact of the two components of the country-specific uncertainty measure by replacing each of them as the uncertainty measure in the VAR estimation. As an idiosyncratic component, the forecast disagreement shocks have less significant impacts on

industrial production and employment. In contrast, common uncertainty shocks have a large and long-lived impact on both industrial production and employment, with the peak impact occurring in two to three years. Therefore, the “wait-and-see” mechanism is observed in the common component of the uncertainty rather than its idiosyncratic component. This result is in contrast with the conclusion of Choi and Loungani (2015) that aggregate uncertainty (parallel to our common component of uncertainty) has an immediate impact on unemployment, which dissipates within a year, whereas sectoral uncertainty (parallel to our idiosyncratic component of uncertainty) has a long-lived impact on unemployment. Turning to our country-specific uncertainty measure, which includes both common and idiosyncratic components, the responses of both industrial production and employment are not significant during the first nine months following the shock. The significant negative impact of the shock on industrial production starts around 10 months after the shock and this effect remains significant, keeping industrial production below its initial level until the middle of the third year.

Using global uncertainty measure and monthly variables, we conduct a similar exercise in the global dimension. Our VAR model includes seven variables in the following order: stock prices, global uncertainty, short term interest rate, oil prices, food prices, unemployment rate and industrial production. Besides global uncertainty, we also use its common or idiosyncratic component in the model. **Figure 5** shows the impulse response function. For industrial production (panel A), there is an immediate decline following the global uncertainty shock, but the decrease dissipates within a few months. The response to the idiosyncratic uncertainty shock has a similarly short-lived impact, but an overshooting occurs after six months following the initial shock. The response to the common uncertainty shock, on the other hand, has a long-

lived impact on industrial production, with the peak impact occurred towards the end of the second year following the initial shock. The divergence in the impacts of the common and idiosyncratic components of the uncertainty shock shows how these two parts capture different aspects of global uncertainty.

As illustrated in panel B, the global uncertainty shocks have a long-lived impact on unemployment, which is consistent with what we observe following the recent global recession. The significant increase in unemployment following the uncertainty shock dissipates almost after 30 months. The idiosyncratic uncertainty shocks are associated with high initial response in unemployment rate, which then overshoots after 30 months; whereas the common uncertainty shocks are associated with more persistent and long-lived high unemployment rates. The impact of the common uncertainty shock on unemployment rate reaches the maximum around 30 months after the initial shock, such that employers “wait-and-see” before they decide to lay off after the initial shock and then hire later on during the recovery. This result again shows that the “wait-and-see” type of behavior is more related to the common rather than idiosyncratic component of global uncertainty.

6. Conclusion

This paper makes three contributions to the uncertainty literature. First, we propose a new measure of uncertainty that has both common and idiosyncratic components, namely, perceived variability of future aggregate shocks and the disagreement among forecasters. Including these two components, our measure can capture economy-wide uncertainty at different dimensions. Second, we use the survey of professional forecasters directly rather than make the forecasts using statistical models and thus, our measure captures the perceived uncertainty of market participants and covers 46 advanced and emerging market economies

with monthly survey data available. Third, we find that the two components of economic uncertainty exhibit strikingly different behavior. Common uncertainty shocks account for a large fraction of fluctuations in economic activity at business cycle frequencies, whereas idiosyncratic uncertainty shocks play a small role.

Future research is warranted by further studying the three different layers of uncertainty. The first layer is the variable-specific uncertainty, which might be useful for the analysis in different sectors of the economy. For instance, uncertainty with respect to the interest rates might be a good indicator in a money market analysis. As another example, one can easily calculate real and nominal uncertainty using the respective variable-specific uncertainties. The second layer is the country-specific uncertainty for a large group of countries. With this comprehensive set of uncertainty measures at hand, one may analyze the cross-country transmission of uncertainty shocks. The third layer is the global uncertainty. Following the global recession of 2009, there is an increasing interest in the global impacts of all types of shocks, including uncertainty shocks. We expect more work towards studying the relationship between global uncertainty and economic activity, parallel to the empirical work at national levels.

Table 1. Correlation between Variable-specific Uncertainty Measures: United States**A. Correlation between Variable-specific Uncertainty Measures**

	Output	Inflation	Consumption	Investment	Industrial production	Unemployment rate	Short-term interest rate	Long-term interest rate
Output	1.00							
Inflation	0.57	1.00						
Consumption	0.79	0.51	1.00					
Investment	0.77	0.64	0.61	1.00				
Industrial production	0.82	0.70	0.61	0.79	1.00			
Unemployment rate	0.77	0.53	0.72	0.70	0.67	1.00		
Short-term interest rate	0.43	0.22	0.55	0.42	0.37	0.28	1.00	
Long-term interest rate	0.41	0.27	0.27	0.42	0.33	0.47	0.24	1.00

B. Correlation between Variable-specific Idiosyncratic Uncertainty Measures

	Output	Inflation	Consumption	Investment	Industrial production	Unemployment rate	Short-term interest rate	Long-term interest rate
Output	1.00							
Inflation	0.38	1.00						
Consumption	0.60	0.36	1.00					
Investment	0.54	0.27	0.53	1.00				
Industrial production	0.56	0.46	0.53	0.51	1.00			
Unemployment rate	0.49	0.30	0.53	0.46	0.39	1.00		
Short-term interest rate	0.19	0.02	0.17	0.15	0.02	0.02	1.00	
Long-term interest rate	0.35	0.36	0.33	0.28	0.29	0.17	0.31	1.00

C. Correlation between Variable-specific Common Uncertainty Measures

	Output	Inflation	Consumption	Investment	Industrial production	Unemployment rate	Short-term interest rate	Long-term interest rate
Output	1.00							
Inflation	0.53	1.00						
Consumption	0.83	0.50	1.00					
Investment	0.75	0.78	0.60	1.00				
Industrial production	0.87	0.68	0.62	0.83	1.00			
Unemployment rate	0.71	0.54	0.68	0.68	0.69	1.00		
Short-term interest rate	0.54	0.30	0.61	0.53	0.44	0.42	1.00	
Long-term interest rate	0.20	0.20	0.16	0.22	0.19	0.49	0.17	1.00

Note: Output, consumption, investment, and industrial production stand for the growth rates of these indicators. The sample is between 1989M11-2014M7 for all estimates.

Table 2. R-square: Variable-specific Uncertainty on Country-specific Uncertainty

	Output	Consumption	Investment	Industrial production	Unemployment rate	Inflation	Short-term interest rate	Long-term interest rate	Average
United States									
Full sample	0.822	0.678	0.763	0.734	0.690	0.506	0.348	0.303	0.606
Recessions	0.833	0.628	0.657	0.662	0.506	0.807	0.065	0.000	0.520
Expansions	0.715	0.554	0.618	0.550	0.513	0.158	0.292	0.364	0.471
United Kingdom									
Full sample	0.777	0.805	0.564	0.659	0.479	0.627	0.512	0.511	0.617
Recessions	0.721	0.803	0.857	0.648	0.124	0.662	0.424	0.157	0.550
Expansions	0.618	0.663	0.240	0.413	0.534	0.438	0.414	0.646	0.496
France									
Full sample	0.696	0.498	0.612	0.640	0.429	0.224	0.342	0.422	0.483
Recessions	0.903	0.150	0.875	0.712	0.811	0.747	0.038	0.686	0.615
Expansions	0.465	0.519	0.401	0.418	0.343	0.004	0.444	0.442	0.380
Germany									
Full sample	0.698	0.528	0.399	0.568	0.251	0.342	0.540	0.317	0.455
Recessions	0.855	0.101	0.667	0.839	0.031	0.544	0.793	0.251	0.510
Expansions	0.645	0.700	0.326	0.477	0.378	0.273	0.459	0.365	0.453
Italy									
Full sample	0.424	0.520	0.701	0.275	0.385	0.650	0.281	0.703	0.492
Recessions	0.431	0.375	0.705	0.272	0.303	0.581	0.247	0.641	0.444
Expansions	0.356	0.372	0.561	0.182	0.367	0.627	0.393	0.709	0.446
Canada									
Full sample	0.753	0.696	0.484	0.675	0.793	0.601	0.583	0.660	0.656
Recessions	0.097	0.395	0.016	0.541	0.596	0.349	0.622	0.802	0.427
Expansions	0.688	0.572	0.436	0.593	0.746	0.533	0.557	0.638	0.595
Japan									
Full sample	0.663	0.323	0.577	0.363	0.183	0.432	0.535	0.220	0.412
Recessions	0.745	0.477	0.553	0.257	0.705	0.834	0.744	0.148	0.558
Expansions	0.618	0.241	0.593	0.372	0.082	0.286	0.524	0.304	0.378
Spain									
Full sample	0.814	0.801	0.907	0.785	N/A	0.751	0.094	0.428	0.654
Recessions	0.478	0.319	0.768	0.743	N/A	0.579	0.682	0.143	0.530
Expansions	0.726	0.624	0.854	0.752	N/A	0.624	0.062	0.472	0.588
Australia									
Full sample	0.539	0.188	0.430	0.379	0.587	0.647	0.641	0.410	0.478
Recessions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Expansions	0.539	0.188	0.430	0.379	0.587	0.647	0.641	0.410	0.478
New Zealand									
Full sample	0.826	0.483	0.316	0.588	0.242	0.341	N/A	N/A	0.466
Recessions	0.678	0.493	0.057	0.772	0.001	0.216	N/A	N/A	0.370
Expansions	0.794	0.424	0.386	0.510	0.194	0.271	N/A	N/A	0.430
Netherlands									
Full sample	0.514	0.041	0.414	0.508	N/A	0.180	0.017	0.562	0.319
Recessions	0.705	0.243	0.125	0.772	N/A	0.239	0.400	0.836	0.474
Expansions	0.155	0.088	0.388	0.153	N/A	0.176	0.000	0.224	0.169
Norway									
Full sample	0.669	0.372	0.446	0.025	N/A	0.103	0.634	0.514	0.395
Recessions	0.567	0.805	0.735	0.070	N/A	0.065	0.401	0.544	0.455
Expansions	0.665	0.329	0.419	0.084	N/A	0.105	0.740	0.556	0.414
Sweden									
Full sample	0.788	0.529	0.646	0.676	N/A	0.532	0.224	0.368	0.538
Recessions	0.739	0.155	0.802	0.739	N/A	0.269	0.774	0.785	0.609
Expansions	0.746	0.456	0.596	0.596	N/A	0.499	0.223	0.480	0.514
Switzerland									
Full sample	0.760	0.183	0.723	0.568	N/A	0.362	N/A	0.166	0.460
Recessions	0.893	0.027	0.660	0.890	N/A	0.802	N/A	0.209	0.580
Expansions	0.691	0.123	0.679	0.494	N/A	0.282	N/A	0.191	0.410
Euro Zone									
Full sample	0.857	0.710	0.887	0.860	0.680	0.568	N/A	N/A	0.760
Recessions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Expansions	0.857	0.710	0.887	0.860	0.680	0.568	N/A	N/A	0.760

Table 2. Continued

	Output	Consumption	Investment	Industrial production	Unemployment rate	Inflation	Short-term interest rate	Long-term interest rate	Average
Turkey									
Full sample	0.919	0.897	0.817	0.889	N/A	0.687	0.259	N/A	0.745
Recessions	0.936	0.818	0.905	0.904	N/A	0.000	0.307	N/A	0.645
Expansions	0.926	0.876	0.828	0.857	N/A	0.659	0.203	N/A	0.725
Argentina									
Full sample	0.824	0.921	0.812	0.833	N/A	0.858	0.793	N/A	0.840
Recessions	0.976	0.832	0.881	0.737	N/A	0.503	0.536	N/A	0.744
Expansions	0.903	0.927	0.831	0.852	N/A	0.924	0.824	N/A	0.877
Brazil									
Full sample	0.783	0.808	0.732	0.535	N/A	0.056	0.201	N/A	0.519
Recessions	0.696	0.805	0.555	0.466	N/A	0.128	0.458	N/A	0.518
Expansions	0.806	0.816	0.782	0.555	N/A	0.031	0.136	N/A	0.521
Chile									
Full sample	0.786	0.731	0.392	0.650	N/A	0.405	0.204	N/A	0.528
Recessions	0.143	0.278	0.816	0.852	N/A	0.244	0.842	N/A	0.529
Expansions	0.748	0.714	0.207	0.683	N/A	0.211	0.161	N/A	0.454
Colombia									
Full sample	0.693	0.725	0.454	0.624	N/A	0.544	N/A	N/A	0.608
Recessions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Expansions	0.693	0.725	0.454	0.624	N/A	0.544	N/A	N/A	0.608
Mexico									
Full sample	0.832	0.719	0.612	0.739	N/A	0.507	0.132	N/A	0.590
Recessions	0.852	0.652	0.012	0.676	N/A	0.372	0.555	N/A	0.520
Expansions	0.728	0.554	0.385	0.609	N/A	0.560	0.287	N/A	0.521
Peru									
Full sample	0.658	0.840	0.770	N/A	N/A	0.459	N/A	N/A	0.682
Recessions	0.689	0.918	0.933	N/A	N/A	0.676	N/A	N/A	0.804
Expansions	0.711	0.850	0.736	N/A	N/A	0.391	N/A	N/A	0.672
Venezuela									
Full sample	0.898	0.566	0.609	N/A	N/A	0.092	0.785	N/A	0.590
Recessions	0.901	0.443	0.917	N/A	N/A	0.107	0.922	N/A	0.658
Expansions	0.883	0.574	0.696	N/A	N/A	0.076	0.742	N/A	0.594
Taiwan									
Full sample	0.766	0.744	0.694	0.755	0.873	0.508	0.138	0.569	0.631
Recessions	0.864	0.752	0.721	0.959	0.667	0.745	0.910	0.708	N/A
Expansions	0.679	0.687	0.637	0.685	0.823	0.396	0.132	0.320	0.545
Hong Kong									
Full sample	0.807	0.707	0.779	0.716	0.907	0.694	0.705	0.139	0.682
Recessions	0.806	0.688	0.858	0.794	0.335	0.826	0.858	0.009	0.647
Expansions	0.807	0.598	0.677	0.682	0.899	0.521	0.465	0.245	0.612
India									
Full sample	0.435	N/A	0.357	0.183	N/A	0.281	0.117	0.042	0.236
Recessions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Expansions	0.435	N/A	0.357	0.183	N/A	0.281	0.117	0.042	0.236
Indonesia									
Full sample	0.927	0.900	0.888	0.803	N/A	0.886	0.803	0.229	0.777
Recessions	0.439	0.289	0.272	0.013	N/A	0.261	0.703	0.648	0.375
Expansions	0.882	0.810	0.852	0.781	N/A	0.789	0.760	0.351	0.746
South Korea									
Full sample	0.894	0.925	0.904	0.537	0.884	0.872	0.727	0.210	0.744
Recessions	0.611	0.560	0.607	0.338	0.723	0.641	0.335	0.310	0.516
Expansions	0.875	0.920	0.880	0.569	0.861	0.840	0.654	0.085	0.711
Malaysia									
Full sample	0.835	0.778	0.727	0.620	N/A	0.363	0.383	0.628	0.619
Recessions	0.826	0.706	0.866	0.142	N/A	0.395	0.613	0.919	0.638
Expansions	0.789	0.778	0.727	0.617	N/A	0.229	0.333	0.535	0.573
Philippines									
Full sample	0.762	0.764	0.536	0.713	N/A	0.109	0.001	N/A	0.481
Recessions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Expansions	0.762	0.764	0.536	0.713	N/A	0.109	0.001	N/A	0.481
China									
Full sample	0.377	0.491	0.407	0.777	N/A	0.623	N/A	0.671	0.558
Recessions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Expansions	0.377	0.491	0.407	0.777	N/A	0.623	N/A	0.671	0.558

Table 2. Continued

	Output	Consumption	Investment	Industrial production	Unemployment rate	Inflation	Short-term interest rate	Long-term interest rate	Average
Singapore									
Full sample	0.713	0.543	0.559	0.438	N/A	0.375	0.208	0.280	0.445
Recessions	0.716	0.200	0.651	0.158	N/A	0.541	0.230	0.554	0.436
Expansions	0.667	0.545	0.526	0.511	N/A	0.350	0.167	0.254	0.431
Thailand									
Full sample	0.884	0.862	0.763	0.407	N/A	0.446	0.004	0.244	0.516
Recessions	0.888	0.903	0.928	0.426	N/A	0.537	0.603	0.071	0.622
Expansions	0.849	0.766	0.482	0.529	N/A	0.146	0.000	0.092	0.409
Russia									
Full sample	0.902	0.894	0.945	0.944	N/A	0.527	N/A	N/A	0.842
Recessions	0.920	0.894	0.931	0.944	N/A	0.022	N/A	N/A	0.742
Expansions	0.902	0.849	0.976	0.968	N/A	0.807	N/A	N/A	0.900
Bulgaria									
Full sample	0.791	0.701	0.941	0.899	N/A	0.742	N/A	N/A	0.815
Recessions	0.790	0.582	0.924	0.812	N/A	0.607	N/A	N/A	0.743
Expansions	0.575	0.732	0.896	0.885	N/A	0.794	N/A	N/A	0.776
Ukraine									
Full sample	0.951	0.938	0.827	0.893	N/A	0.145	N/A	N/A	0.751
Recessions	0.977	0.962	0.929	0.961	N/A	0.057	N/A	N/A	0.777
Expansions	0.936	0.923	0.811	0.844	N/A	0.262	N/A	N/A	0.755
Czech Republic									
Full sample	0.869	0.880	0.874	0.897	N/A	0.656	N/A	0.479	0.776
Recessions	0.934	0.878	0.865	0.902	N/A	0.823	N/A	0.652	0.842
Expansions	0.808	0.876	0.888	0.912	N/A	0.792	N/A	0.297	0.762
Slovakia									
Full sample	0.892	0.641	0.717	0.769	N/A	0.274	N/A	N/A	0.659
Recessions	0.537	0.520	0.028	0.420	N/A	0.106	N/A	N/A	0.322
Expansions	0.871	0.505	0.707	0.818	N/A	0.309	N/A	N/A	0.642
Estonia									
Full sample	0.906	0.869	N/A	0.840	N/A	0.905	N/A	N/A	0.880
Recessions	0.937	0.952	N/A	0.891	N/A	0.909	N/A	N/A	0.922
Expansions	0.876	0.739	N/A	0.754	N/A	0.936	N/A	N/A	0.826
Latvia									
Full sample	0.868	N/A	0.504	0.862	N/A	0.913	N/A	N/A	0.787
Recessions	0.586	N/A	0.526	0.207	N/A	0.504	N/A	N/A	0.456
Expansions	0.790	N/A	0.467	0.842	N/A	0.909	N/A	N/A	0.752
Hungary									
Full sample	0.780	N/A	0.026	0.742	N/A	0.079	0.849	0.693	0.528
Recessions	0.782	N/A	0.095	0.836	N/A	0.075	0.876	0.902	0.594
Expansions	0.610	N/A	0.004	0.666	N/A	0.010	0.652	0.301	0.374
Lithuania									
Full sample	0.890	0.902	0.848	0.798	N/A	0.748	N/A	N/A	0.837
Recessions	0.235	0.725	0.339	0.590	N/A	0.000	N/A	N/A	N/A
Expansions	0.867	0.823	0.766	0.691	N/A	0.881	N/A	N/A	0.806
Croatia									
Full sample	0.687	0.707	0.808	0.455	N/A	0.390	N/A	N/A	0.609
Recessions	0.791	0.672	0.802	0.394	N/A	0.239	N/A	N/A	0.580
Expansions	0.784	0.918	0.980	0.948	N/A	0.955	N/A	N/A	0.917
Slovenia									
Full sample	0.853	0.032	0.842	0.468	N/A	0.689	N/A	N/A	0.577
Recessions	0.897	0.000	0.776	0.582	N/A	0.803	N/A	N/A	0.612
Expansions	0.858	0.076	0.908	0.265	N/A	0.690	N/A	N/A	0.559
Romania									
Full sample	0.906	0.936	0.904	0.738	N/A	0.134	N/A	N/A	0.724
Recessions	0.906	0.999	0.456	0.947	N/A	0.581	N/A	N/A	0.778
Expansions	0.893	0.925	0.928	0.758	N/A	0.173	N/A	N/A	0.735
Poland									
Full sample	0.735	0.132	0.561	0.804	N/A	0.123	N/A	N/A	0.471
Recessions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Expansions	0.735	0.132	0.561	0.804	N/A	0.123	N/A	N/A	0.471

Note: Each cell presents the R-square of the regressions of respective variable-specific uncertainty on country-specific uncertainty measures. Recession episodes are from Claessens, Kose, Ozturk, Terrones (2016, forthcoming). The last column presents the average of the R-square in each economy. Numbers in red are the smallest values and numbers in green are the largest values in the row they stand.

Table 3. R-square: Country-specific Uncertainty on Global Uncertainty

	Uncertainty (total)		Idiosyncratic Uncertainty		Common Uncertainty	
	β	R ²	β	R ²	β	R ²
Estonia	1.597***	0.880	1.369***	0.698	1.190***	0.816
Bulgaria	1.396***	0.886	1.247***	0.586	1.012***	0.812
Lithuania	1.351***	0.925	1.136***	0.686	1.024***	0.873
Latvia	1.346***	0.904	1.122***	0.772	1.032***	0.802
Taiwan	1.320***	0.891	1.228***	0.692	1.007***	0.875
Peru	1.296***	0.694	1.075***	0.373	0.943***	0.644
Russia	1.268***	0.836	1.147***	0.481	0.922***	0.678
Philippines	1.255***	0.857	1.216***	0.490	0.913***	0.780
United States	1.212***	0.782	1.249***	0.686	0.808***	0.670
Canada	1.211***	0.677	1.008***	0.488	0.891***	0.703
United Kingdom	1.210***	0.711	1.230***	0.654	0.844***	0.702
New Zealand	1.161***	0.798	1.071***	0.557	0.820***	0.678
Euro Zone	1.144***	0.679	1.329***	0.623	0.863***	0.618
Czech Republic	1.122***	0.906	0.866***	0.706	0.889***	0.817
Mexico	1.108***	0.789	1.132***	0.642	0.801***	0.819
Romania	1.104***	0.803	0.902***	0.483	0.761***	0.687
Turkey	1.081***	0.849	0.800***	0.386	0.947***	0.887
China	1.071***	0.428	1.334***	0.418	0.678***	0.354
Hong Kong	1.047***	0.435	0.844***	0.306	0.814***	0.476
Colombia	1.043***	0.724	0.954***	0.538	0.773***	0.562
Chile	1.023***	0.724	1.152***	0.596	0.730***	0.685
Sweden	1.000***	0.517	0.832***	0.328	0.819***	0.592
Singapore	0.988***	0.708	0.891***	0.494	0.739***	0.721
Brazil	0.970***	0.731	0.947***	0.535	0.747***	0.800
Australia	0.968***	0.566	1.071***	0.534	0.660***	0.592
Switzerland	0.961***	0.808	0.856***	0.506	0.769***	0.780
Japan	0.954***	0.692	0.867***	0.465	0.747***	0.671
Germany	0.946***	0.625	0.765***	0.457	0.723***	0.636
Ukraine	0.911***	0.544	0.863***	0.269	0.649***	0.428
France	0.903***	0.571	0.740***	0.385	0.717***	0.584
Slovakia	0.890***	0.872	0.856***	0.489	0.698***	0.837
Croatia	0.885***	0.711	0.588***	0.274	0.799***	0.651
Spain	0.860***	0.378	0.830***	0.397	0.660***	0.366
Hungary	0.783***	0.819	0.933***	0.571	0.614***	0.833
Slovenia	0.722***	0.537	0.833***	0.441	0.562***	0.452
Italy	0.702***	0.315	0.584***	0.221	0.609***	0.388
Poland	0.632***	0.788	0.899***	0.616	0.391***	0.775
Malaysia	0.605***	0.180	0.553***	0.156	0.477***	0.191
Netherlands	0.541***	0.451	0.648***	0.234	0.406***	0.504
South Korea	0.500***	0.090	0.495***	0.109	0.400***	0.106
India	0.460***	0.432	0.292***	0.053	0.373***	0.504
Norway	0.452***	0.215	0.356***	0.054	0.382***	0.407
Argentina	0.412***	0.076	0.311***	0.048	0.352***	0.092
Thailand	0.350***	0.079	0.327***	0.049	0.300***	0.110
Indonesia	0.208***	0.017	0.276***	0.029	0.163***	0.021
Venezuela	0.039	0.001	0.183***	0.026	-0.022	0.000

Note : Economies are sorted with respect to their estimated coefficients in uncertainty (total). Each result is based on bivariate regressions of country-specific uncertainty on global uncertainty. *** indicates significance at 1 percent level.

Table 4. Correlations of Uncertainty Measures: United States

	Country-specific uncertainty	Common uncertainty	Idiosyncratic uncertainty	Economic policy uncertainty	News-based policy uncertainty	Jurado et al. (2015)	VXO
Country-specific uncertainty	1.00						
Common uncertainty	0.94	1.00					
Idiosyncratic uncertainty	0.80	0.54	1.00	0.00			
Economic policy uncertainty	0.18	0.05	0.36	1.00			
News-based policy uncertainty	0.19	0.07	0.35	0.90	1.00		
Jurado et al. (2015)	0.79	0.75	0.59	0.28	0.27	1.00	
VXO	0.54	0.48	0.49	0.40	0.49	0.60	1.00

Note: News-based policy uncertainty and economic policy uncertainty measures are from the policy uncertainty website of Baker, Bloom, and Davis (2013).

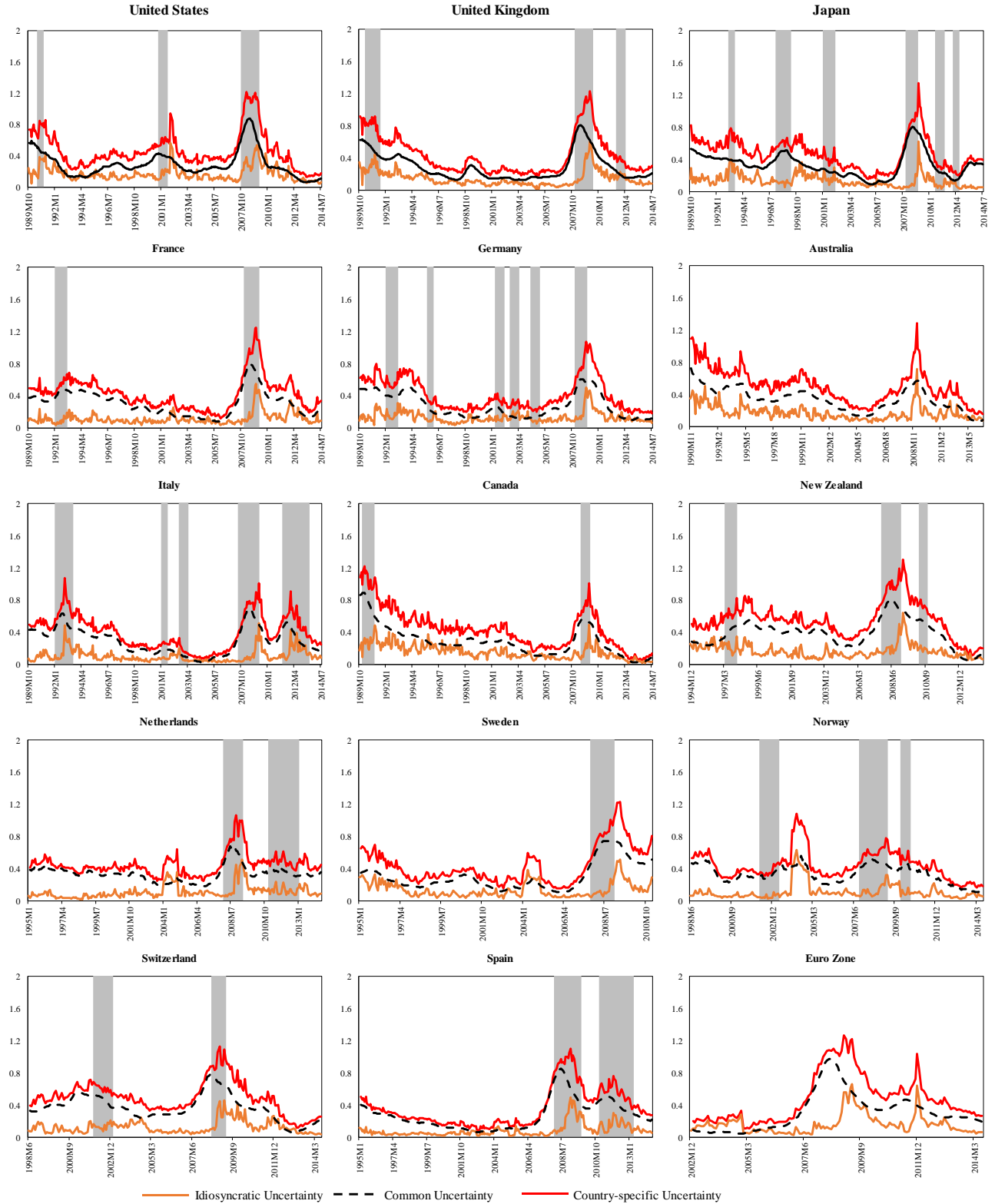


Figure 1. Country-Specific Uncertainty

Note : Country-specific uncertainty is the sum of idiosyncratic and common uncertainty. Gray bars indicate the period of recessions as identified in Claessens, Kose, Ozturk, Terrones (2016, forthcoming).

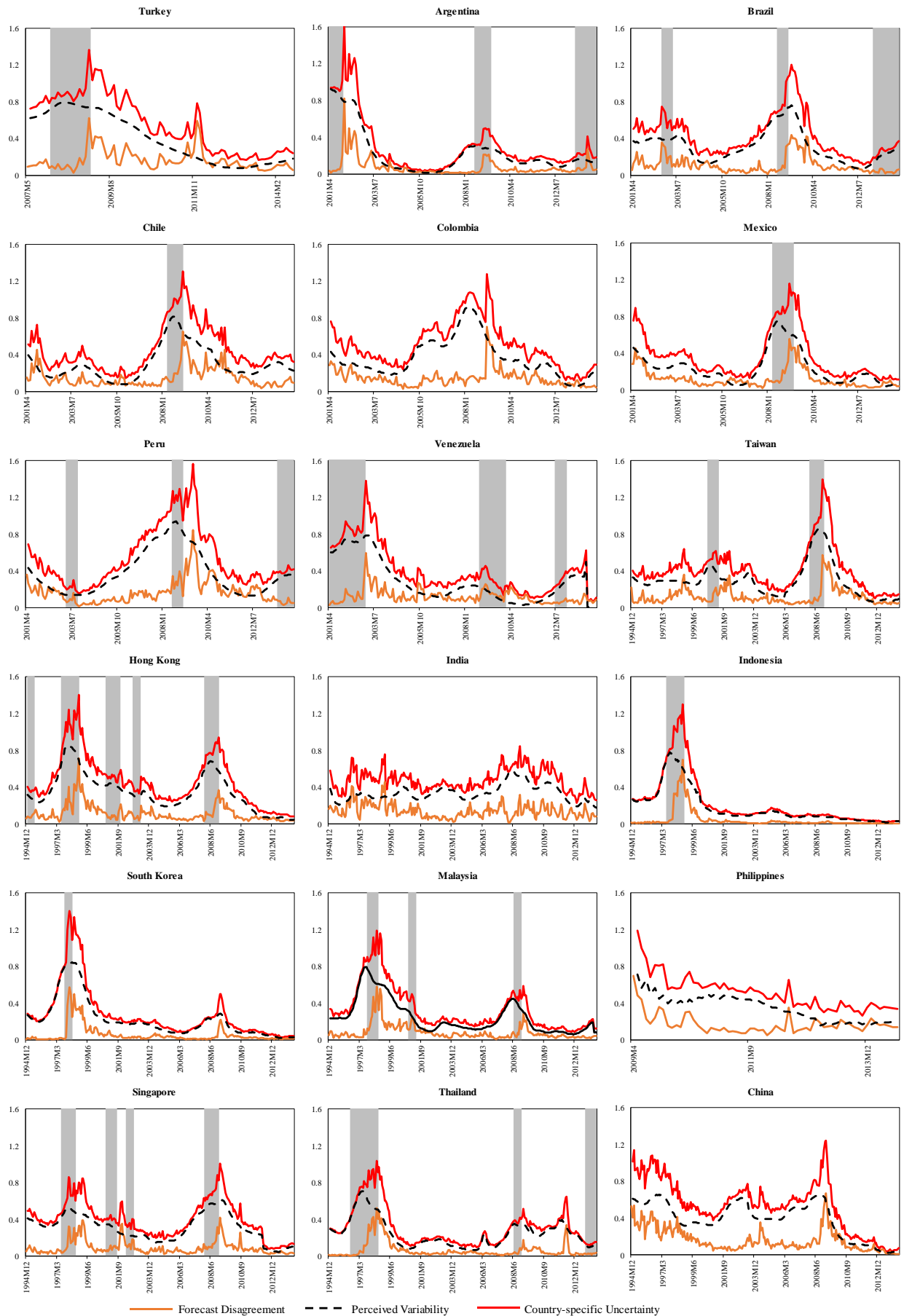


Figure 1. Country-Specific Uncertainty (continued)

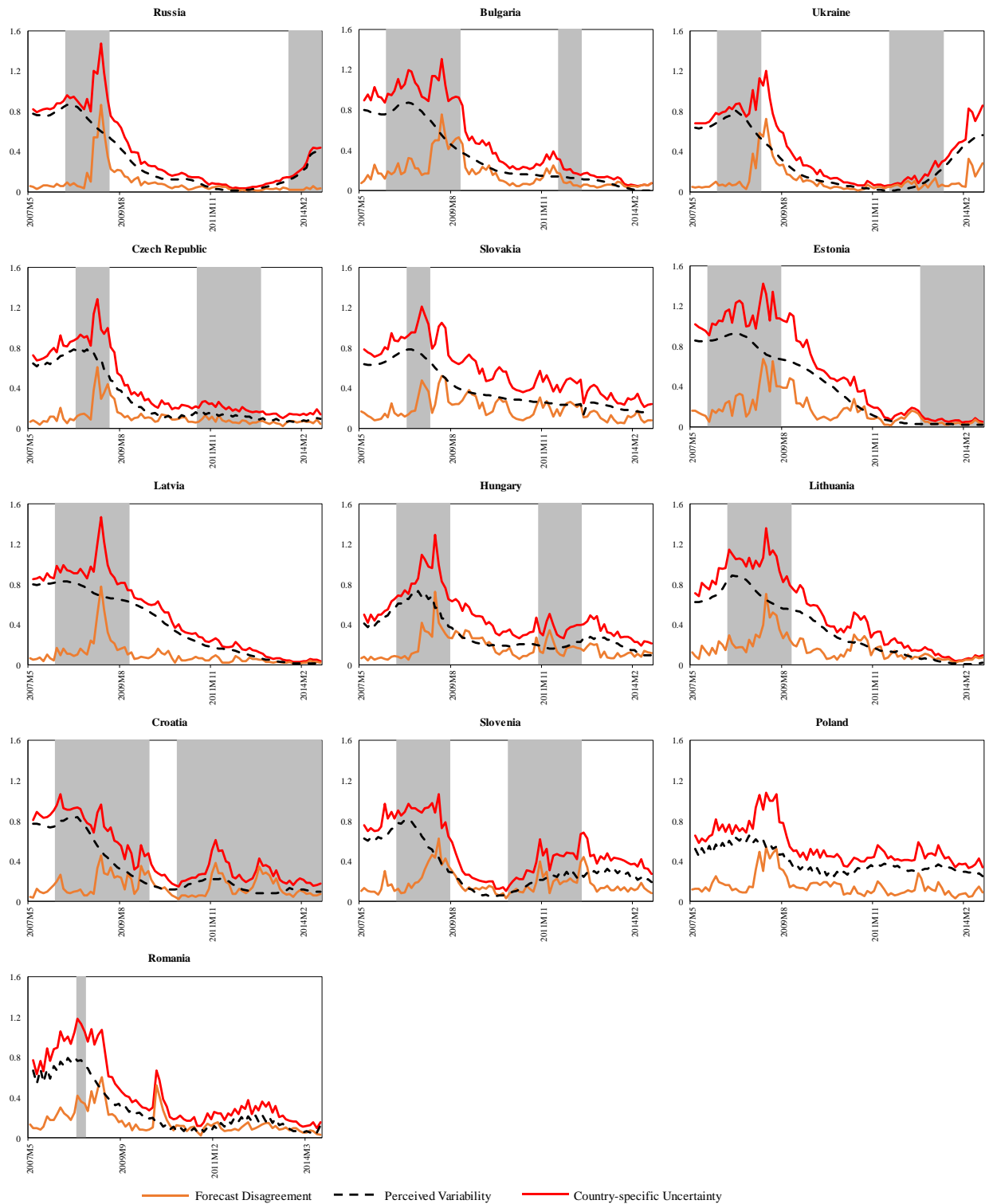


Figure 1. Country-Specific Uncertainty (continued)

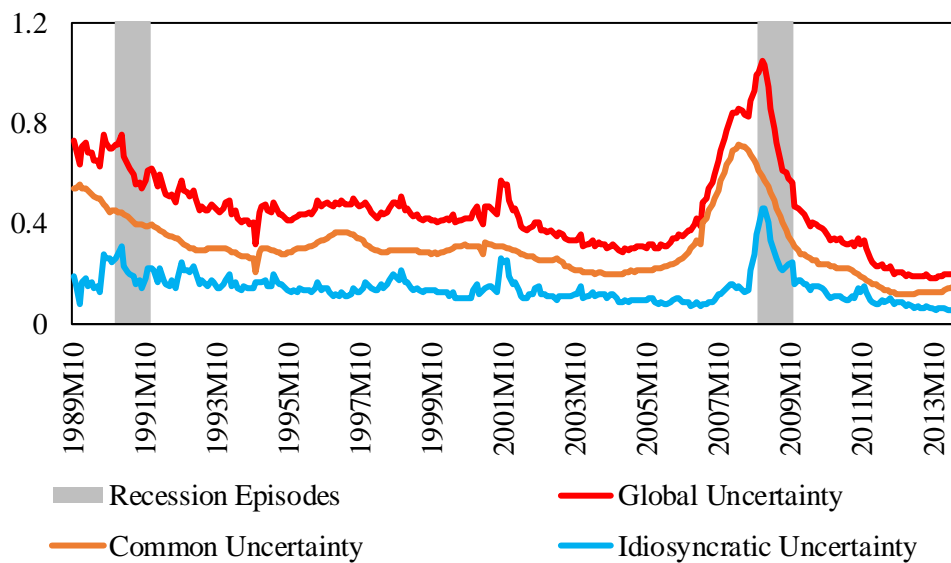


Figure 2. Global Uncertainty

Note : Each line presents the PPP-weighted average of the respective measure for 46 economies. Gray bars present the global recession episodes identified by Kose and Terrones (2015).

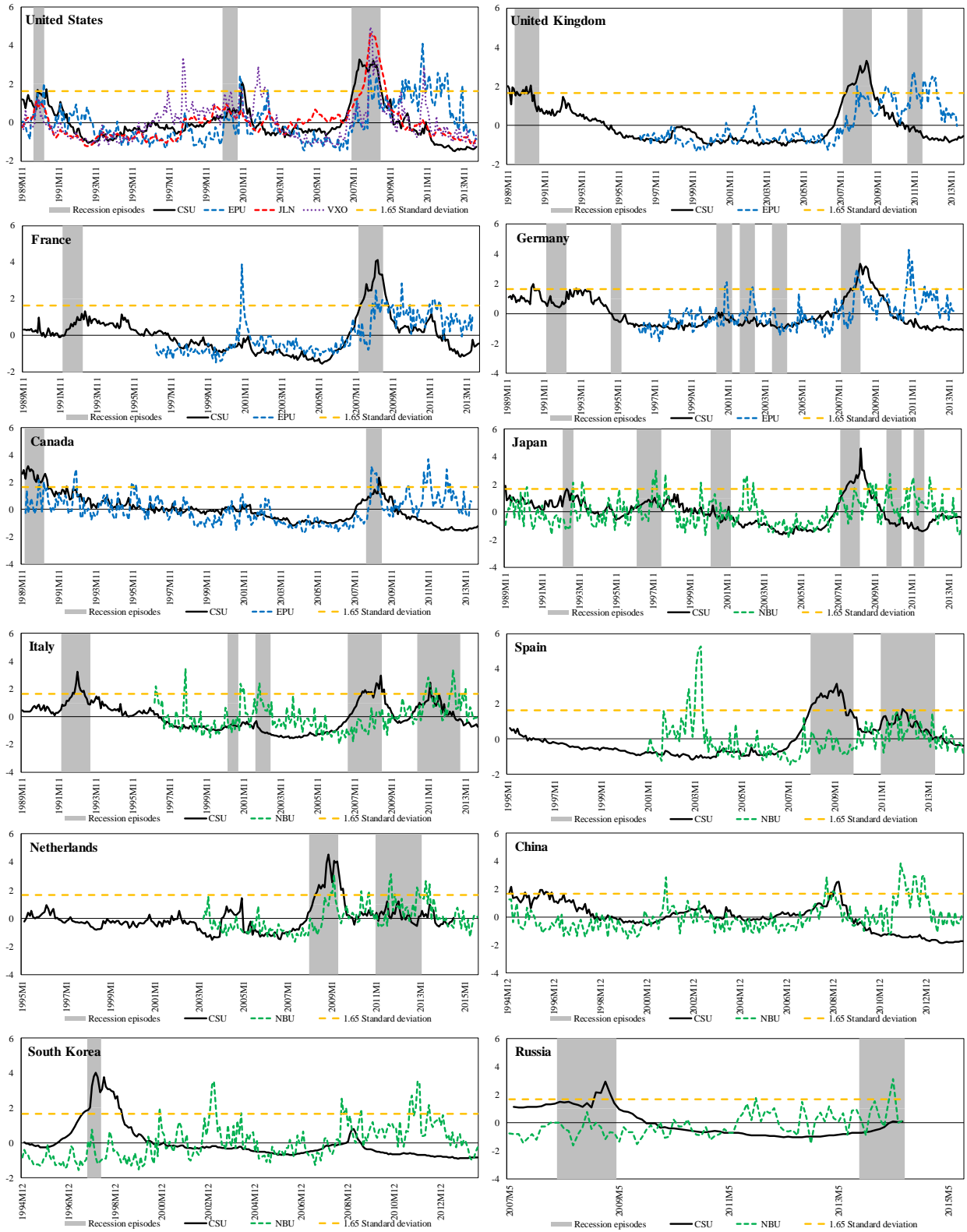


Figure 3. Comparison of Uncertainty Measures

Note: Each uncertainty measure is standardized by subtracting the mean and dividing by the standard deviation. CSU = country-specific uncertainty, JLN=uncertainty measure from Jurado et al (2015), EPU=economic policy uncertainty (Baker et al, 2013), NBU=news-based uncertainty (Baker et al, 2013).

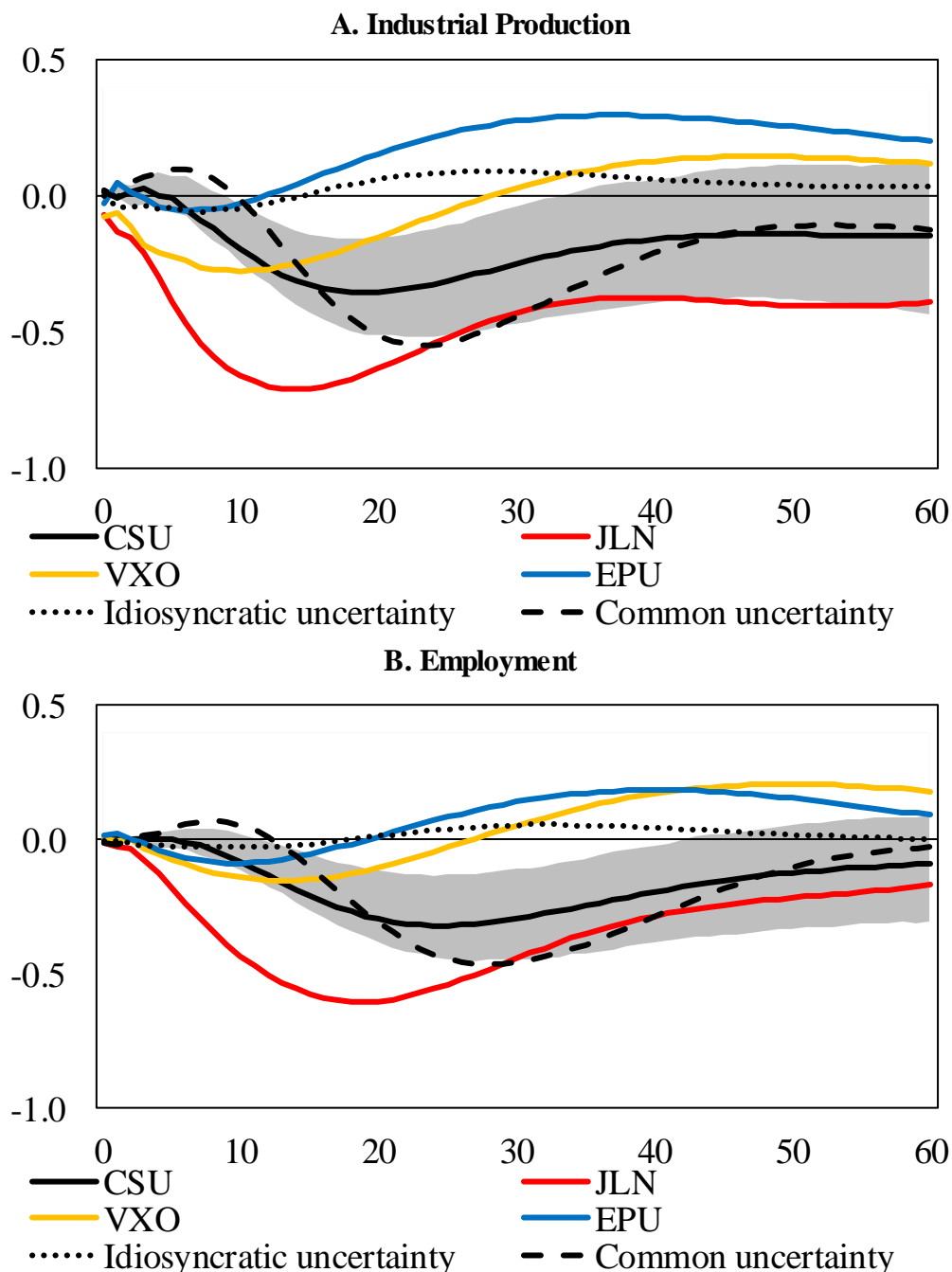


Figure 4. Responses to Uncertainty Shocks

Note : Panel A (Panel B) plots the responses of industrial production (employment) to uncertainty shocks identified recursively in eight-variable VAR system estimated separately for each of the uncertainty measures. CSU=country-specific uncertainty; JLN=uncertainty estimate from Jurado et. al (2015), EPU= economic policy uncertainty estimate from Baker et. al (2013). Dotted (dashed) line is the response to the forecast disagreement shocks, where CSU is replaced with idiosyncratic uncertainty (common uncertainty) component. Shaded regions present 64 percent confidence intervals using Killian (1998) bias-corrected bootstrap.

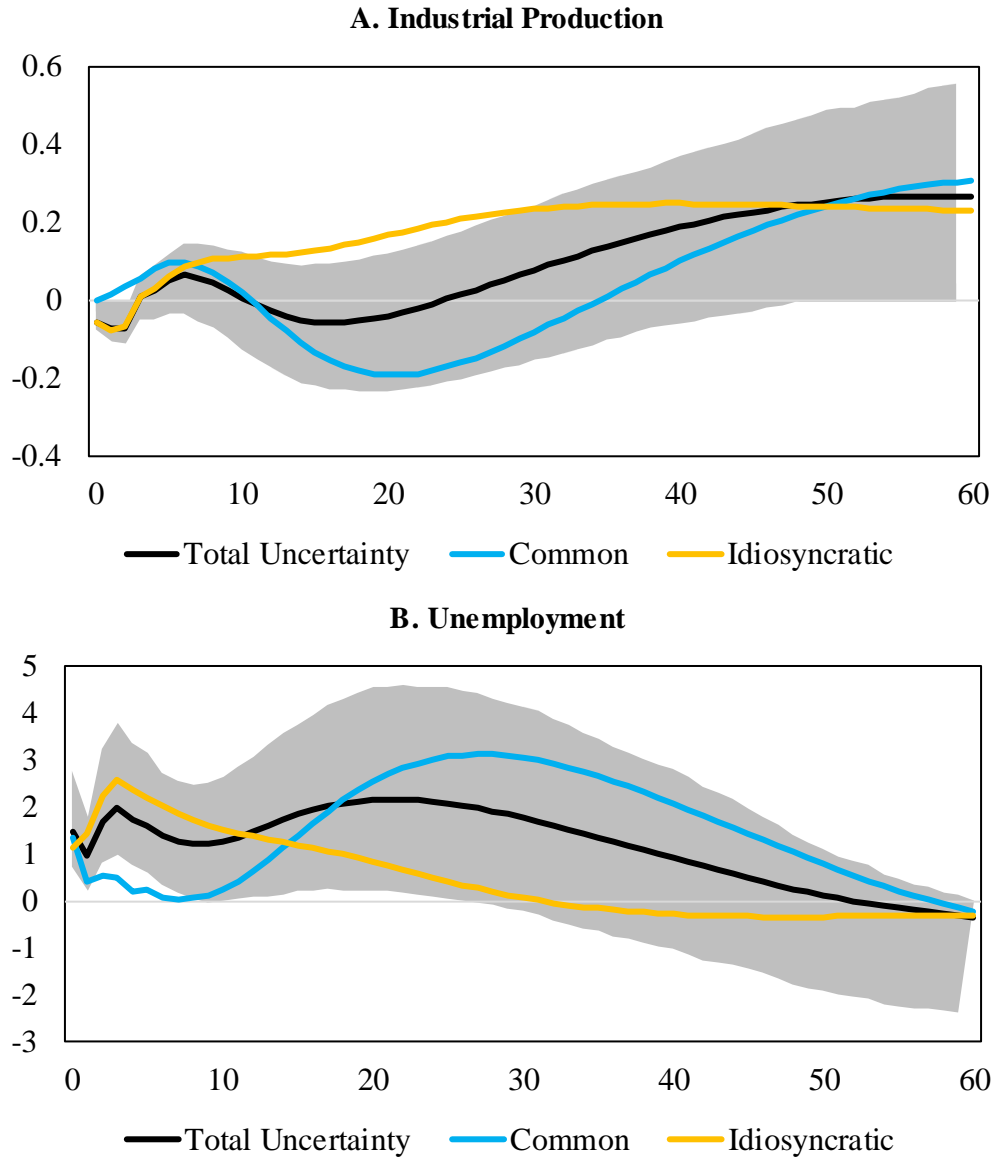


Figure 5. Responses to Global Uncertainty Shocks

Note : Panel A (Panel B) plots the responses of industrial production (unemployment rate) to uncertainty shocks identified recursively in a seven-variable VAR system estimated separately for total uncertainty and its common and idiosyncratic components.

Table A.1. Data Coverage of Survey-based Forecast Dataset

		GDP	Consumption	Investment	Industrial	Inflation	Unemployment	Short-term	Long-term
	Data Coverage	growth	growth	growth	production	rate	rate	interest rate	interest rate
Advanced Economies									
<i>G7 Countries</i>									
Canada	1989M11-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
France	1989M11-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
Germany	1989M11-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
Italy	1989M11-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
Japan	1989M11-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
United Kingdom	1989M11-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
United States	1989M11-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
<i>Western Europe</i>									
Euro zone	2002M12-2014M7	✓	✓	✓	✓	✓	✓	*	*
Netherlands	1995M1-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Norway	1998M6-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Spain	1995M1-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Sweden	1995M1-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Switzerland	1998M6-2014M7	✓	✓	✓	✓	✓	*	✓	✓
<i>Asia-Pacific</i>									
Australia	1990M11-2014M7	✓	✓	✓	1991M01	✓	✓	✓	✓
New Zealand	1994M12-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
Emerging Market Economies									
<i>Latin America</i>									
Argentina	2001M4-2014M7	✓	✓	✓	✓	✓	*	✓	*
Brazil	2001M4-2014M7	✓	✓	✓	✓	✓	*	✓	*
Chile	2001M4-2014M7	✓	✓	✓	✓	✓	*	✓	*
Mexico	2001M4-2014M7	✓	✓	✓	✓	✓	*	✓	*
Venezuela	2001M4-2014M7	✓	✓	✓	✓	✓	*	✓	*
Colombia	2001M4-2014M7	✓	✓	✓	✓	✓	*	*	*
Peru	2001M4-2014M7	✓	✓	✓	✓	✓	*	*	*
<i>Eastern Europe</i>									
Bulgaria	2007M5-2014M7	✓	✓	✓	✓	✓	*	*	*
Croatia	2007M5-2014M7	✓	✓	✓	✓	✓	*	*	*
Czech Republic	2007M5-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Estonia	2007M5-2014M7	✓	✓	✓	✓	✓	*	*	*
Hungary	2007M5-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Latvia	2007M5-2014M7	✓	✓	✓	✓	✓	*	*	*
Lithuania	2007M5-2014M7	✓	✓	✓	✓	✓	*	*	*
Poland	2007M5-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Romania	2007M5-2014M7	✓	✓	✓	✓	✓	*	*	*
Russia	2007M5-2014M7	✓	✓	✓	✓	✓	*	*	✓
Slovakia	2007M5-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Slovenia	2007M5-2014M7	✓	✓	✓	✓	✓	*	*	*
Turkey	2007M5-2014M7	✓	✓	✓	✓	✓	*	✓	*
Ukraine	2007M5-2014M7	✓	✓	2008M06	✓	✓	*	*	*
<i>Asia Pacific</i>									
China	1994M12-2014M7	✓	✓	✓	✓	✓	*	*	2003M07
Hong Kong	1994M12-2014M7	✓	✓	✓	✓	✓	2003M06	✓	✓
India	1994M12-2014M7	✓	*	✓	✓	✓	*	✓	✓
Indonesia	1994M12-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Malaysia	1994M12-2014M7	✓	✓	✓	✓	✓	*	✓	✓
Philippines	2009M4-2014M7	✓	✓	✓	✓	✓	*	✓	*
Singapore	1994M12-2014M7	✓	✓	✓	✓	✓	*	✓	✓
South Korea	1994M12-2014M7	✓	✓	✓	✓	✓	✓	✓	✓
Taiwan	1994M12-2014M7	✓	✓	✓	✓	✓	2003M09	✓	2006M03
Thailand	1994M12-2014M7	✓	✓	✓	✓	✓	*	✓	✓

Source: Consensus Forecasts database of the Consensus Economics, Inc.

Notes: ✓ sign indicates the dataset covers the related variable; * sign indicates that the dataset does not cover the related variable. If a series starts later than the others for a country, the check or cross signs are replaced with the start date of that specific series.

Table A.2. Forecast Efficiency Regression Results

	α	β	F	p-value		α	β	F	p-value
United States					United Kingdom				
Output	0.787***	-0.339***	8.9	0.0	Output	0.542**	-0.230**	3.1	0.0
Industrial production	1.163**	-0.617***	19.6	0.0	Industrial production	-0.160	-0.867***	78.1	0.0
CPI	1.553***	-0.632***	25.5	0.0	CPI	-0.706***	0.040	47.7	0.0
Consumption	0.227	0.012	5.4	0.0	Consumption	0.239	0.103	14.1	0.0
Investment	-0.101	-0.412***	97.6	0.0	Investment	-0.038	-0.472***	27.8	0.0
Unemployment rate	0.052	-0.013	0.9	0.4	Unemployment rate	3.450***	-0.351***	981.9	0.0
Short-term interest rate	-0.123***	0.015***	62.6	0.0	Short-term interest rate	-0.022	0.022***	25.6	0.0
Long-term interest rate	-0.301***	0.037***	61.6	0.0	Long-term interest rate	-0.136***	0.021***	9.8	0.0
France					Germany				
Output	0.570***	-0.463***	25.4	0.0	Output	0.689**	-0.451***	4.4	0.0
Industrial production	-0.009	-0.998***	75.4	0.0	Industrial production	1.902***	-1.272***	42.1	0.0
CPI	0.889***	-0.529***	29.0	0.0	CPI	-0.084	0.004	1.0	0.4
Consumption	0.438***	-0.362***	15.8	0.0	Consumption	0.546***	-0.430***	10.3	0.0
Investment	0.012	-0.516***	52.2	0.0	Investment	0.355	-0.735***	94.3	0.0
Unemployment rate	2.657***	-0.326***	592.2	0.0	Unemployment rate	-0.676***	0.049**	18.6	0.0
Short-term interest rate	-0.403***	0.097***	64.3	0.0	Short-term interest rate	-0.055**	0.024***	14.8	0.0
Long-term interest rate	-0.152***	0.022***	11.5	0.0	Long-term interest rate	-0.155***	0.019***	24.5	0.0
Italy					Japan				
Output	-0.297	-0.298***	34.8	0.0	Output	0.789***	-0.849***	35.1	0.0
Industrial production	-0.199	-1.068***	56.7	0.0	Industrial production	1.424***	-1.750***	142.9	0.0
CPI	0.461***	-0.175***	13.7	0.0	CPI	0.015	-0.172***	6.4	0.0
Consumption	-0.225	-0.271***	24.5	0.0	Consumption	0.671***	-0.696***	32.9	0.0
Investment	-1.936***	0.052	27.9	0.0	Investment	-0.755***	-0.811***	198.6	0.0
Unemployment rate	1.466***	-0.209***	60.8	0.0	Unemployment rate	0.323***	-0.092***	31.2	0.0
Short-term interest rate	0.044	0.014	15.2	0.0	Short-term interest rate	0.008	0.028***	15.5	0.0
Long-term interest rate	0.012	0.007	4.7	0.0	Long-term interest rate	-0.045*	0.004	8.3	0.0
Canada					Spain				
Output	-0.209	0.007	2.1	0.1	Output	-0.096	0.143**	8.5	0.0
Industrial production	1.093***	-0.422***	10.5	0.0	Industrial production	-0.442	-0.798***	63.0	0.0
CPI	0.889***	-0.494***	11.6	0.0	CPI	1.099***	-0.465***	10.6	0.0
Consumption	1.539***	-0.548***	10.7	0.0	Consumption	-0.045	0.014	0.0	1.0
Investment	1.716**	-0.782***	109.5	0.0	Investment	-0.192	0.019	0.1	0.9
Unemployment rate	-0.136	0.022	1.3	0.3	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	-0.189***	0.043***	52.2	0.0	Short-term interest rate	-0.003	0.006	0.6	0.6
Long-term interest rate	-0.246***	0.030***	46.2	0.0	Long-term interest rate	-0.014	-0.001	0.7	0.5
Australia					New Zealand				
Output	1.388***	-0.398***	8.5	0.0	Output	2.630***	-0.929***	24.1	0.0
Industrial production	1.907***	-0.836***	44.0	0.0	Industrial production	1.055	-1.116***	62.5	0.0
CPI	1.915***	-0.784***	24.9	0.0	CPI	0.793***	-0.408***	6.5	0.0
Consumption	1.707***	-0.459***	37.5	0.0	Consumption	1.156**	-0.159	20.3	0.0
Investment	3.462***	-0.672***	62.4	0.0	Investment	1.132	-0.174*	1.9	0.1
Unemployment rate	-0.395***	0.034**	28.1	0.0	Unemployment rate	-0.021	-0.000	0.3	0.7
Short-term interest rate	0.058	-0.014	1.6	0.2	Short-term interest rate	-0.231***	0.044***	13.2	0.0
Long-term interest rate	-0.257***	0.024**	30.5	0.0	Long-term interest rate	-0.247***	0.021	26.5	0.0
Netherlands					Norway				
Output	0.353*	-0.101	1.6	0.2	Output	2.075***	-1.149***	42.6	0.0
Industrial production	1.619***	-1.315***	33.9	0.0	Industrial production	-1.532***	-0.578***	30.2	0.0
CPI	0.031	-0.047	0.5	0.6	CPI	1.929***	-1.044***	21.3	0.0
Consumption	0.125	0.040	1.1	0.3	Consumption	3.140***	-0.973***	36.6	0.0
Investment	-0.108	0.056	0.1	0.9	Investment	0.982*	-0.082	1.8	0.2
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	-0.024	0.016**	2.1	0.1	Short-term interest rate	-0.132***	0.037***	6.6	0.0
Long-term interest rate	-0.096**	-0.000	27.6	0.0	Long-term interest rate	-0.226***	0.022*	25.3	0.0
Sweden					Switzerland				
Output	1.682***	-0.678***	7.1	0.0	Output	1.527***	-0.739***	15.3	0.0
Industrial production	0.817	-0.891***	36.7	0.0	Industrial production	2.783***	-1.081***	53.6	0.0
CPI	1.107***	-0.800***	76.1	0.0	CPI	0.381***	-0.759***	20.6	0.0
Consumption	2.192***	-0.907***	50.0	0.0	Consumption	1.728***	-1.107***	106.9	0.0
Investment	1.854**	-0.574***	15.2	0.0	Investment	1.129**	-0.644***	8.2	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	-0.437***	0.032***	179.3	0.0	Short-term interest rate	-0.048***	0.005	11.8	0.0
Long-term interest rate	-0.247***	0.025***	53.2	0.0	Long-term interest rate	-0.112***	0.032***	18.1	0.0
Euro Zone									
Output	0.261	-0.382**	3.3	0.0					
Industrial production	0.806	-1.313***	39.7	0.0					
CPI	1.272***	-0.697***	5.3	0.0					
Consumption	0.014	-0.231**	4.1	0.0					
Investment	-0.501	-0.257*	3.7	0.0					
Unemployment rate	1.653***	-0.147***	56.1	0.0					
Short-term interest rate	N/A	N/A	N/A	N/A					
Long-term interest rate	N/A	N/A	N/A	N/A					

Table A.2. Continued

	α	β	F	p-value		α	β	F	p-value
Turkey					Argentina				
Output	5.993***	-1.775***	27.2	0.0	Output	2.822***	-0.549***	8.7	0.0
Industrial production	6.384***	-1.820***	42.8	0.0	Industrial production	3.482***	-0.989***	20.8	0.0
CPI	18.258***	-2.369***	260.6	0.0	CPI	11.058***	-0.928***	65.0	0.0
Consumption	4.293***	-1.519***	31.8	0.0	Consumption	2.352***	-0.278*	4.4	0.0
Investment	6.271***	-1.528***	10.0	0.0	Investment	6.233***	-0.604***	4.5	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	3.242***	-0.150***	110.1	0.0	Short-term interest rate	1.390**	-0.104*	2.6	0.1
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	N/A	N/A	N/A	N/A
Brazil					Chile				
Output	2.313**	-0.732***	4.7	0.0	Output	1.097	-0.294**	3.7	0.0
Industrial production	5.097***	-1.927***	35.9	0.0	Industrial production	-1.786	0.195	3.6	0.0
CPI	4.174***	-0.563***	20.9	0.0	CPI	2.806***	-0.853**	5.2	0.0
Consumption	-0.217	0.087	0.4	0.7	Consumption	4.246***	-0.665***	14.0	0.0
Investment	4.028**	-0.975***	14.5	0.0	Investment	3.047**	-0.376**	3.3	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	-0.372*	0.037**	4.5	0.0	Short-term interest rate	0.354***	-0.043*	7.0	0.0
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	N/A	N/A	N/A	N/A
Colombia					Mexico				
Output	3.536***	-0.746***	61.0	0.0	Output	1.515**	-0.721***	20.0	0.0
Industrial production	6.142***	-1.875***	39.1	0.0	Industrial production	1.259**	-0.919***	76.6	0.0
CPI	1.026***	-0.248***	7.2	0.0	CPI	3.179***	-0.741***	39.9	0.0
Consumption	2.229***	-0.467***	21.0	0.0	Consumption	2.069**	-0.781***	10.3	0.0
Investment	7.024***	-0.615***	17.8	0.0	Investment	0.894	-0.497***	9.8	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	N/A	N/A	N/A	N/A	Short-term interest rate	-0.089*	0.026***	6.0	0.0
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	N/A	N/A	N/A	N/A
Peru					Venezuela				
Output	5.679***	-0.990***	44.0	0.0	Output	2.355	-0.661*	2.0	0.1
Industrial production	12.040***	-2.513***	24.5	0.0	Industrial production	5.635**	-2.136***	8.8	0.0
CPI	3.825***	-1.415***	23.3	0.0	CPI	9.879***	-0.323**	8.1	0.0
Consumption	4.287***	-0.751***	25.4	0.0	Consumption	2.570***	-0.319**	3.4	0.0
Investment	5.251***	-0.444*	4.8	0.0	Investment	0.682	0.194	1.4	0.2
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	N/A	N/A	N/A	N/A	Short-term interest rate	2.042***	-0.123**	16.7	0.0
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	N/A	N/A	N/A	N/A
Taiwan					Hong Kong				
Output	6.560***	-1.499***	67.6	0.0	Output	4.376***	-1.236***	49.4	0.0
Industrial production	13.972***	-2.708***	62.7	0.0	Industrial production	-3.400***	1.871***	49.1	0.0
CPI	0.830***	-0.854***	69.5	0.0	CPI	-0.696***	-0.117**	28.2	0.0
Consumption	1.338***	-0.455***	22.3	0.0	Consumption	3.572***	-1.075***	36.6	0.0
Investment	5.229***	-1.625***	60.0	0.0	Investment	0.436	-0.460**	10.0	0.0
Unemployment rate	0.982***	-0.232***	15.1	0.0	Unemployment rate	0.075	-0.059***	28.4	0.0
Short-term interest rate	-0.200***	0.010	101.6	0.0	Short-term interest rate	-0.399***	-0.035**	152.8	0.0
Long-term interest rate	0.099**	-0.114***	65.8	0.0	Long-term interest rate	-2.697***	0.079*	352.4	0.0
India					Indonesia				
Output	8.004***	-1.186***	21.6	0.0	Output	2.046**	-0.491***	7.5	0.0
Industrial production	3.900***	-0.663***	10.7	0.0	Industrial production	4.561***	-1.398***	60.0	0.0
CPI	3.284***	-0.445***	12.9	0.0	CPI	8.017***	-0.694***	18.7	0.0
Consumption	N/A	N/A	N/A	N/A	Consumption	2.636***	-0.606***	13.4	0.0
Investment	7.817***	-0.851***	14.6	0.0	Investment	0.625	-0.261*	3.2	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	0.317***	-0.045***	4.5	0.0	Short-term interest rate	-1.158*	0.184***	14.8	0.0
Long-term interest rate	2.317***	-0.356***	80.3	0.0	Long-term interest rate	-1.074**	-0.120*	295.4	0.0
South Korea					Malaysia				
Output	5.084***	-1.133***	26.1	0.0	Output	5.391***	-1.084***	25.9	0.0
Industrial production	14.227***	-2.218***	83.5	0.0	Industrial production	6.653***	-1.272***	49.8	0.0
CPI	2.392***	-0.793***	17.3	0.0	CPI	2.279***	-0.924***	41.0	0.0
Consumption	4.186***	-1.211***	30.1	0.0	Consumption	4.046***	-0.627***	8.6	0.0
Investment	2.431***	-0.946***	28.9	0.0	Investment	3.070	-0.860***	7.7	0.0
Unemployment rate	1.253***	-0.275***	35.2	0.0	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	-0.300***	0.055***	11.6	0.0	Short-term interest rate	0.611***	-0.284***	277.0	0.0
Long-term interest rate	0.496***	-0.117***	15.9	0.0	Long-term interest rate	-0.214	-0.273***	819.4	0.0
Philippines					China				
Output	8.789***	-1.539***	146.0	0.0	Output	6.293***	-0.628***	59.9	0.0
Industrial production	21.242***	-3.146***	123.0	0.0	Industrial production	10.077***	-0.802***	25.3	0.0
CPI	3.634***	-1.025***	15.2	0.0	CPI	1.076***	-0.664***	140.4	0.0
Consumption	-0.678	0.257*	17.8	0.0	Consumption	8.242***	-0.964***	878.4	0.0
Investment	21.479***	-2.862***	47.6	0.0	Investment	11.604***	-1.014***	323.5	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	0.098	-0.412***	47.3	0.0	Short-term interest rate	N/A	N/A	N/A	N/A
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	-1.728***	-0.248***	8795.0	0.0

Table A.2. Continued

	α	β	F	p-value		α	β	F	p-value
Singapore					Thailand				
Output	7.388***	-1.403***	50.9	0.0	Output	3.673***	-1.073***	45.8	0.0
Industrial production	13.030***	-2.190***	25.7	0.0	Industrial production	7.827***	-1.631***	46.5	0.0
CPI	1.172***	-0.722***	21.6	0.0	CPI	2.240***	-0.784***	27.0	0.0
Consumption	6.424***	-1.485***	33.7	0.0	Consumption	2.035***	-0.742***	22.8	0.0
Investment	2.625**	-0.502**	3.3	0.0	Investment	-3.072*	-0.266	18.1	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	0.394***	-0.555***	127.2	0.0	Short-term interest rate	1.646***	-0.747***	64.2	0.0
Long-term interest rate	-1.297	-0.212	904.7	0.0	Long-term interest rate	2.069***	-0.558***	129.5	0.0
Russia					Bulgaria				
Output	1.305*	-1.007***	13.2	0.0	Output	0.315	-0.746***	11.0	0.0
Industrial production	4.404***	-1.995***	58.4	0.0	Industrial production	2.389**	-2.110***	33.8	0.0
CPI	8.152***	-0.867***	17.6	0.0	CPI	0.685	-0.450***	5.0	0.0
Consumption	5.181***	-1.139***	16.5	0.0	Consumption	0.515	-1.074***	8.9	0.0
Investment	3.087***	-1.129***	15.5	0.0	Investment	-8.768***	0.630**	27.6	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	N/A	N/A	N/A	N/A	Short-term interest rate	N/A	N/A	N/A	N/A
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	N/A	N/A	N/A	N/A
Slovakia					Estonia				
Output	2.667***	-1.237***	17.5	0.0	Output	-0.497	-0.672***	12.7	0.0
Industrial production	5.359***	-1.210***	14.8	0.0	Industrial production	6.231***	-1.850***	34.2	0.0
CPI	0.105	-0.255	5.3	0.0	CPI	2.515***	-0.872***	12.4	0.0
Consumption	-0.421*	-0.416***	21.6	0.0	Consumption	-1.276	-0.623***	16.1	0.0
Investment	3.355**	-1.998***	11.5	0.0	Investment	-4.188*	-0.117	2.8	0.1
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	-0.008	-0.061***	31.1	0.0	Short-term interest rate	N/A	N/A	N/A	N/A
Long-term interest rate	0.151	-0.012	3.8	0.0	Long-term interest rate	N/A	N/A	N/A	N/A
Latvia					Hungary				
Output	-1.211*	-0.463***	11.0	0.0	Output	0.144	-0.889***	14.2	0.0
Industrial production	2.219*	-1.452***	42.5	0.0	Industrial production	4.543***	-2.003***	58.5	0.0
CPI	0.782*	-0.375***	3.9	0.0	CPI	-1.305**	0.190	4.5	0.0
Consumption	-0.662	-1.022***	41.5	0.0	Consumption	-1.155***	-0.308**	7.9	0.0
Investment	-5.328**	0.108	3.6	0.0	Investment	-0.916	-0.680***	9.9	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	N/A	N/A	N/A	N/A	Short-term interest rate	-0.428***	0.085***	12.2	0.0
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	-0.735***	0.146***	14.2	0.0
Lithuania					Croatia				
Output	0.498	-0.856***	15.8	0.0	Output	-1.396***	-1.042***	42.6	0.0
Industrial production	3.005***	-1.443***	38.6	0.0	Industrial production	-1.689***	-1.348***	35.1	0.0
CPI	1.013**	-0.413***	3.9	0.0	CPI	0.679	-0.494***	10.7	0.0
Consumption	-0.488	-0.570***	11.3	0.0	Consumption	-0.076	-0.413	1.3	0.3
Investment	-0.663	-0.865***	10.5	0.0	Investment	-7.266***	0.648*	47.6	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	N/A	N/A	N/A	N/A	Short-term interest rate	N/A	N/A	N/A	N/A
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	N/A	N/A	N/A	N/A
Slovenia					Romania				
Output	0.190	-1.476***	18.5	0.0	Output	0.320	-0.518*	1.9	0.2
Industrial production	2.606***	-2.437***	41.2	0.0	Industrial production	5.936***	-1.546***	32.6	0.0
CPI	1.488***	-0.901***	15.3	0.0	CPI	0.426	-0.142	1.0	0.4
Consumption	-0.412	-0.571***	24.1	0.0	Consumption	1.236***	-1.051***	6.5	0.0
Investment	-5.092***	-1.011***	16.5	0.0	Investment	-5.745**	-0.595	15.1	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	N/A	N/A	N/A	N/A	Short-term interest rate	N/A	N/A	N/A	N/A
Long-term interest rate	N/A	N/A	N/A	N/A	Long-term interest rate	N/A	N/A	N/A	N/A
Poland					Ukraine				
Output	2.660***	-0.854***	43.9	0.0	Output	-3.084***	-0.680**	16.4	0.0
Industrial production	6.978***	-1.781***	82.5	0.0	Industrial production	-2.812**	-1.587***	27.5	0.0
CPI	-1.928***	0.615***	9.8	0.0	CPI	11.274***	-0.804***	8.3	0.0
Consumption	0.687**	-0.279***	6.8	0.0	Consumption	-0.997	-0.321	2.1	0.1
Investment	2.624***	-0.777***	26.6	0.0	Investment	-11.767***	-0.318	17.0	0.0
Unemployment rate	N/A	N/A	N/A	N/A	Unemployment rate	N/A	N/A	N/A	N/A
Short-term interest rate	0.032	0.019	10.7	0.0	Short-term interest rate	N/A	N/A	N/A	N/A
Long-term interest rate	-0.207*	0.038*	1.8	0.2	Long-term interest rate	N/A	N/A	N/A	N/A

Note: The results are from the OLS regression. Median forecast error is regressed on constant and median forecast. Sample size varies between countries and indicators. ***, **, * indicate the level of statistical significance at 1, 5, and 10 percent levels, respectively.

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