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Sune Karlsson, Stepan Mazur and Mariya Raftab

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Örebro University School of Business
SE-701 82 Örebro, Sweden

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Sune Karlsson, Stepan Mazur, and Mariya Raftab

Unit of Statistics, School of Business, Örebro University, 70182 Örebro, Sweden

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Abstract

This paper focuses on identifying useful indicators for nowcasting GDP in Sweden. We analyze 35 monthly indicators spanning the period from 1993 to 2023. Additionally, we evaluate the group-wise performance of these indicators. The analysis is conducted using mixed-data sampling (MIDAS) and mixed-frequency VAR models in both individual and pooled setups for nowcasting. While the primary focus is on nowcasting, we also assess the performance of the indicators for backcasting and forecasting. For nowcasting, we identify 16 indicators in the individual setup and 23 indicators in the pooled setup that outperform the benchmark. Group-wise, indicators belonging to the survey, interest & exchange rates, and public finance groups exhibit strong performance in the individual setup. Notably, in the pooled setup, the output, survey, price, interest & exchange rates, and public finance groups demonstrate strong performance.

Keywords: Nowcasting, Swedish GDP, MIDAS, Mixed-frequency VAR

1 Introduction

It is beneficial to society if economic developments are smooth and we accordingly have policymakers who try to achieve this through stabilization policies. The two main types of such policies are monetary policy and fiscal policy. A common feature of these policies is that they affect the economy with a lag and, accordingly, that they should be based on forecasts to be as effective as possible. In addition, key macroeconomic variables such as GDP are published with a lag and both the future and current state of the economy is unknown.[1] Predictions or estimates of both the current and future state of the economy are thus needed.

This paper focuses on predicting or "nowcasting" GDP. Data on GDP and GDP growth in Sweden, as well as many other countries, is only available with a quarterly frequency. At the same time there are many variables or indicators published with a higher frequency, monthly, weekly or daily, which becomes available before the official GDP data is published and are informative about the development of GDP.

[1] It should be noted that Statistics Sweden publishes a monthly "GDP indicator" that is available with a one-month delay.

This leads to a mixed-frequency setup where higher frequency (monthly) data is used to forecast, nowcast and even "backcast" the quarterly GDP.[2]

A growing body of literature has developed various approaches to address the challenges associated with mixed-frequency data. Notably, following the pioneering work of Ghysels et al. (2005, 2006, 2007) and Clements and Galvão (2008), there has been a substantial expansion in the adoption of MIDAS techniques for macroeconomic forecasting. Extensive research in macroeconomics has demonstrated that MIDAS models enhance economic forecasts by effectively integrating variables from different frequencies, particularly during volatile periods, as evidenced by Kuzin et al. (2013), den Reijer and Johansson (2019), Laine and Lindblad (2021), Chow et al. (2023). A related literature has instead addressed the issue of different frequencies by modeling it as missing observations within a state-space framework, utilizing mixed-frequency vector auto-regressive models (MF-VAR) (see Mariano and Murasawa (2003), Mariano and Murasawa (2010), Ghysels (2012), Kuck and Schweikert (2021), Marcellino and Sivec (2021)). It is widely recognized that pooling forecasts from multiple models enhances both the reliability and accuracy of predictions, as demonstrated by Jacobson and Karlsson (2004), Timmermann (2006), Eklund and Karlsson (2007), Andersson and Karlsson (2009), Kuzin et al. (2013), den Reijer and Johansson (2019), Chow et al. (2023). The aforementioned forecasting models accommodate data with mixed frequencies and publication delays, each exhibiting distinct features. This diversity complicates their theoretical ranking and underscores the need for rigorous empirical comparisons to evaluate their relative performance in a particular context.

Studies on nowcasting with mixed-frequency data are relatively limited in the Swedish context. den Reijer and Johansson (2019) employed Factor MIDAS and Factor VAR models to nowcast Swedish GDP. This study evaluated individual model forecasts and pooled forecasts over two distinct periods: before (2003Q3–2007Q4) and after (2008Q1–2014Q2) the financial crisis. Similarly, Ankargren and Lindholm (2021) examined the performance of various forecasting models for nowcasting Swedish GDP growth. This analysis utilized dynamic factor models, bridge equations, and unrestricted MIDAS regressions, relying on Swedish data spanning the pre-Covid period (2010–2019) and a limited evaluation of the Covid period (2020Q2 and Q3). It further explored how model sizes and the inclusion of international variables influenced forecasting performance. Importantly, those findings underscored the heightened demand for timely data during the Covid pandemic to effectively capture economic fluctuations.

The primary contribution of this paper lies in comparing the performance of various monthly indicators within a mixed-frequency framework to nowcast GDP growth in Sweden. In the same fashion as Kuzin et al. (2011), we do this using single-indicator MIDAS and MF-VAR models. To assess the effectiveness of various indicators, we use relative mean squared forecasting errors (MSFEs). The performance of individual nowcasts from different models is then evaluated in both individual and pooled setups. Although the primary focus is on nowcasting, the performance of the indicators is also evaluated for backcasting and forecasting. We consider 35 monthly indicators for the period from 1993 to 2023, which were collected from two sources: Statistics Sweden (SCB) and the National Institute of Economic Research

[2]The need for backcasting arises as GDP is released with a delay, at the end of the second month of the following quarter for Sweden. A better estimate than the latest nowcast can then be made by utilizing information that becomes available in the beginning of the quarter to "forecast" the past quarter.

(NIER). The focus is on the evaluation period from 2003Q1 to 2023Q3. Additionally, in the appendix, we examine the pre-covid (2003Q1 to 2018Q4) Covid/post-Covid (2019Q1 to 2023Q3) subperiods.. The effect of publication delays, as well as the group-wise performance of the indicators, are also considered.

Our main findings can be summarized as follows. We identify 16 indicators in the individual setup and 23 indicators in the pooled setup that outperform the benchmark. A group-wise analysis reveals that indicators from the survey, interest & exchange rates, and public finance groups consistently exhibit strong performance in the individual setup. In the pooled setup, indicators from the output, survey, price, interest & exchange rates, and public finance groups demonstrate particularly strong performance, highlighting the enhanced nowcasting capabilities when these groups are considered. Overall, it is also worth nothing that the timeliness of the indicators matter.

The structure of the paper is as follows. Section 2 outlines the econometric framework, with a focus on the MIDAS and MF-VAR models, including their estimation and forecasting methodologies. Section 3 details the dataset and the nowcasting design, followed by an evaluation of the indicators based on single-indicator models and their forecast pooling performance. Finally, Section 4 summarizes the key findings and presents the concluding remarks.

2 Econometric Framework

In this section, we discuss the econometric framework for nowcasting and forecasting GDP growth in Sweden using mixed-frequency data. In what follows, we assume that $y_{t_q} = \ln Y_{t_q} - \ln Y_{t_q-1}$ represents the quarterly GDP growth with the quarterly time index $t_q = 1, 2, \ldots, T_q^y$, where T_q^y denotes the last quarter for which GDP data is available. Note that the quarterly GDP growth can also be represented at a monthly frequency using the monthly time index t_m, by defining $y_{t_m} = y_{t_q}$ for each $t_m = 3t_q$. Therefore, since GDP growth is released quarterly, y_{t_m} is observable at $t_m = 3, 6, 9, \ldots, T_m^y$ with $T_m^y = 3T_q^y$. Let x_{t_m} be the monthly indicator(s) with the time index $t_m = 1, 2, \ldots, T_m^x$, where T_m^x is the last month for which the data is available. For simplicity, we consider econometric models with one monthly indicator; however, the generalization to the case of multiple monthly indicators is straightforward. Therefore, the overall goal is to deliver nowcasts and forecasts of GDP growth h_q quarters ahead and $h_m = 3h_q$ months ahead by utilizing all the information up to the month T_m^x. These nowcasts and forecasts will be denoted by $y_{T_m^y+h_m|T_m^x}$.

Now, we proceed to the specification of models such as MIDAS and MF-VAR, along with their estimation and forecasting methods.

2.1 MIDAS

The MIDAS approach Ghysels et al. (2007) can in many ways be seen as a generalization of the bridge equation approach. It models the quarterly data as a function of its own past and a weighted average of the available monthly data. The monthly data can be utilized up to the last available observation, for example for more recent dates than the quarterly data. The weights are typically taken to follow an Almon lag polynomial, thereby providing larger weights to recent observations, leading to estimation by non-linear least squares. In a forecasting context, different models – with leads of the dependent variable - are typically used for each forecast horizon leading to so called direct forecasts. We will now discuss the aforementioned points in more detail.

The MIDAS regression model with a forecasting horizon of h_q quarters, where $h_q = h_m/3$, is expressed as

$$y_{t_q+h_q} = y_{t_m+h_m} = \beta_0 + \beta_1 B(L_m;\theta) x_{t_m+w} + \epsilon_{t_m+h_m}, \tag{1}$$

where $\epsilon_{t_m+h_m}$ is an error term that follows a normal distribution with a zero mean and covariance σ^2; $w = T_m^x - T_m^y$ is the offset between the last month and the last quarter for which data is available; $B(L_m;\theta)$ is a lag polynomial given by

$$B(L_m;\theta) = \sum_{k=0}^{K} C(k;\theta) L_m^k \tag{2}$$

with the lag coefficients $C(k;\theta)$ and the monthly lag operator L_m^k such that $L_m^k x_{t_m} = x_{t_m-k}$. We also set the maximum number of lags K to be 12. The parameter vector θ of the lag polynomial contains a limited set of parameters to avoid overparameterization. Ghysels et al. (2006) discussed various functional forms for $C(k;\theta)$ and found that the exponential Almon lag is a quite flexible candidate to work with. Following Clements and Galvão (2008) and Kuzin et al. (2011), we consider the Almon lag weighting scheme with $\theta = (\theta_1, \theta_2)$ such that $\theta_1 < 5$ and $\theta_2 < 0$, and the lagged coefficients given by

$$C(k;\theta) = \frac{\exp(\theta_1 k + \theta_2 k^2)}{\sum_{k=0}^{K} \exp(\theta_1 k + \theta_2 k^2)}. \tag{3}$$

To estimate the parameters of the MIDAS regression model in (1), we use the non-linear least squares method as in Marcellino and Schumacher (2010); Kuzin et al. (2011). This gives us the estimated coefficients $\hat{\beta}_0$, $\hat{\beta}_1$, $\hat{\theta}_1$ and $\hat{\theta}_2$, which are used to generate the forecast as follows

$$\hat{y}_{T_m^y+h_m|T_m^x} = \hat{\beta}_0 + \hat{\beta}_1 B(L_m;\hat{\theta}) x_{T_m^x}. \tag{4}$$

Let us note that the MIDAS forecast is time-dependent and must be re-estimated for multi-step forecasts or when new data becomes available. For instance, monthly updates to the indicator and quarterly GDP releases require monthly re-estimation.

2.1.1 AR-MIDAS

The MIDAS regression model can be extended by integrating autoregressive terms. This is particularly beneficial in economic forecasting, as lagged values of the variable of interest may contain useful predictive information. Following Clements and Galvão (2008), we consider the MIDAS-AR model defined as

$$y_{t_m+h_m} = \beta_0 + \lambda y_{t_m} + \beta_1 B(L_m;\theta)(1 - \lambda L_m^{h_m}) x_{t_m+w} + \epsilon_{t_m+h_m}, \tag{5}$$

where λ is the autoregressive coefficient.

The autoregressive coefficient λ is estimated under a common-factor restriction (Ghysels et al. (2007); Clements and Galvão (2008)). This restriction particularly ensures a smooth impulse response function. Then, λ is estimated using non-linear least squares method along with the other coefficients.

2.2 MF-VAR

In the missing data or state-space approach – often in the form of MF-VARs Schorfheide and Song (2015) – a latent variable at the monthly frequency is tied to the observable quarterly variable through an aggregation constraint. The model is then formulated as a state space model at the monthly frequency, using data up to the last availably monthly observation. As a dynamic model for all the variables, observed and unobserved, forecasts are easily obtained by iterating the model using the Kalman filter.

Let $y^*_{t_m}$ be the unobserved monthly growth rate. As is standard in the literature we follow Mariano and Murasawa (2003) and write the quarterly growth rates as a linear function of the monthly growth rates,

$$y_{t_m} = \frac{1}{3}y^*_{t_m} + \frac{2}{3}y^*_{t_m-1} + y^*_{t_m-2} + \frac{2}{3}y^*_{t_m-3} + \frac{1}{3}y^*_{t_m-4} \tag{6}$$

with $t_m = 3, 6, 9, \ldots, T^y_m$.[3] To capture the joint dynamics between latent monthly GDP growth $y^*_{t_m}$ and the corresponding monthly indicator x_{t_m} using past observations, we will employ a bivariate VAR(p) process. For that, let $\mu^*_y = E(y^*_{t_m})$ and $\mu_x = E(x_{t_m})$. Then, we assume that

$$\Phi(L_m) z_{t_m} = u_{t_m} \quad \text{with} \quad z_{t_m} = \begin{pmatrix} y^*_{t_m} - \mu^*_y \\ x_{t_m} - \mu_x \end{pmatrix}, \tag{7}$$

where u_{t_m} is an error term that follows a bi-variate normal distribution with a zero mean vector and a positive definite covariance matrix Σ, and $\Phi(L_m) = I - \sum_{i=1}^{p} \Phi_i L^i_m$ represents a lag polynomial. The maximum number of lags is set to $p = 4$, and the Bayesian Information Criterion (BIC) is then used to determine the appropriate lag order.

The state-space representation of the MF-VAR model is given by

$$s_{t_m+1} = D s_{t_m} + E v_{t_m}, \tag{8}$$

$$\begin{pmatrix} y_{t_m} - \mu_y \\ x_{t_m} - \mu_x \end{pmatrix} = F s_{t_m}, \tag{9}$$

with $\mu_y = E(y_{t_m})$ such that $\mu_y = 3\mu^*_y$, the state vector $s_{t_m} = (z^\top_{t_m}, \ldots, z^\top_{t_m-4})^\top$, and the error term v_{t_m} that follows a bivariate normal distribution with a zero mean vector and an identity covariance matrix. The system matrices D and E contains the unknown parameters to be estimated

$$D = \begin{pmatrix} D_1 \\ D_2 \end{pmatrix}, \quad D_1 = \begin{pmatrix} \Phi_1 \ldots \Phi_p \, 0_{2\times 2(5-p)} \end{pmatrix}, \quad D_2 = \begin{pmatrix} I_8 \, 0_{8\times 2} \end{pmatrix}, \quad E = \begin{pmatrix} \Sigma^{1/2} \\ 0_{8\times 2} \end{pmatrix},$$

and

$$F = \begin{pmatrix} \frac{1}{3} & 0 & \frac{2}{3} & 0 & 1 & 0 & \frac{2}{3} & 0 & \frac{1}{3} & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

enforces the aggregation constraint (6).

Following Kuzin et al. (2011), the estimation of parameters in the state-space model given in (8) and (9) is based on the EM algorithm. For simplicity the data is demeaned prior to estimation. The issue of missing observations is addressed as

[3] Note that (6) is an approximate relationship that works well for slowly moving variables like GDP. We use it here as it facilitates the use of a linear Kalman filter.

proposed by Mariano and Murasawa (2003, 2010). First, missing values are replaced with zeros, assuming they are sampled from a standard normal distribution. Second, equation (9) is modified by setting the upper row of the matrix F to zero and adding a standard normal error term for the first two months of each quarter. Finally, after estimation, GDP growth is forecasted with the help of the Kalman smoother and the mean is added back.

3 Empirical Analysis

3.1 Data

The dataset used in this analysis consists of quarterly GDP growth data for Sweden, alongside 35 monthly indicators. The quarterly GDP growth data spans from 1993Q1 to 2023Q3, while the monthly indicators cover the period from 1993M1 to 2024M1. The monthly indicators include a variety of variables, encompassing those related to output, trade, surveys, construction cost, prices, transportation, exchange and interest rates, and public finance. The data is sourced from SCB (Statistics Sweden) and NIER (National Institute of Economic Research, Sweden). Most of the collected data is not seasonally adjusted. To account for seasonal fluctuations and improve forecast accuracy, the X-12 ARIMA method was applied. Several transformations, including differencing and log transformations, were applied to address stationarity issues. It is also important to note that outliers were not removed from the dataset. Additional information regarding the dataset, including detailed descriptions of the variables, is provided in the Appendix.

The collected dataset is a final dataset, in contrast to real-time data, which typically consists of multiple vintages reflecting historical revisions of how data appeared at different points in time before updates. Unlike real-time data, our dataset presents a consistent view, free from such revisions. There are also many studies showing that data revisions do not significantly affect forecast accuracy, e.g., Rusnák (2013); Franta et al. (2016). However, we account for the fact that GDP growth and monthly indicators in this dataset are released at different times according to the publication calendar, resulting in missing data at the end of the sample, often referred to as ragged-edge data. The varying publication delays across the series lead to an unbalanced dataset. Ignoring these imbalances may adversely affect the results, such as forecast accuracy Girardi et al. (2016). Since the dataset was downloaded in the first week of February 2024, only the February 2024 vintage was used for the analysis, rather than multiple historical revisions. The methodology for evaluating back-, now- and forecasting involves conducting a pseudo-real-time nowcast exercise, simulating the data available each month within a quarter, accounting for these missing patterns Rünstler et al. (2009). Pseudo-real-time datasets are created by selecting only the data available at the time of each forecasting period, enhancing the robustness of the results. Furthermore, it is assumed that the ragged-edge structure in the February 2024 vintage of the data remains consistent throughout the sample period.

3.2 Design of Back-, Now- and Forecasting

The full sample period is divided into estimation and evaluation periods. The estimation period spans from 1993Q1 to 2002Q4. As new data becomes available, the estimation sample is recursively expanded to incorporate the latest data points, enabling the model to update its parameters for better fit and more accurate forecasting.

The evaluation period runs from 2003Q1 to 2023Q3. Within this evaluation period, we generate backcasts for the previous quarter, nowcasts for the current quarter, and forecasts for the following two quarters using only data that would have been available at the beginning of each month. When reporting the results the forecast horizons are relative to the month the prediction is made. For example, in 2004M1 predictions are made for GDP growth in 2003Q4, 2004Q1, 2004Q2 and 2004Q3. These are labeled as horizon -1 (backcast), 3 (nowcast), 6 and 9 (forecast). At the beginning of 2004M2 predictions are again made for 2003Q4, 2004Q1, 2004Q2 and 2004Q3 labeled as horizon -2 (backcast), 2 (nowcast), 5 and 8 (forecast). In the beginning of 2004M3 we stop backcasting as GDP for 2003Q4 is now available and predictions are made for 2004Q1, 2004Q2 and 2004Q3 labeled as horizon 1 (nowcast), 4 and 7 (forecast). In 2004M4, the quarters to predict for are moved up and predictions are made for 2004Q1, 2004Q2, 2004Q3 and 2004Q4.

In the Appendix, we further examine the evaluation sample periods from 2003Q1 to 2018Q4 (pre-pandemic) and from 2019Q1 to 2023Q3 (post-pandemic), as outlined by den Reijer and Johansson (2019); Chow et al. (2023).

3.3 Single Indicator Models

We begin the analysis by evaluating the forecasting performance of single indicator mixed-frequency models. Table 1a and 1b present the relative MSFEs of these models for quarterly GDP growth. The relative MSFE is calculated as the ratio of a single model's MSFE to that of the benchmark, which is a recursively estimated AR model with the lag length determined by the BIC. The baseline AR model shows limited performance across most horizons, highlighting the advantages of the MIDAS and MF-VAR models, which provide more accurate forecasts. The performance of the indicators over all horizons varies by framework, with some performing better in the MF-VAR setup and others in the MIDAS framework. Overall, no single indicator consistently outperforms across all models. However, turning to the nowcasting evaluation, which is of primary interest, we can observe the strong performance of the IM, RTI, ECOTEN, PPICA, SEKEU, and SEKUSD indicators across all models. The predictive accuracy of these indicators is reaffirmed by examining the percentages of the single-indicator models. The results, showcased in Table 2, highlight that these indicators have robust predictive power, with 100% of the models having relative MSFEs less than 1.

To get more robust measure of the performance of the indicators which does not depend on a specific models ability to capture the information in the indicator, we calculate the average relative MSFEs, as shown in Table 3. This is done by averaging the relative MSFEs of the three models for a given indicator and horizon. In general, across all horizons, many indicators demonstrate strong performance. Particularly noteworthy among them are the IPI(INV), IM, EX, CONSCON, MANFCON, SEKEU, and SEKUSD indicators. In the context of nowcasting, 16 out of 35 indicators outperform the benchmark across all nowcasting horizons. Here, we can observe that the timeliness, release cycle, and informativeness of monthly indicators are key drivers. When evaluating the effect of the timeliness of the indicators it should be noted that the delays shown in Table 8 is relative to the month the statistics refer to. That is, when forecasts are made at the beginning of the first month of the quarter (nowcasts with horizon 3) we have data for the last month of the previous quarter if the delay is zero, for the second month of the previous quarter if the delay is 1, for the first month if the delay is 2 and only data relating to the quarter before the previous quarter if the delay is 3. Similarly, when the final nowcast (horizon 1) is made at the beginning of the third month we have data on the first two months of the current quarter when the delay is zero, the first month when the delay is 1, the whole previous quarter when the delay is 2 and the first two months of the previous quarter when the delay is 3. For the most timely indicators, survey and Exchange & Interest rates, the indicators improve on the benchmark for all nowcast horizon – and more so as we move forward in the quarter. The gain is substantial for the survey indicators with a relative MSFE as low as 0.5 at horizon 1 for ECOTEN. Turning to the next most timely indicator groups, price indexes, construction cost indexes and the single indicators CARPASS and GOVTDE, we see little or no gain for the horizon 3 and 2 nowcasts and large gains – in particular for the construction cost indexes – for the horizon 1 nowcasts when there is some information on the current quarter. For the least timely indicators, output and trade groups, the nowcast improves on the benchmark at all nowcast horizons for most of the indicators. The improvement is small for horizon 3 and 2 and in many cases substantial for horizon 1 despite not having information on the current quarter.

Furthermore, we evaluate the group-wise performance of indicators by analyzing the average relative MSFEs calculated across indicator groups. Table 4 presents the corresponding results. From this table, we observe the strong performance of groups such as trade, survey, price, and interest & exchange rates across all horizons. For nowcasting across all horizons, three leading groups—survey, interest & exchange rates, and public finance—are clearly identifiable. However, it is also worth noting that for $h_m = 1$, all groups exhibit strong performance.

The performance of the indicators for the pre-pandemic and post-pandemic periods can be found in Tables 9 in the Appendix. It can be noted that, for nowcasting, more indicators outperform the benchmark after the pandemic, compared to both the pre-pandemic period and the full evaluation sample. It is also noteworthy that new releases appear to be beneficial for many indicators.

3.4 Pooling Forecasts

Although single-indicator models can yield accurate forecasts, their reliance on a limited information set often results in suboptimal outcomes. A more robust approach involves pooling forecasts from multiple models, which facilitates the integration of diverse information and reduces model-specific biases. Several studies highlight the benefits of pooling forecasts, particularly in improving nowcasting performance, e.g., Aprigliano et al. (2017); Heinisch and Scheufele (2018); Kuck and Schweikert (2021).

Following Kuzin et al. (2013), we employ the mean pooling method, noting that the other two methods, such as the median and weighted mean, show similar performance. The mean forecast is obtained by averaging the forecasts from all models over the evaluation period, followed by the calculation of the MSFE. In Table 5, we present the relative MSFE of mean pooling within the single indicator model class, compared to the benchmark (a recursively estimated AR model with the lag length determined by the BIC). The pooled forecasts within a single indicator demonstrate varying performance patterns when compared to the benchmark. Comparing the results in Table 5 with those in Table 3, we observe that many more indicators outperform the benchmark across all nowcasting horizons. Specifically, 23 indicators outperform the benchmark in the pooling setup. Additionally, we observe that new releases have more predictive content when pooled. For example, for $h_m = 2$, new releases are beneficial for 27 out of 35 indicators.

Furthermore, we present the percentages of models in terms of MSFE for the mean pooling across all model indicators in Table 7. These values represent the percentage of individual models that outperform the combined forecast. The results clearly demonstrate that the percentile analysis reinforces the effectiveness of the pooling setup, with MSFE percentages consistently below 33% across all horizons. Notably, within the nowcasting horizons, 28 indicators under the pooled framework outperform their corresponding single indicator models. Additionally, for nowcasting, we evaluate the overall performance of indicators within the individual and pooled frameworks by averaging the MSFE across all nowcasting horizons. Figure 1 illustrates this performance. It is evident that the pooled framework consistently outperforms the individual models for each indicator.

We proceed with the group-wise evaluation of the indicators in the pooling setup. For this, we examine the average relative MSFEs of the indicators within each corresponding group, as reported in Table 6. Overall, all groups demonstrate good performance across all horizons. Notably, strong nowcasting performance is observed for the output, survey, price, interest & exchange rates, and public finance groups. The effect of releases is beneficial for all groups except construction cost and transportation.

Finally, the results outlining performance during the post- and pre-crisis periods in the pooled setting are provided in Tables 10 and 11 in the Appendix. Our findings are consistent with those of Chow et al. (2023), who noted that pooling forecasts during financial crises perform better than during non-crisis periods.

4 Conclusion

Timely nowcasts for economies are essential for policymakers to make the best possible decisions. This paper addresses the challenges associated with nowcasting one of the key macroeconomic variables, GDP growth in Sweden. Particular attention was given to identifying useful indicators for nowcasting GDP that are available at a monthly frequency. We assessed the performance of these indicators using single-indicator mixed-frequency models, including MIDAS, AR-MIDAS, and MF-VAR. The methodology for evaluating backcasting, nowcasting, and forecasting involves a recursively conducted pseudo-real-time nowcast exercise.

Our analysis identified 16 indicators in the individual model framework and 23 indicators in the pooled framework that outperform the benchmark, demonstrating their effectiveness in nowcasting GDP growth across all nowcasting horizons. We found that new releases are useful for most indicators, even when the indicators released with delays, and are more dominant in a pooled setup. Namely, we identified 21 indicators in the individual framework and 27 indicators in the pooled framework for which the new release is beneficial. A group-wise assessment reveals that indicators belonging to the survey, interest & exchange rates, and public finance groups consistently exhibit strong predictive performance in the individual setup. In the pooled setup, indicators from the output, survey, price, interest & exchange rate, and public finance groups emerged as particularly effective. These findings align with existing nowcasting literature, which underscores the relevance of these groups in capturing critical macroeconomic signals.

Having identified useful indicators for nowcasting GDP growth in Sweden, we aim to build on these findings for further analysis. Specifically, we plan to explore multiple-indicator mixed-frequency models within both frequentist and Bayesian frameworks, following methodologies outlined in, for example, Eraker et al. (2014), Pan et al. (2019), and Chow et al. (2023). Moreover, building on the work of Karlsson et al. (2023), we will consider distributions that account for fat tails and asymmetry. These advancements will be adapted to the Bayesian MF-VAR framework for nowcasting. Particular focus will be given to nowcasting GDP growth in Sweden.

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Table 1a: The relative MSFEs [relative to the recursively estimated AR model] for the single indicator mixed-frequency models for GDP growth

		Horizon h_m										
Indicator	Model	-2	-1	1	2	3	4	5	6	7	8	9
IPI	MIDAS	**0.61**	**0.71**	**0.68**	1.00	**0.94**	**0.91**	**0.97**	**0.94**	**0.94**	1.00	**0.97**
	AR-MIDAS	**0.61**	**0.72**	**0.75**	1.05	1.00	**0.95**	1.00	**0.95**	**0.95**	1.02	**0.99**
	MF-VAR	**0.51**	**0.64**	**0.71**	1.00	**0.99**	**0.99**	**0.98**	**0.98**	**0.97**	**0.98**	**0.98**
IPI(INS)	MIDAS	**0.86**	**0.93**	**0.76**	1.00	**0.96**	**0.92**	**0.92**	**0.97**	**0.94**	1.00	**0.98**
	AR-MIDAS	**0.88**	**0.93**	**0.79**	**0.97**	1.02	**0.93**	**0.96**	**0.97**	**0.97**	1.00	1.00
	MF-VAR	**0.83**	**0.91**	**0.85**	**0.99**	**0.93**	**0.96**	**0.99**	**0.99**	1.01	1.02	1.02
IPI(INV)	MIDAS	**0.95**	**0.79**	**0.73**	1.09	**0.99**	**0.95**	**0.98**	**0.98**	**0.94**	1.00	**0.97**
	AR-MIDAS	**0.89**	**0.76**	**0.75**	1.08	1.00	**0.97**	1.01	1.01	**0.95**	1.02	**0.99**
	MF-VAR	**0.58**	**0.63**	**0.72**	**0.99**	**0.98**	**0.97**	**0.96**	**0.97**	**0.97**	**0.97**	**0.97**
IPI(IVKON ND)	MIDAS	**0.95**	**0.99**	**0.78**	1.01	1.01	**0.99**	1.02	1.01	**0.98**	1.12	**0.99**
	AR-MIDAS	1.02	1.02	**0.97**	1.03	1.04	1.02	1.04	1.04	1.04	1.13	**0.97**
	MF-VAR	**0.97**	**0.98**	**0.86**	**0.97**	1.04	1.03	**0.97**	1.01	**0.99**	**0.98**	1.00
IPI(IVKON D)	MIDAS	**0.83**	**0.92**	**0.77**	**0.99**	1.02	1.00	**0.97**	**0.97**	**0.97**	1.02	**0.98**
	AR-MIDAS	**0.83**	**0.94**	**0.86**	1.00	1.03	1.01	1.01	1.03	1.00	1.04	1.00
	MF-VAR	**0.85**	**0.93**	**0.83**	**0.98**	**0.98**	**0.98**	**0.99**	**0.99**	**0.99**	**0.97**	**0.96**
MANU	MIDAS	**0.97**	1.02	**0.83**	1.00	**0.97**	**0.96**	**0.99**	**0.97**	1.00	1.04	**0.99**
	AR-MIDAS	**0.98**	1.04	1.05	1.03	1.01	1.03	1.03	1.00	1.02	1.06	1.00
	MF-VAR	1.41	1.21	1.23	1.12	1.22	1.23	1.26	1.37	1.44	1.12	1.13
IM	MIDAS	**0.81**	1.00	**0.89**	**0.95**	**0.95**	**0.93**	**0.94**	**0.99**	**0.98**	**0.96**	**0.98**
	AR-MIDAS	**0.82**	1.03	**0.72**	**0.98**	**0.99**	**0.97**	**0.96**	1.02†	1.00	1.00	**0.99**
	MF-VAR	**0.74**	**0.83**	**0.62**	**0.93**	**0.97**	**0.96**	**0.96**	**0.97**	**0.96**	**0.97**	**0.97**
EX	MIDAS	**0.83**	**0.96**	**0.72**	1.00	1.01	**0.94**	**0.95**	1.02	**0.99**	**0.96**	**0.93**
	AR-MIDAS	**0.84**	**0.96**	**0.70**	1.01	1.04	**0.97**	**0.96**	1.07	1.01	1.00	**0.95**
	MF-VAR	**0.63**	**0.78**	**0.61**	**0.89**	**0.94**	**0.96**	**0.95**	**0.95**	**0.95**	**0.96**	**0.96**
NT	MIDAS	1.12	1.11	**0.81**	1.09	1.25	1.01	**0.99**	1.02	1.17	1.08	1.01
	AR-MIDAS	1.19	**0.99**	1.01	1.14	1.31	1.06	1.17	1.04	1.18	1.11	**0.99**
	MF-VAR	1.28	1.14	1.23	1.08	1.05	1.00	1.03	1.04	1.02	**0.99**	**0.99**
RTI	MIDAS	**0.99**	**0.78**	**0.68**	**0.87**	**0.95**	**0.99**	1.07	1.00	**0.97**	**0.96**	**0.95**
	AR-MIDAS	**0.93**	**0.89**	**0.67**	**0.90**	**0.98**	1.06	1.08	1.01	**0.97**	**0.98**	**0.97**
	MF-VAR	**0.77**	**0.78**	**0.63**	**0.84**	**0.97**	**0.96**	**0.98**	**0.98**	**0.97**	1.01	1.01
TSV	MIDAS	**0.86**	**0.92**	**0.71**	**0.92**	1.03	1.02	**0.98**	**0.96**	**0.94**	**0.95**	**0.96**
	AR-MIDAS	1.11	**0.97**	1.02	**0.97**	1.14	1.12	1.00	1.05	1.02	**0.99**	**0.99**
	MF-VAR	**0.72**	**0.78**	**0.57**	**0.78**	1.04	1.02	1.03	**0.98**	**0.98**	**0.98**	**0.98**
CONSCON	MIDAS	**0.97**	**0.97**	**0.79**	**0.97**	**0.97**	**0.97**	**0.97**	**0.96**	**0.96**	**0.97**	**0.97**
	AR-MIDAS	1.00	1.00	**0.99**	1.00	1.01	1.01	1.00	**0.99**	**0.98**	**0.99**	1.00
	MF-VAR	**0.99**	**0.99**	**0.93**	**0.99**	**0.99**	**0.99**	1.01	1.01	1.01	**0.97**	**0.97**
MANFCON	MIDAS	**0.78**	**0.98**	**0.64**	**0.98**	**0.96**	1.04	1.00	**0.88**	**0.88**	**0.94**	**0.94**
	AR-MIDAS	**0.80**	1.00	**0.73**	1.00	1.00	1.08	**0.98**	**0.90**	**0.89**	**0.93**	1.00
	MF-VAR	**0.76**	**0.80**	**0.58**	**0.80**	**0.94**	**0.98**	**0.97**	**0.97**	**0.97**	**0.98**	**0.98**
CONSBCON	MIDAS	**0.82**	**0.88**	**0.63**	**0.88**	**0.97**	**0.99**	1.00	**0.98**	**0.95**	**0.98**	**0.98**
	AR-MIDAS	**0.81**	**0.89**	**0.61**	**0.89**	1.01	1.01	1.04	1.01	**0.98**	1.02	1.03
	MF-VAR	**0.83**	**0.86**	**0.68**	**0.86**	1.00	1.01	1.03	1.03	1.03	**0.96**	**0.97**
TRAIND	MIDAS	**0.89**	**0.89**	**0.59**	**0.89**	1.00	1.05	1.06	**0.95**	**0.97**	**0.91**	**0.92**
	AR-MIDAS	**0.85**	**0.85**	**0.64**	**0.85**	1.15	1.09	1.13	1.00	1.01	**0.94**	**0.94**
	MF-VAR	**0.83**	**0.82**	**0.66**	**0.82**	**0.98**	1.00	1.10	1.01	**0.98**	**0.97**	**0.98**
RETINDI	MIDAS	**0.80**	**0.79**	**0.50**	**0.79**	1.05	1.08	1.15	**0.98**	**0.99**	**0.93**	**0.92**
	AR-MIDAS	**0.78**	**0.87**	**0.53**	**0.87**	1.19	1.12	1.19	1.10	1.10	**0.95**	**0.93**
	MF-VAR	**0.79**	**0.76**	**0.57**	**0.76**	**0.99**	1.05	1.22	1.02	**0.99**	**0.97**	**0.97**
MANPRD	MIDAS	1.17	1.19	**0.92**	1.19	1.01	**0.89**	**0.94**	**0.92**	**0.94**	**0.96**	**0.97**
	AR-MIDAS	1.22	1.23	1.00	1.23	1.02	1.27	1.12	**0.95**	**0.95**	1.00	1.01
	MF-VAR	**0.90**	**0.86**	**0.66**	**0.86**	1.02	**0.97**	**0.93**	**0.97**	**0.97**	**0.97**	**0.97**
ECOTEN	MIDAS	**0.72**	**0.77**	**0.46**	**0.77**	**0.97**	1.10	1.04	**0.89**	**0.86**	1.05	**0.89**
	AR-MIDAS	**0.72**	**0.77**	**0.52**	**0.77**	1.00	1.15	1.03	**0.90**	**0.86**	1.07	**0.92**
	MF-VAR	**0.69**	**0.61**	**0.53**	**0.61**	**0.85**	**0.94**	1.00	**0.95**	**0.95**	**0.97**	**0.98**
CCIM	MIDAS	**0.89**	**0.79**	**0.57**	1.01	1.01	1.02	1.00	1.00	1.00	**0.98**	**0.96**
	AR-MIDAS	**0.90**	**0.83**	**0.54**	1.04	1.05	1.07	1.02	1.04	1.01	1.00	**0.96**
	MF-VAR	1.04	1.03	**0.67**	1.05	1.04	1.05	**0.97**	**0.98**	**0.97**	**0.97**	**0.97**

The relative MSFE is computed as the ratio of the MSFE for a single indicator model to that of the benchmark. A value less than 1 indicates that the given model outperforms the benchmark.

Table 1b: The relative MSFEs [relative to the recursively estimated AR model] for the single indicator mixed-frequency models for GDP growth

		Horizon h_m										
Indicator	Model	-2	-1	1	2	3	4	5	6	7	8	9
CCA	MIDAS	**0.82**	**0.75**	**0.55**	1.04	**0.97**	1.02	**0.99**	1.01	**0.97**	**0.97**	**0.98**
	AR-MIDAS	**0.88**	**0.79**	**0.57**	1.09	1.00	1.11	1.04	1.04	**0.99**	1.02	1.02
	MF-VAR	1.09	1.10	**0.70**	1.14	1.12	1.13	**0.95**	**0.97**	**0.97**	**0.97**	**0.98**
CPI	MIDAS	1.09	1.03	**0.81**	1.04	1.01	**0.94**	**0.93**	**0.90**	**0.95**	**0.88**	**0.91**
	AR-MIDAS	1.15	1.09	**0.98**	1.08†	**0.97**	**0.91**	**0.99**	**0.98**	1.04	**0.91**	**0.94**
	MF-VAR	1.06	1.06	**0.98**	1.01	1.04	**0.98**	1.00	**0.99**	**0.99**	**0.97**	**0.97**
PPIC	MIDAS	**0.95**	**0.99**	**0.79**	1.02	1.01	1.02	**0.97**	**0.99**	**0.98**	1.02	1.07
	AR-MIDAS	1.07	1.05	**0.93**	1.00	1.02	1.08	**0.97**	1.00	**0.98**	1.01	1.05
	MF-VAR	1.01	1.02	**0.94**	**0.99**	**0.96**	1.01	**0.99**	1.00	1.01	**0.97**	**0.97**
PPIE	MIDAS	1.00	**0.99**	**0.80**	1.03	**0.99**	1.01	1.01	1.04	1.02	**0.99**	**0.99**
	AR-MIDAS	1.06	1.04	**0.91**	1.06	1.00	1.06	1.03	1.05	1.03	1.01	1.02
	MF-VAR	1.04	1.04	**0.91**	1.05	1.03	1.02	1.04	1.04	1.04	**0.97**	**0.97**
PPICA	MIDAS	**0.98**	**0.92**	**0.72**	**0.95**	**0.96**	1.02	1.00	**0.99**	**0.99**	1.02	**0.98**
	AR-MIDAS	1.03	**0.96**	**0.86**	**0.98**	**0.97**	1.05	1.02	1.02	1.02	1.05	**0.98**
	MF-VAR	**0.91**	**0.91**	**0.79**	**0.94**	**0.93**	**0.95**	**0.97**	**0.97**	**0.97**	**0.98**	**0.97**
EPI	MIDAS	**0.97**	**0.98**	**0.80**	**0.98**	**0.98**	**0.95**	**0.99**	**0.98**	**0.97**	1.01	**0.99**
	AR-MIDAS	1.01	1.02	1.01	1.02	1.02	1.00	1.01	1.02	**0.99**	1.01	1.00
	MF-VAR	**0.98**	**0.98**	**0.95**	**0.97**	**0.96**	**0.96**	1.00	1.00	1.00	**0.97**	**0.97**
IMPI	MIDAS	**0.98**	**0.96**	**0.80**	**0.96**	**0.98**	**0.95**	**0.96**	**0.99**	**0.98**	1.00	1.01
	AR-MIDAS	1.02	1.01	**0.97**	1.01	1.03	**0.99**	**0.98**	1.03	1.01	1.02	1.03
	MF-VAR	1.01	**0.99**	**0.86**	**0.99**	**0.99**	**0.99**	1.00	1.02	1.02	**0.97**	**0.97**
PPI	MIDAS	**0.96**	**0.99**	**0.81**	**0.99**	**0.98**	**0.94**	**0.98**	**0.98**	1.02	1.01	1.00
	MIDAS-AR	1.00	1.03	**0.96**	1.03	1.02	**0.99**	1.00	1.02	1.03	1.02	1.02
	MF-VAR	**0.97**	**0.97**	**0.92**	**0.97**	**0.96**	**0.95**	1.00	1.00	1.00	**0.97**	**0.96**
CARPASS	MIDAS	**0.6**	**0.96**	**0.77**	**0.98**	**0.98**	**0.98**	1.00	**0.96**	**0.99**	**0.97**	**0.97**
	AR-MIDAS	1.42	1.01	**0.99**	1.05†	1.03	1.07	1.07	**0.99**	1.02	1.00	**0.99**
	MF-VAR	**0.92**	1.02	**0.85**	1.04	1.04	1.06	**0.98**	**0.97**	**0.96**	**0.96**	**0.97**
POLRATE	MIDAS	**0.96**	**0.98**	**0.78**	**0.98**	**0.97**	**0.97**	**0.97**	**0.97**	**0.90**	**0.95**	**0.91**
	AR-MIDAS	**0.98**	1.02	**0.98**	1.02	1.02	1.03	**0.98**	1.01	**0.95**	**0.95†**	**0.96**
	MF-VAR	1.00	1.03	**0.96**	1.03	**0.98**	**0.99**	1.02	1.02	1.02	**0.97**	**0.97**
GOVTBND10	MIDAS	**0.98**	**0.97**	**0.79**	**0.97**	**0.96**	**0.98**	**0.98**	**0.99**	**0.98**	**0.98**	**0.98**
	AR-MIDAS	1.02	1.01	1.00	1.01	1.01	1.02	1.01	1.02	1.01	1.00	**0.99**
	MF-VAR	1.00	1.00	**0.91**	1.00	**0.99**	**0.99**	1.01	1.01	1.01	**0.97**	**0.97**
GOVTBND5	MIDAS	**0.98**	**0.96**	**0.80**	**0.96**	**0.97**	**0.97**	**0.97**	**0.99**	**0.99**	**0.97**	**0.98**
	AR-MIDAS	1.02	1.01	1.01	1.01	1.03	1.01	1.00	1.02	1.02	**0.99**	1.00
	MF-VAR	1.01	1.00	**0.91**	1.00	**0.99**	**0.99**	1.01	1.02	1.01	**0.96**	**0.96**
TREBIL	MIDAS	**0.99**	**0.95**	**0.80**	**0.95**	**0.98**	**0.98**	**0.97**	**0.97**	**0.98**	**0.95**	**0.91**
	AR-MIDAS	1.00	**0.97**	1.00	**0.97**	1.01	1.02	1.00	**0.95**	1.01	**0.98**	**0.93**
	MF-VAR	**0.98**	**0.98**	**0.92**	**0.98**	**0.99**	1.00	1.01	1.02	1.01	**0.96**	**0.96**
SEKEU	MIDAS	**0.95**	**0.93**	**0.79**	**0.93**	**0.93**	1	**0.98**	**0.98**	**0.97**	**0.99**	**0.99**
	AR-MIDAS	1.00	**0.95**	**0.99**	**0.95**	**0.95**	1.03	1.00	1.02	1.00	1.01	1.00
	MF-VAR	**0.93**	**0.96**	**0.83**	**0.93**	**0.93**	**0.98**	**0.99**	**0.99**	**0.99**	**0.97**	**0.96**
SEKUSD	MIDAS	**0.96**	**0.93**	**0.79**	**0.93**	**0.94**	**0.96**	1.00	1.00	**0.97**	**0.99**	**0.99**
	AR-MIDAS	1.02	**0.96**	**0.99**	**0.96**	**0.97**	1.00	1.04	1.01	1.01	**0.99**	**0.99**
	MF-VAR	**0.92**	**0.91**	**0.80**	**0.93**	**0.93**	**0.98**	**0.99**	**0.99**	**0.99**	**0.97**	**0.96**
GOVTDE	MIDAS	**0.99**	1.00	**0.84**	**0.98**	**0.95**	**0.97**	**0.92**	**0.94**	**0.91**	1.01	1.04
	AR-MIDAS	1.01	1.02	1.01	1.00	**0.99**	1.04	**0.96**	**0.99**	**0.96**	1.07	1.06
	MF-VAR	1.01	1.01	**0.94**	1.01	1.02	1.08	1.09	1.09	1.09	1.05	1.05

The relative MSFE is computed as the ratio of the MSFE for a single indicator model to that of the benchmark. A value less than 1 indicates that the given model outperforms the benchmark.

Table 2: Share of single indicator mixed-frequency models with MSFEs less than 1

	Horizon h_m										
Indicator	-2	-1	1	2	3	4	5	6	7	8	9
IPI	1.00	1.00	1.00	0.00	0.67	1.00	0.67	1.00	1.00	0.33	1.00
IPI(INS)	1.00	1.00	1.00	1.00	0.67	1.00	1.00	1.00	0.67	0.00	0.67
IPI(INV)	1.00	1.00	1.00	0.33	1.00	1.00	0.67	0.67	1.00	0.33	1.00
IPI(IVKON ND)	0.67	0.67	1.00	0.33	0.00	0.33	0.33	0.00	0.67	0.33	0.67
IPI(IVKON D)	1.00	1.00	1.00	1.00	0.33	0.67	0.67	0.67	1.00	0.33	1.00
MANU	0.67	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.00	0.00	0.67
IM	1.00	0.67	1.00	1.00	1.00	1.00	1.00	0.67	0.67	1.00	1.00
EX	1.00	1.00	1.00	0.33	0.33	1.00	1.00	0.33	0.67	1.00	1.00
NT	0.00	0.33	0.33	0.00	0.00	0.33	0.33	0.00	0.00	0.33	0.67
RTI	1.00	1.00	1.00	1.00	1.00	0.67	0.33	0.33	1.00	0.67	0.67
TSV	0.67	1.00	0.67	1.00	0.00	0.00	0.33	0.67	0.67	1.00	1.00
CONSCON	0.67	0.67	1.00	0.67	0.67	0.67	0.67	0.67	0.67	1.00	1.00
MANFCON	1.00	1.00	1.00	1.00	1.00	0.33	1.00	1.00	1.00	1.00	0.67
CONSBCON	1.00	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.67	0.67	0.67
TRAIND	1.00	1.00	1.00	1.00	0.33	0.33	0.00	0.67	0.67	1.00	1.00
RETINDI	1.00	1.00	1.00	1.00	0.33	0.00	0.00	0.33	0.67	1.00	1.00
MANPRD	0.33	0.33	0.67	0.33	0.00	0.67	0.67	1.00	1.00	1.00	0.67
ECOTEN	1.00	1.00	1.00	1.00	1.00	0.33	0.00	1.00	1.00	0.33	1.00
CCIM	0.67	0.67	1.00	0.00	0.00	0.00	0.67	0.67	0.67	1.00	1.00
CCA	0.67	0.67	1.00	0.00	0.33	0.00	0.67	0.33	1.00	0.67	0.67
CPI	0.00	0.00	1.00	0.00	0.33	1.00	1.00	1.00	0.67	1.00	1.00
PPIC	0.33	0.33	1.00	0.67	0.33	0.00	1.00	0.33	0.67	0.33	0.33
PPIE	0.33	0.33	1.00	0.00	0.33	0.00	0.00	0.00	0.00	0.67	0.67
PPICA	0.67	1.00	1.00	1.00	1.00	0.33	0.67	0.67	0.67	0.33	1.00
EPI	0.67	0.67	0.67	0.67	0.67	1.00	0.67	0.67	1.00	0.33	0.67
IMPI	0.33	0.67	1.00	0.67	0.67	1.00	0.67	0.33	0.33	0.33	0.33
PPI	0.67	0.67	1.00	0.67	0.67	1.00	0.33	0.67	0.00	0.33	0.33
CARPASS	0.67	0.33	1.00	0.33	0.33	0.33	0.67	1.00	0.67	1.00	1.00
POLRATE	0.67	0.33	1.00	0.33	0.67	0.67	0.67	0.33	0.67	1.00	1.00
GOVTBND10	0.33	0.67	0.67	0.67	0.67	0.67	0.33	0.33	0.33	1.00	1.00
GOVTBND5	0.33	0.33	0.67	0.33	0.67	0.67	0.33	0.33	0.33	1.00	1.00
TREBIL	1.00	1.00	1.00	1.00	0.67	0.67	0.67	0.67	0.33	1.00	1.00
SEKEU	0.67	1.00	1.00	1.00	1.00	0.33	0.67	0.67	1.00	0.67	0.67
SEKUSD	0.67	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00
GOVTDE	0.33	0.00	0.67	0.33	0.67	0.33	0.67	0.67	0.67	0.00	0.00

The percentages of MSFEs less than 1 are considered for each indicator. A higher percentage indicates that the given individual model outperforms the benchmark.

Table 3: Average relative MSFEs [relative to recursively estimated AR model] for the single indicator mixed-frequency models for GDP growth

	Horizon h_m										
Indicator	-2	-1	1	2	3	4	5	6	7	8	9
IPI	**0.57**	**0.69**	**0.71**	1.02	**0.97**	**0.95**	**0.98**	**0.96**	**0.95**	1.00	**0.98**
IPI(INS)	**0.85**	**0.92**	**0.80**	**0.99**	**0.99**	**0.94**	**0.95**	**0.97**	**0.97**	1.00	1.00
IPI(INV)	**0.80**	**0.72**	**0.73**	1.05	**0.99**	**0.96**	**0.98**	**0.99**	**0.95**	**0.99**	**0.98**
IPI(IVKON ND)	**0.98**	**0.99**	**0.87**	1.00	1.03	1.01	1.01	1.02	1.00	1.08	**0.99**
IPI(IVKON D)	**0.83**	**0.99**	**0.82**	**0.99**	1.01	**0.99**	**0.99**	**0.99**	**0.98**	1.01	**0.98**
MANU	1.12	1.09	1.03	1.05	1.06	1.07	1.09	1.11	1.15	1.07	1.04
IM	**0.79**	**0.95**	**0.75**	**0.95**	**0.97**	**0.95**	**0.95**	**0.99**	**0.98**	**0.98**	**0.98**
EX	**0.76**	**0.90**	**0.67**	**0.96**	**0.99**	**0.95**	**0.95**	1.01	**0.98**	**0.97**	**0.95**
NT	1.19	1.08	1.01	1.10	1.20	1.02	1.06	1.03	1.12	1.06	**0.99**
RTI	**0.89**	**0.82**	**0.66**	**0.87**	**0.96**	1.00	1.04	**0.99**	**0.97**	**0.98**	**0.97**
TSV	**0.89**	**0.89**	**0.77**	**0.89**	1.07	1.05	1.00	**0.99**	**0.98**	**0.97**	**0.98**
CONSCON	**0.99**	**0.99**	**0.90**	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**	**0.98**	**0.98**	**0.99**
MANFCON	**0.78**	**0.93**	**0.65**	**0.92**	**0.97**	1.03	**0.98**	**0.92**	**0.91**	**0.95**	**0.97**
CONSBCON	**0.82**	**0.88**	**0.64**	**0.88**	**0.99**	1.00	1.02	1.00	**0.99**	**0.99**	**0.99**
TRAIND	**0.86**	**0.85**	**0.63**	**0.85**	1.04	1.05	1.10	**0.99**	**0.99**	**0.94**	**0.95**
RETINDI	**0.79**	**0.80**	**0.53**	**0.81**	1.08	1.08	1.19	1.03	1.03	**0.95**	**0.94**
MANPRD	1.09	1.09	**0.86**	1.03	1.01	1.04	**0.99**	**0.95**	**0.95**	**0.98**	**0.98**
ECOTEN	**0.71**	**0.72**	**0.50**	**0.72**	**0.94**	1.06	1.02	**0.91**	**0.89**	1.03	**0.93**
CCIM	**0.94**	**0.88**	**0.59**	1.03	1.03	1.05	**0.99**	1.00	**0.99**	**0.98**	**0.96**
CCA	**0.93**	**0.88**	**0.61**	1.09	1.03	1.09	**0.99**	1.00	**0.98**	**0.99**	**0.99**
CPI	1.10	1.06	**0.92**	1.07	1.01	**0.94**	**0.97**	**0.95**	**0.99**	**0.92**	**0.94**
PPIC	1.01	1.02	**0.89**	1.00	1.00	1.04	**0.98**	1.00	**0.99**	1.00	1.03
PPIE	1.03	1.02	**0.87**	1.05	1.00	1.03	1.03	1.04	1.03	**0.99**	**0.99**
PPICA	**0.97**	**0.93**	**0.79**	**0.96**	**0.95**	1.00	1.00	**0.99**	**0.99**	1.02	**0.98**
EPI	**0.98**	**0.99**	**0.92**	**0.99**	**0.99**	**0.97**	1.00	1.00	**0.98**	**0.99**	**0.99**
IMPI	1.00	**0.98**	**0.88**	**0.99**	1.00	**0.98**	**0.98**	1.01	1.00	1.00	1.00
PPI	**0.98**	**0.99**	**0.90**	1.00	**0.99**	**0.96**	**0.99**	1.00	1.02	1.00	**0.99**
CARPASS	1.1	**0.99**	**0.87**	1.02	1.01	1.03	1.01	**0.97**	**0.99**	**0.97**	**0.97**
POLRATE	**0.98**	1.01	**0.91**	1.01	**0.99**	**0.99**	**0.99**	1.00	**0.96**	**0.96**	**0.95**
GOVTBND10	**0.99**	**0.99**	**0.90**	**0.99**	**0.99**	**0.99**	1.00	1.00	1.00	**0.98**	**0.98**
GOVTBND5	1.00	**0.99**	**0.91**	**0.99**	**0.99**	**0.99**	**0.99**	1.01	1.00	**0.97**	**0.98**
TREBIL	**0.99**	**0.96**	**0.91**	**0.96**	**0.99**	1.00	**0.99**	**0.98**	1.00	**0.96**	**0.93**
SEKEU	**0.97**	**0.93**	**0.87**	**0.93**	**0.94**	1.00	**0.99**	**0.99**	**0.99**	**0.99**	**0.98**
SEKUSD	**0.93**	**0.96**	**0.86**	**0.93**	**0.94**	1.00	**0.99**	**0.99**	**0.99**	**0.99**	**0.98**
GOVTDE	1.00	1.01	**0.93**	**0.99**	**0.99**	1.01	**0.99**	**0.99**	**0.99**	1.04	1.05

The relative MSFE is computed as the ratio of the MSFE for a single indicator mixed-frequency model to that of the benchmark. Then, the average of MSFEs is considered for the models for a given indicator. A value less than 1 indicates that the given model outperforms the benchmark.

Table 4: Average relative MSFE [relative to the recursively estimated AR model] of different groups for the single indicator mixed-frequency models of GDP growth

	Horizon h_m										
Group	-2	-1	1	2	3	4	5	6	7	8	9
output	**0.85**	**0.89**	**0.82**	1.01	1.00	**0.98**	**0.99**	1.00	1.00	1.02	**0.99**
trade	**0.90**	**0.92**	**0.77**	**0.95**	1.03	**0.99**	1.00	1.00	1.00	**0.99**	**0.97**
survey	**0.86**	**0.89**	**0.67**	**0.88**	**0.86**	1.00	1.04	**0.97**	**0.96**	**0.97**	**0.96**
construction cost	**0.93**	**0.88**	**0.60**	1.06	1.03	1.07	**0.99**	1.00	**0.98**	**0.98**	**0.98**
price	1.01	**0.99**	**0.88**	1.00	**0.99**	**0.98**	**0.99**	**0.99**	1.00	**0.98**	**0.98**
transportation	1.10	**0.99**	**0.87**	1.02	1.01	1.03	1.01	**0.97**	**0.99**	**0.97**	**0.97**
interest & exchange Rates	**0.97**	**0.97**	**0.89**	**0.96**	**0.97**	**0.99**	**0.97**	**0.99**	**0.99**	**0.97**	**0.96**
public finance	**0.99**	1.01	**0.93**	**0.99**	**0.99**	1.00	**0.99**	**0.99**	**0.99**	1.04	1.05

The relative MSFE is computed as the MSFE for a single indicator mixed-frequency model relative to that of the benchmark. Then, the average of relative MSFEs is considered for the model class group.

Table 5: The relative MSFEs [relative to the recursively estimated AR model] for single indicator mixed-frequency models in the pooled setup for GDP growth

	Horizon h_m										
Indicator	-2	-1	1	2	3	4	5	6	7	8	9
IPI	**0.57**	**0.68**	**0.70**	**0.99**	**0.96**	**0.93**	**0.96**	**0.94**	**0.95**	**0.99**	**0.97**
IPI(INS)	**0.85**	**0.92**	**0.78**	**0.97**	**0.96**	**0.92**	**0.94**	**0.97**	**0.96**	**0.99**	**0.99**
IPI(INV)	**0.75**	**0.71**	**0.72**	1.03	**0.97**	**0.97**	**0.97**	**0.95**	**0.99**	**0.97**	**0.97**
IPI(IVKON ND)	**0.95**	**0.97**	**0.85**	**0.98**	1.01	**0.99**	**0.99**	1.00	**0.98**	1.05	**0.97**
IPI(IVKON D)	**0.83**	**0.91**	**0.80**	**0.97**	**0.99**	**0.98**	**0.97**	**0.98**	**0.97**	1.00	**0.98**
MANU	1.02	**0.99**	**0.94**	**0.98**	**0.98**	**0.99**	1.02	1.03	1.06	1.02	**0.98**
IM	**0.78**	**0.93**	**0.73**	**0.94**	**0.95**	**0.94**	**0.94**	**0.98**	**0.97**	**0.96**	**0.97**
EX	**0.75**	**0.88**	**0.67**	**0.95**	**0.98**	**0.94**	**0.94**	1.00	**0.97**	**0.95**	**0.94**
NT	1.13	1.02	**0.97**	1.06	1.16	**0.99**	1.02	1.01	1.09	1.04	**0.98**
RTI	**0.87**	**0.80**	**0.65**	**0.86**	**0.96**	**0.99**	1.01	**0.98**	**0.96**	**0.96**	**0.96**
TSV	**0.81**	**0.86**	**0.73**	**0.86**	1.04	1.03	**0.98**	**0.98**	**0.95**	**0.95**	**0.96**
CONSCON	**0.97**	**0.97**	**0.88**	**0.97**	**0.97**	**0.97**	**0.98**	**0.97**	**0.97**	**0.97**	**0.97**
MANFCON	**0.75**	**0.89**	**0.64**	**0.89**	**0.94**	1.00	**0.96**	**0.90**	**0.90**	**0.94**	**0.96**
CONSBCON	**0.80**	**0.86**	**0.62**	**0.86**	**0.97**	**0.98**	**0.99**	**0.98**	**0.96**	**0.97**	**0.97**
TRAIND	**0.83**	**0.82**	**0.62**	**0.82**	1.00	1.02	1.07	**0.96**	**0.95**	**0.93**	**0.93**
RETINDI	**0.77**	**0.79**	**0.52**	**0.79**	1.04	1.05	1.16	**0.99**	**0.98**	**0.93**	**0.92**
MANPRD	1.04	1.03	**0.83**	1.03	**0.96**	**0.97**	**0.96**	**0.91**	**0.90**	**0.94**	**0.95**
ECOTEN	**0.67**	**0.68**	**0.48**	**0.68**	**0.90**	1.02	1.00	**0.88**	**0.86**	**0.96**	**0.91**
CCIM	**0.90**	**0.85**	**0.57**	1.02	1.01	1.02	**0.98**	**0.98**	**0.97**	**0.97**	**0.95**
CCA	**0.89**	**0.84**	**0.58**	1.06	1.01	1.06	**0.97**	**0.98**	**0.96**	**0.97**	**0.98**
CPI	1.07	1.03	**0.89**	1.05	**0.98**	**0.89**	**0.93**	**0.92**	**0.95**	**0.89**	**0.89**
PPIC	**0.97**	1.00	**0.86**	**0.97**	**0.97**	1.01	**0.96**	**0.98**	**0.97**	**0.99**	1.02
PPIE	1.01	1.00	**0.85**	1.02	**0.98**	1.00	1.00	1.01	1.01	**0.98**	**0.99**
PPICA	**0.95**	**0.91**	**0.77**	**0.94**	**0.94**	**0.99**	**0.98**	**0.98**	**0.98**	1.01	**0.98**
EPI	**0.97**	**0.97**	**0.90**	**0.97**	**0.97**	**0.95‡**	**0.98**	**0.98**	**0.97**	**0.99**	**0.98**
IMPI	**0.98**	**0.97**	**0.86**	**0.96**	**0.98**	**0.96**	**0.96**	**0.99**	**0.98**	**0.99**	**0.99**
PPI	**0.96**	**0.98**	**0.88**	**0.98**	**0.96**	**0.94**	**0.98**	**0.98**	**0.99**	**0.99**	**0.99**
CARPASS	**0.98**	**0.97**	**0.85**	1.00	**0.99**	1.00	**0.99**	**0.96**	**0.98**	**0.97**	**0.97**
POLRATE	**0.97**	**0.99**	**0.89**	**0.99**	**0.97**	**0.97**	**0.97**	**0.98**	**0.92**	**0.95†**	**0.93**
GOVTBND10	**0.98**	**0.97**	**0.89**	**0.97**	**0.97**	**0.97**	**0.98**	**0.99**	**0.98**	**0.97**	**0.97**
GOVTBND5	**0.98**	**0.97**	**0.89**	**0.97**	**0.97**	**0.97**	**0.98**	**0.99**	**0.99**	**0.97**	**0.97**
TREBIL	**0.98**	**0.95**	**0.89**	**0.95**	**0.98**	**0.98**	**0.98**	**0.95**	**0.98**	**0.95**	**0.92**
SEKEU	**0.95**	**0.92**	**0.85**	**0.92**	**0.92**	**0.98**	**0.97**	**0.98**	**0.97**	**0.99**	**0.98**
SEKUSD	**0.95**	**0.91**	**0.84**	**0.91**	**0.92**	**0.95**	**0.98**	**0.98**	**0.98**	**0.98**	**0.98**
GOVTDE	**0.97**	**0.98**	**0.91**	**0.96**	**0.95**	**0.98**	**0.94**	**0.95**	**0.93**	1.01	1.02

The relative MSFE is computed as the MSFE for a single indicator model in the pooled setup to that of the benchmark.

Table 6: Average relative MSFE [relative to recursive estimated AR model] of different groups in the pooled setup for GDP growth

	Horizon h_m										
Group	-2	-1	1	2	3	4	5	6	7	8	9
output	**0.82**	**0.86**	**0.86**	**0.98**	**0.97**	**0.98**	**0.99**	1.00	1.00	1.02	**0.99**
trade	**0.86**	**0.89**	**0.75**	**0.93**	1.01	**0.98**	**0.98**	**0.99**	**0.98**	**0.97**	**0.96**
survey	**0.86**	**0.86**	**0.65**	**0.86**	**0.96**	1.00	1.01	**0.94**	**0.93**	**0.94**	**0.94**
construction cost	**0.89**	**0.84**	**0.57**	1.03	1.01	1.04	**0.97**	**0.98**	**0.96**	**0.96**	**0.97**
price	**0.98**	**0.98**	**0.85**	**0.98**	**0.96**	**0.96**	**0.97**	**0.97**	**0.98**	**0.97**	**0.98**
transportation	**0.98**	**0.97**	**0.85**	1.00	**0.99**	1.00	**0.99**	**0.96**	**0.98**	**0.97**	**0.97**
interest & exchange rates	**0.96**	**0.95**	**0.87**	**0.95**	**0.95**	**0.97**	**0.97**	**0.97**	**0.97**	**0.97**	**0.96**
public finance	**0.97**	**0.98**	**0.91**	**0.96**	**0.95**	**0.98**	**0.94**	**0.95**	**0.93**	1.01	1.02

The relative MSFE is computed as the MSFE for a single indicator model in the pooled setup to that of the benchmark. Then, the average of relative MSFEs is considered for the model class group.

Table 7: Quantiles of MSFE of single indicator models in the pooled setup

						Horizon h_m					
Indicator	-2	-1	1	2	3	4	5	6	7	8	9
IPI	0.33	0.33	0.33	0.00	0.33	0.33	0.00	0.33	0.33	0.33	0.33
IPI(INS)	0.33	0.33	0.33	0.00	0.33	0.33	0.33	0.33	0.34	0.00	0.34
IPI(INV)	0.33	0.34	0.33	0.33	0.00	0.00	0.33	0.33	0.33	0.33	0.00
IPI(IVKON ND)	0.00	0.33	0.34	0.33	0.00	0.33	0.33	0.00	0.00	0.33	0.00
IPI(IVKON D)	0.00	0.00	0.33	0.00	0.33	0.33	0.33	0.33	0.33	0.34	0.34
IM	0.33	0.34	0.66	0.33	0.00	0.33	0.33	0.33	0.34	0.33	0.00
EX	0.33	0.33	0.33	0.33	0.33	0.33	0.00	0.34	0.34	0.00	0.33
NT	0.33	0.33	0.34	0.00	0.33	0.00	0.34	0.00	0.33	0.33	0.00
RTI	0.33	0.66	0.33	0.33	0.33	0.34	0.33	0.33	0.00	0.33	0.33
TSV	0.33	0.33	0.66	0.33	0.34	0.66	0.33	0.34	0.33	0.00	0.00
CONSCON	0.00	0.33	0.34	0.33	0.33	0.00	0.33	0.33	0.33	0.34	0.66
MANFCON	0.00	0.33	0.34	0.33	0.00	0.33	0.00	0.66	0.66	0.34	0.33
CONSBCON	0.00	0.00	0.33	0.00	0.33	0.00	0.00	0.33	0.33	0.33	0.33
TRAIND	0.00	0.00	0.33	0.00	0.66	0.33	0.33	0.33	0.00	0.33	0.33
RETINDI	0.00	0.34	0.33	0.34	0.34	0.33	0.33	0.33	0.00	0.33	0.33
MANPRD	0.33	0.33	0.34	0.33	0.00	0.34	0.66	0.00	0.00	0.00	0.00
ECOTEN	0.00	0.33	0.33	0.33	0.33	0.33	0.00	0.00	0.33	0.00	0.33
CCIM	0.66	0.66	0.66	0.33	0.00	0.33	0.33	0.33	0.00	0.00	0.00
CCA	0.66	0.66	0.66	0.33	0.66	0.33	0.33	0.33	0.00	0.66	0.66
CPI	0.33	0.33	0.33	0.33	0.33	0.00	0.00	0.33	0.00	0.33	0.00
PPIC	0.33	0.33	0.33	0.00	0.33	0.00	0.00	0.00	0.00	0.33	0.33
PPIE	0.33	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.34
PPICA	0.33	0.34	0.34	0.00	0.33	0.33	0.33	0.33	0.33	0.34	0.33
EPI	0.00	0.00	0.34	0.33	0.33	0.00	0.00	0.00	0.00	0.33	0.34
IMPI	0.33	0.33	0.34	0.33	0.00	0.33	0.33	0.00	0.33	0.34	0.33
PPI	0.33	0.33	0.34	0.33	0.33	0.33	0.00	0.00	0.00	0.33	0.34
CARPASS	0.66	0.33	0.34	0.33	0.33	0.33	0.34	0.00	0.33	0.66	0.34
MANU	0.66	0.00	0.33	0.00	0.33	0.33	0.34	0.66	0.66	0.00	0.00
POLRATE	0.33	0.33	0.33	0.33	0.00	0.00	0.00	0.33	0.33	0.00	0.33
GOVTBND10	0.00	0.33	0.34	0.33	0.33	0.00	0.00	0.00	0.33	0.34	0.34
GOVTBND5	0.33	0.33	0.34	0.33	0.33	0.00	0.33	0.00	0.00	0.34	0.34
TREBIL	0.00	0.33	0.34	0.33	0.00	0.00	0.33	0.33	0.00	0.33	0.34
SEKEU	0.33	0.00	0.66	0.00	0.00	0.33	0.00	0.00	0.00	0.34	0.34
SEKUSD	0.33	0.33	0.66	0.33	0.33	0.33	0.33	0.33	0.33	0.66	0.66
GOVTDE	0.00	0.00	0.34	0.00	0.33	0.33	0.33	0.33	0.33	0.00	0.00

The entries in the table are computed as follows: first, compute the MSFE of the pooled forecast using the forecast combination mean; then, the quantiles of the pooled MSFE are computed in relation to the MSFE of individual models.

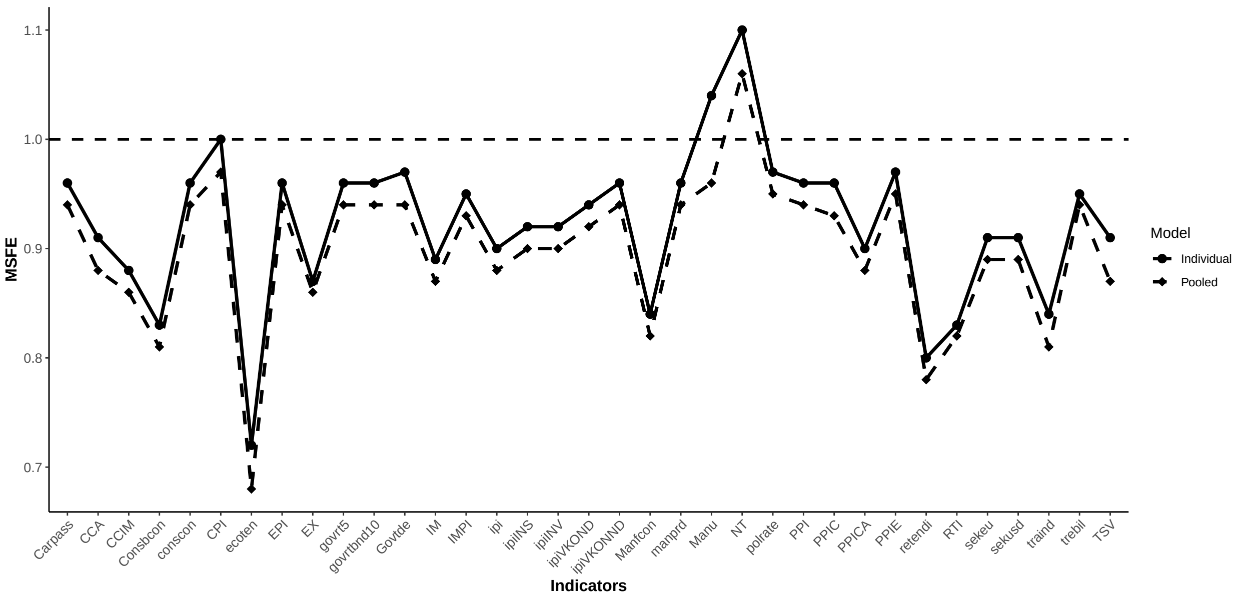

Figure 1: Average nowcasting performance of indicators within individual and pooled setup

Appendix

Table 8: Dataset

Indicator	Description	Transform	Frequency	Source	Publication Lag
Output					
GDP	Gross Domestic Product (Constant Prices)	3	Quarterly	SCB	2 Months
IPI	Industrial Production Index	2	Monthly	SCB	2 Months
IPI(INS)	Industrial Production Index (Intermediate Goods Industry)	2	Monthly	SCB	2 Months
IPI(INV)	Industrial Production Index (Capital Goods Industry)	3	Monthly	SCB	2 Months
IPI(IVKON ND)	Industrial Production Index (Durable Consumer Goods Industry)	3	Monthly	SC B	2 Months
IPI(IVKON D)	Industrial Production Index (Non-Durable Consumer Goods Industry)	3	Monthly	SCB	2 Months
MANU	Manufacturing Industry	3	Monthly	SCB	2 Months
Trade					
IM	Total Imports (SEK millions)	3	Monthly	SCB	2 Months
EX	Total Exports (SEK millions)	3	Monthly	SCB	2 Months
NT	Net Trade (SEK millions)	3	Monthly	SCB	3 Months
RTI	Retail Sale Index (Trade)	3	Monthly	SCB	2 Months
TSV	Trade Selling Volume (Economic Tendency)	1	Monthly	NIER	0 Month
Survey					
CONSCON	Consumer Confidence Indicator	3	Monthly	NIER	0 Month
CONSBCON	Construction Confidence Indicator	3	Monthly	NIER	0 Month
MANFCON	Manufacturing Confidence Indicator	3	Monthly	NIER	0 Month
TRAIND	Trade Confidence Indicator	3	Monthly	NIER	0 Month
RETINDI	Retail Trade Confidence Indicator	3	Monthly	NIER	0 Month
MANPRD	Manufacturing Production Volume Outcomes	3	Monthly	NIER	0 Month
ECOTEN	Economic Tendency Indicato	3	Monthly	NIER	0 Month
Construction Cost					
CCIM	Construction Cost Index (Multi-dwellings)	3	Monthly	SCB	1 Month
CCA	Construction Cost Index (Agriculture)	3	Monthly	SCB	1 Month
Price					
CPI	Consumer Price Index	3	Monthly	SCB	1 Month
PPIC	Producer Price Index (Consumer Goods)	3	Monthly	SCB	1 Month
PPIE	Producer Price Index (Energy Goods)	3	Monthly	SCB	1 Month
PPICA	Producer Price Index (Capital Goods)	3	Monthly	SCB	1 Month
EPI	Export Price Index	3	Monthly	SCB	1 Month
IMPI	Import Price Index	3	Monthly	SCB	1 Month
PPI	Producer Price Index (Total)	3	Monthly	SCB	1 Month
Transportation					
CARPASS	Newly Registered Passenger Cars	1	Monthly	SCB	1 Month
Exchange & Interest Rates					
POLRATE	Policy Rate (Monthly Average)	2	Monthly	NIER	0 Month
GOVTBND10	10-Year Government Bond Yield	2	Monthly	NIER	0 Month
GOVTBND5	5-Year Government Bond Yield	2	Monthly	NIER	0 Month
TREBIL	3-Month Treasury Bill Rate	2	Monthly	NIER	0 Month
SEKEU	SEK per Euro	2	Monthly	NIER	0 Month
SEKUSD	SEK per USD	2	Monthly	NIER	0 Month
Public Finance					
GOVTDE	Total Central Government Debt (SEK millions)	2	Monthly	SCB	1 Month

Transformations: 1 – No change; 2 – First-order difference; 3 – Log transformation.

Table 9: Average relative MSFEs [relative to recursively estimated AR model] for the single indicator mixed-frequency models for GDP growth

	Period 1: 2003Q1–2018Q4											Period 2: 2019Q1–2023Q3										
Indicator	-2	-1	1	2	3	4	5	6	7	8	9	-2	-1	1	2	3	4	5	6	7	8	9
IPI	**0.97**	**0.92**	**0.91**	1.09	1.08	1.04	1.02	**0.96**	**0.95**	1.03	**0.98**	**0.44**	**0.61**	**0.65**	**0.99**	**0.94**	**0.91**	**0.97**	**0.95**	**0.96**	**0.98**	**0.97**
IPI(INS)	**0.91**	**0.83**	**0.99**	1.01	1.03	**0.95**	1.02	1.01	**0.97**	1.01	**0.98**	**0.87**	**0.92**	**0.74**	**0.98**	**0.97**	**0.93**	**0.94**	**0.97**	**0.97**	1.00	1.00
IPI(INV)	**0.97**	**0.98**	**0.81**	1.06	1.05	1.05	1.04	**0.99**	**0.94**	**0.97**	**0.95**	**0.74**	**0.64**	**0.71**	1.04	**0.96**	**0.93**	**0.96**	**0.98**	**0.96**	1.01	**0.98**
IPI(IVKON ND)	1.12	1.10	1.04	1.16	1.15	1.11	1.01	1.08	1.06	1.28	1.02	**0.93**	**0.95**	**0.81**	**0.94**	**0.98**	**0.97**	1.01	**0.99**	**0.98**	**0.99**	**0.97**
IPI(INKON D)	**0.91**	**0.98**	**0.99**	**0.99**	1.07	1.06	1.04	1.06	1.02	1.06	**0.99**	**0.80**	**0.90**	**0.76**	**0.98**	**0.98**	**0.97**	**0.97**	**0.98**	**0.98**	**0.98**	**0.98**
MANU	1.07	1.08	1.15	1.09	1.06	1.05	1.09	1.13	1.11	1.05	1.07	1.13	1.09	**0.98**	1.03	1.07	1.08	1.08	1.11	1.14	1.07	1.05
IM	**0.95**	1.05	1.02	1.01	1.04	1.03	0.95	1.08	1.06	**0.97**	1.04	**0.73**	**0.91**	**0.67**	**0.93**	**0.94**	**0.93**	**0.95**	**0.95**	**0.94**	**0.97**	**0.95**
EX	**0.93**	1.03	**0.99**	1.00	1.11	1.01	**0.93**	1.09	1.02	**0.94**	**0.98**	**0.70**	**0.85**	**0.59**	**0.95**	**0.96**	**0.93**	**0.96**	**0.98**	**0.97**	**0.97**	**0.93**
NT	1.17	1.12	1.07	1.14	1.18	1.09	1.07	1.07	1.03	1.04	1.00	1.18	1.06	**0.99**	1.08	1.20	**0.99**	1.06	1.03	1.16	1.08	**0.98**
RTI	1.07	1.02	**0.93**	1.00	1.04	1.08	1.00	1.04	1.06	1.03	**0.99**	**0.83**	**0.74**	**0.58**	**0.82**	**0.94**	**0.97**	1.06	**0.98**	**0.94**	**0.95**	**0.97**
TSV	**0.87**	**0.97**	**0.91**	1.02	1.02	1.04	1.02	**0.99**	**0.98**	**0.99**	**0.99**	**0.90**	**0.86**	**0.75**	**0.86**	1.08	1.06	1.01	**0.99**	**0.98**	**0.98**	**0.97**
CONSCON	1.04	1.04	1.00	1.04	1.04	1.05	1.04	1.02	1.00	**0.99**	**0.98**	**0.96**	**0.97**	**0.87**	**0.97**	**0.97**	**0.97**	**0.99**	**0.99**	**0.99**	**0.97**	**0.97**
MANFCON	**0.90**	1.06	**0.86**	1.06	1.00	1.04	**0.95**	**0.95**	**0.97**	1.01	1.01	**0.73**	**0.88**	**0.58**	**0.88**	**0.95**	1.03	1.00	**0.91**	**0.89**	**0.92**	**0.95**
CONSBCON	**0.75**	**0.89**	**0.74**	**0.89**	1.06	**0.96**	1.02	**0.99**	**0.98**	1.01	**0.99**	**0.83**	**0.86**	**0.6**	**0.86**	**0.96**	1.01	1.02	1.01	**0.98**	**0.97**	**0.99**
TRAIND	**0.98**	**0.96**	**0.99**	**0.96**	1.00	**0.93**	**0.97**	**0.93**	**0.94**	**0.89**	**0.91**	**0.81**	**0.81**	**0.53**	**0.81**	1.05	1.08	1.15	1.01	1.01	**0.96**	**0.96**
RETINDI	**0.88**	**0.87**	**0.84**	**0.87**	**0.94**	**0.89**	**0.85**	**0.92**	**0.94**	**0.95**	**0.90**	**0.75**	**0.78**	**0.44**	**0.78**	1.11	1.14	1.32	1.08	1.06	**0.94**	**0.95**
MANPRND	1.20	1.23	1.18	1.23	1.24	1.13	1.13	1.15	1.08	**0.95**	**0.95**	1.09	1.08	**0.77**	1.08	**0.98**	1.02	1.00	**0.93**	**0.94**	**0.99**	**0.99**
ECOTEN	**0.85**	**0.87**	**0.90**	**0.87**	**0.88**	**0.89**	**0.80**	**0.83**	**0.82**	**0.90**	**0.92**	**0.65**	**0.65**	**0.38**	**0.65**	**0.95**	1.12	1.12	**0.95**	**0.92**	1.09	**0.93**
CCIM	1.04	1.03	**0.98**	1.05	1.06	1.06	1.04	1.04	**0.94**	**0.91**	**0.89**	**0.91**	**0.83**	**0.48**	1.02	1.02	1.03	**0.98**	**0.99**	1.01	1.01	**0.99**
CCA	**0.97**	**0.95**	**0.92**	1.02	1.02	**0.99**	**0.96**	**0.95**	**0.96**	**0.95**	**0.97**	**0.92**	**0.86**	**0.52**	1.11	1.03	1.12	1.01	1.03	**0.98**	**0.99**	1.00
CPI	1.07	1.11	1.08	1.13	1.06	**0.94**	**0.99**	**0.97**	1.06	**0.92**	**0.88**	1.10	1.03	**0.87**	1.05	**0.98**	**0.94**	**0.96**	**0.95**	**0.97**	**0.91**	**0.97**
PPIC	1.16	1.16	1.17	1.17	1.14	1.13	1.01	1.02	1.09	1.07	1.16	**0.95**	**0.96**	**0.80**	**0.93**	**0.94**	1.00	**0.96**	**0.99**	**0.95**	**0.96**	**0.97**
PPIE	1.10	1.09	1.04	1.09	1.07	1.04	1.04	1.07	1.04	1.00	**0.98**	1.00	**0.99**	**0.82**	1.02	**0.98**	1.02	1.02	1.03	1.03	**0.99**	**0.99**
PPICA	1.16	1.08	1.01	1.09	1.07	1.12	1.07	1.07	1.07	1.12	**0.99**	**0.90**	**0.88**	**0.72**	**0.91**	**0.91**	**0.97**	**0.97**	**0.97**	**0.96**	**0.97**	**0.97**
EPI	1.11	1.08	1.04	1.07	1.06	1.06	1.04	1.03	1.02	1.03	1.01	**0.94**	**0.96**	**0.89**	**0.96**	**0.97**	**0.93**	**0.98**	**0.99**	**0.97**	**0.97**	**0.97**
IMPI	1.10	1.06	1.01	1.06	1.06	1.04	1.00	1.00	1.03	1.03	1.02	**0.95**	**0.96**	**0.83**	**0.95**	**0.98**	**0.96**	**0.97**	1.02	**0.99**	**0.98**	**0.99**
PPI	1.05	1.05	1.01	1.07	1.03	1.05	1.03	1.02	1.06	1.04	1.04	**0.95**	**0.97**	**0.86**	**0.97**	**0.97**	**0.93**	**0.98**	**0.99**	1.00	**0.98**	**0.97**
CARPASS	1.11	1.03	**0.95**	1.05	1.06	1.05	1.02	**0.99**	1.02	**0.98**	**0.98**	1.09	**0.98**	**0.84**	1.00	**0.99**	1.02	1.02	**0.96**	**0.98**	**0.97**	**0.97**
POLRATE	**0.97**	1.02	**0.98**	1.01	1.04	1.06	1.01	**0.89**	**0.93**	**0.88**	**0.85**	**0.99**	**0.97**	**0.89**	1.00	**0.98**	**0.97**	**0.99**	1.00	**0.98**	**0.97**	**0.97**
GOVTBND10	1.05	1.03	1.02	1.04	1.04	1.05	1.01	1.03	1.03	**0.99**	**0.98**	**0.99**	1.00	**0.87**	**0.97**	**0.97**	**0.97**	1.00	1.00	**0.98**	**0.97**	**0.97**
GOVTBND5	1.05	1.00	1.01	1.05	1.03	1.04	1.02	1.02	1.02	**0.99**	**0.99**	**0.98**	**0.98**	**0.86**	**0.98**	**0.97**	**0.97**	**0.99**	1.01	1.01	**0.96**	**0.97**
TREBIL	**0.92**	**0.87**	**0.87**	1.01	1.03	1.00	**0.98**	1.03	**0.91**	**0.84**	**0.90**	**0.99**	**0.98**	**0.89**	**0.98**	**0.99**	**0.99**	1.00	**0.98**	**0.99**	1.00	**0.97**
SEKEU	1.04	1.04	**0.98**	1.04	1.00	1.08	1.01	1.01	1.03	1.02	1.02	**0.95**	**0.90**	**0.84**	**0.90**	**0.91**	**0.97**	**0.98**	1.00	**0.97**	**0.97**	**0.96**
SEKUSD	1.19	1.07	1.01	1.07	1.07	1.08	1.07	1.04	1.02	**0.98**	**0.98**	**0.88**	**0.88**	**0.81**	**0.88**	**0.89**	**0.92**	**0.97**	**0.97**	**0.98**	**0.98**	**0.98**
GOVTDE	1.12	1.15	1.08	1.08	1.08	**0.99**	1.06	1.15	1.04	1.21	1.08	**0.96**	**0.96**	**0.86**	**0.95**	**0.95**	**0.98**	**0.95**	**0.98**	**0.91**	**0.96**	**0.97**

The relative MSFE is computed as the ratio of the MSFE for a single indicator mixed-frequency model to that of the benchmark. Then, the average of MSFEs is considered for the models for a given indicator. A value less than 1 indicates that the given model outperforms the benchmark.

Table 10: The relative MSFEs [relative to the recursively estimated AR model] for single indicators mixed-frequency models in the pooled setup for GDP growth

	Period 1: 2003Q1–2018Q4											Period 2: 2019Q1–2023Q3										
Indicator	-2	-1	1	2	3	4	5	6	7	8	9	-2	-1	1	2	3	4	5	6	7	8	9
IPI	**0.94**	**0.91**	**0.87**	1.06	1.06	**0.99**	1.00	**0.94**	**0.93**	1.01	**0.97**	**0.44**	**0.61**	**0.65**	**0.97**	**0.92**	**0.91**	**0.95**	**0.95**	**0.96**	**0.98**	**0.97**
IPI(INS)	**0.79**	**0.93**	**0.96**	**0.98**	1.00	0.91	1.00	1.00	**0.96**	**0.97**	**0.97**	**0.87**	**0.92**	**0.72**	**0.96**	**0.94**	**0.92**	**0.93**	**0.97**	**0.96**	1.00	1.00
IPI(INV)	**0.92**	**0.92**	**0.78**	1.03	1.03	1.02	1.03	**0.97**	**0.92**	**0.95**	**0.94**	**0.70**	**0.64**	**0.70**	1.03	**0.95**	**0.92**	**0.95**	**0.97**	**0.96**	1.00	**0.98**
IPI(IVKON ND)	1.07	1.05	1.02	1.12	1.11	1.07	1.00	1.05	1.02	1.19	**0.97**	**0.91**	**0.94**	**0.80**	**0.93**	**0.97**	**0.96**	**0.99**	**0.98**	**0.97**	**0.99**	**0.97**
IPI(INKON D)	**0.89**	**0.96**	**0.97**	**0.97**	1.03	1.03	1.02	1.05	1.01	1.06	**0.99**	**0.80**	**0.90**	**0.76**	**0.98**	**0.98**	**0.96**	**0.96**	**0.96**	**0.96**	**0.98**	**0.97**
MANU	1.00	1.00	1.07	**0.97**	1.01	**0.99**	1.05	1.08	1.07	1.02	1.02	1.03	**0.98**	**0.90**	**0.96**	**0.98**	**0.99**	1.00	1.02	1.02	1.01	**0.99**
IM	**0.93**	1.02	**0.99**	**0.97**	1.00	1.01	**0.94**	1.07	1.06	**0.95**	1.02	**0.73**	**0.90**	**0.65**	**0.93**	**0.94**	**0.92**	**0.95**	**0.95**	**0.94**	**0.96**	**0.95**
EX	**0.69**	**0.84**	**0.97**	**0.98**	1.08	1.00	**0.92**	1.08	1.01	**0.93**	**0.96**	**0.91**	1.00	**0.58**	**0.95**	**0.94**	**0.93**	**0.96**	**0.98**	**0.96**	**0.96**	**0.93**
NT	1.08	1.08	1.02	1.09	1.15	1.07	1.05	1.04	1.01	1.02	**0.98**	1.13	1.00	**0.94**	1.05	1.16	**0.96**	1.01	1.01	1.13	1.06	**0.98**
RTI	1.00	**0.97**	**0.91**	**0.98**	1.03	1.04	**0.97**	1.02	1.03	1.00	**0.95**	**0.81**	**0.74**	**0.58**	**0.81**	**0.93**	**0.96**	1.04	**0.97**	**0.93**	**0.94**	**0.96**
TSV	**0.80**	**0.93**	**0.89**	**0.99**	**0.98**	1.01	1.01	**0.96**	**0.91**	**0.92**	**0.92**	**0.81**	**0.83**	**0.71**	**0.83**	1.06	1.05	1.00	**0.97**	**0.96**	**0.98**	**0.97**
CONSCON	1.02	1.02	**0.99**	1.02	1.02	1.02	1.02	**0.99**	**0.99**	**0.98**	**0.98**	**0.95**	**0.95**	**0.85**	**0.95**	**0.95**	**0.95**	**0.96**	**0.97**	**0.96**	**0.97**	**0.97**
MANFCON	**0.85**	**0.99**	**0.85**	**0.99**	**0.94**	**0.97**	**0.91**	**0.92**	**0.95**	**0.99**	**0.99**	**0.71**	**0.86**	**0.57**	**0.86**	**0.94**	1.01	**0.98**	**0.90**	**0.88**	**0.92**	**0.95**
CONSBCON	**0.74**	**0.86**	**0.72**	**0.86**	1.01	**0.93**	**0.99**	**0.97**	**0.97**	1.00	**0.98**	**0.81**	**0.85**	**0.58**	**0.85**	**0.95**	**1.00**	**0.99**	**0.99**	**0.96**	**0.95**	**0.97**
TRAIND	**0.93**	**0.88**	**0.96**	**0.88**	**0.93**	**0.89**	**0.93**	**0.89**	**0.91**	**0.87**	**0.88**	**0.79**	**0.79**	**0.52**	**0.79**	1.03	1.07	1.12	**0.99**	**0.98**	**0.95**	**0.95**
RETINDI	**0.83**	**0.82**	**0.80**	**0.82**	**0.89**	**0.82**	**0.82**	**0.89**	**0.91**	**0.92**	**0.88**	**0.75**	**0.77**	**0.44**	**0.77**	1.09	1.13	1.30	1.04	1.02	**0.94**	**0.94**
MANPRD	1.12	1.03	1.12	1.03	1.04	1.01	1.04	1.05	1.00	**0.94**	**0.93**	1.03	1.03	**0.74**	1.03	**0.95**	**0.96**	**0.98**	**0.92**	**0.89**	**0.95**	**0.96**
ECOTEN	**0.76**	**0.79**	**0.80**	**0.79**	**0.80**	**0.79**	**0.73**	**0.77**	**0.77**	**0.85**	**0.89**	**0.63**	**0.64**	**0.38**	**0.64**	**0.94**	1.11	1.11	**0.93**	**0.90**	1.01	**0.92**
CCIM	1.01	1.00	**0.95**	1.04	1.04	1.05	1.01	1.01	**0.92**	**0.89**	**0.87**	**0.87**	**0.80**	**0.46**	1.01	1.00	1.01	**0.97**	**0.97**	**0.99**	1.00	**0.98**
CCA	**0.95**	**0.93**	**0.90**	1.00	**0.99**	**0.97**	**0.93**	**0.92**	**0.94**	**0.93**	**0.96**	**0.88**	**0.81**	**0.49**	1.08	1.02	1.10	**0.99**	1.02	**0.97**	**0.99**	**0.99**
CPI	1.02	1.06	1.00	1.10	1.03	**0.90**	**0.96**	**0.94**	1.01	**0.88**	**0.84**	1.09	1.02	**0.86**	1.03	**0.97**	**0.89**	**0.92**	**0.92**	**0.93**	**0.90**	**0.92**
PPIC	1.12	1.12	1.14	1.12	1.09	1.09	**0.98**	**0.99**	1.07	1.06	1.14	**0.92**	**0.95**	**0.78**	**0.92**	**0.92**	**0.98**	**0.95**	**0.98**	**0.94**	**0.95**	**0.97**
PPIE	1.08	1.07	1.02	1.05	1.04	1.02	1.02	1.05	1.02	**0.98**	**0.97**	**0.99**	**0.98**	**0.80**	1.00	**0.96**	**0.99**	**0.99**	1.01	1.01	**0.98**	**0.99**
PPICA	1.14	1.06	**0.98**	1.06	1.04	1.08	1.04	1.06	1.05	1.11	**0.99**	**0.88**	**0.87**	**0.72**	**0.90**	**0.90**	**0.96**	**0.96**	**0.96**	**0.95**	**0.97**	**0.97**
EPI	1.08	1.06	1.03	1.04	1.02	1.03	1.03	1.02	1.01	1.03	1.00	**0.93**	**0.95**	**0.87**	**0.95**	**0.96**	**0.92**	**0.96**	**0.97**	**0.95**	**0.97**	**0.97**
IMPI	1.08	1.03	1.00	1.03	1.03	1.02	**0.99**	**0.98**	1.02	1.02	1.00	**0.95**	**0.94**	**0.82**	**0.94**	**0.96**	**0.94**	**0.95**	1.00	**0.97**	**0.98**	**0.99**
PPI	1.03	1.03	1.00	1.04	1.00	1.02	1.02	1.01	1.04	1.03	1.03	**0.94**	**0.96**	**0.84**	**0.96**	**0.95**	**0.91**	**0.97**	**0.98**	**0.98**	**0.97**	**0.97**
CARPASS	1.01	1.00	**0.93**	1.03	1.03	1.03	1.00	**0.98**	1.00	**0.97**	**0.98**	**0.96**	**0.95**	**0.82**	**0.98**	**0.98**	**0.99**	**0.99**	**0.95**	**0.97**	**0.97**	**0.97**
POLRATE	**0.95**	1.00	**0.97**	**0.98**	1.01	1.02	1.00	**0.86**	**0.91**	**0.86**	**0.82**	**0.97**	**0.98**	**0.87**	**0.98**	**0.96**	**0.96**	**0.97**	**0.98**	**0.95**	**0.97**	**0.96**
GOVTBND10	1.04	1.02	1.01	1.02	1.03	1.03	1.00	1.02	1.02	**0.99**	**0.98**	**0.95**	**0.96**	**0.85**	**0.96**	**0.95**	**0.96**	**0.98**	**0.98**	**0.96**	**0.97**	**0.96**
GOVTBND5	1.03	**0.99**	1.01	1.03	1.01	1.02	1.01	1.01	1.01	**0.99**	**0.98**	**0.96**	**0.96**	**0.85**	**0.96**	**0.96**	**0.95**	**0.97**	**0.99**	**0.98**	**0.96**	**0.97**
TREBIL	**0.91**	**0.87**	**0.85**	1.00	1.01	**0.98**	**0.96**	1.01	**0.88**	**0.82**	**0.88**	**0.98**	**0.97**	**0.87**	**0.97**	**0.97**	**0.97**	**0.99**	**0.96**	**0.97**	**0.99**	**0.96**
SEKEU	1.02	1.01	**0.97**	1.01	**0.99**	1.06	**0.99**	1.00	1.03	1.01	1.02	**0.93**	**0.89**	**0.82**	**0.89**	**0.90**	**0.96**	**0.96**	**0.98**	**0.95**	**0.97**	**0.96**
SEKUSD	1.16	1.05	**0.99**	1.05	1.05	1.05	1.05	1.03	1.01	**0.97**	**0.98**	**0.87**	**0.87**	**0.80**	**0.87**	**0.88**	**0.91**	**0.96**	**0.96**	**0.97**	**0.98**	**0.98**
GOVTDE	1.06	1.08	1.06	1.01	1.02	**0.95**	**0.97**	1.05	1.00	1.16	**0.99**	**0.94**	**0.95**	**0.84**	**0.93**	**0.93**	**0.96**	**0.93**	**0.94**	**0.89**	**0.95**	**0.96**

The relative MSFE is computed as the MSFE for a single indicator model in the pooled setup to that of the benchmark.

Table 11: Quantiles of MSFE of single indicators in pooled setup

	Period 1: 2003Q1–2018Q4											Period 2: 2019Q1–2023Q3										
Indicator	-2	-1	1	2	3	4	5	6	7	8	9	-2	-1	1	2	3	4	5	6	7	8	9
IPI	0.33	0.00	0.00	0.00	0.33	0.33	0.00	0.33	0.33	0.33	0.33	0.34	0.34	0.33	0.33	0.33	0.66	0.00	0.33	0.33	0.33	0.33
IPI(INS)	0.33	0.00	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.00	0.33	0.66	0.66	0.33	0.66	0.66	0.66
ipi(INV)	0.33	0.34	0.33	0.33	0.00	0.00	0.33	0.33	0.33	0.00	0.33	0.33	0.34	0.33	0.33	0.00	0.33	0.00	0.33	0.34	0.33	0.33
IPI(IVKON ND)	0.00	0.33	0.33	0.00	0.33	0.33	0.33	0.00	0.33	0.33	0.33	0.66	0.34	0.66	0.34	0.34	0.34	0.33	0.00	0.33	0.34	0.33
IPI(IVKON D)	0.00	0.00	0.33	0.33	0.00	0.00	0.66	0.66	0.33	0.34	0.34	0.33	0.33	0.34	0.34	0.34	0.66	0.00	0.33	0.00	0.34	0.33
MANU	0.00	0.00	0.66	0.00	0.00	0.00	0.66	0.33	0.66	0.33	0.33	0.66	0.00	0.33	0.33	0.34	0.34	0.34	0.66	0.66	0.00	0.00
IM	0.33	0.33	0.00	0.33	0.00	0.33	0.34	0.33	0.34	0.33	0.66	0.34	0.34	0.66	0.34	0.66	0.34	0.33	0.33	0.33	0.34	0.34
EX	0.33	0.00	0.33	0.00	0.34	0.33	0.33	0.34	0.66	0.33	0.34	0.00	0.33	0.34	0.34	0.34	0.34	0.33	0.34	0.34	0.34	0.66
NT	0.00	0.00	0.33	0.00	0.34	0.66	0.33	0.33	0.33	0.33	0.33	0.34	0.33	0.34	0.33	0.33	0.33	0.34	0.33	0.33	0.33	0.33
RTI	0.33	0.00	0.33	0.00	0.33	0.33	0.33	0.33	0.33	0.00	0.66	0.34	0.66	0.34	0.66	0.34	0.66	0.33	0.33	0.34	0.33	0.33
TSV	0.00	0.33	0.00	0.33	0.00	0.00	0.33	0.33	0.00	0.00	0.66	0.34	0.33	0.66	0.33	0.34	0.66	0.33	0.34	0.66	0.66	0.34
CONSCON	0.33	0.33	0.33	0.33	0.00	0.33	0.00	0.33	0.33	0.66	0.66	0.33	0.33	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
MANFCON	0.33	0.33	0.33	0.33	0.33	0.00	0.33	0.66	0.00	0.33	0.33	0.33	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
CONSBCON	0.33	0.00	0.33	0.00	0.00	0.00	0.33	0.33	0.33	0.34	0.34	0.00	0.00	0.33	0.00	0.33	0.00	0.00	0.00	0.34	0.00	0.00
TRAIND	0.33	0.00	0.34	0.00	0.00	0.34	0.00	0.66	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.66	0.34	0.33	0.33	0.33	0.00	0.00
RETINDI	0.34	0.33	0.66	0.33	0.33	0.33	0.66	0.66	0.34	0.00	0.33	0.34	0.34	0.34	0.34	0.66	0.34	0.33	0.34	0.33	0.66	0.00
MANPRD	0.66	0.00	0.66	0.00	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.33	0.00	0.66	0.66	0.33	0.00	0.00	0.00
ECOTEN	0.00	0.33	0.33	0.33	0.00	0.00	0.00	0.33	0.34	0.33	0.00	0.33	0.33	0.66	0.33	0.33	0.34	0.33	0.00	0.33	0.33	0.33
CCIM	0.33	0.00	0.00	0.33	0.33	0.33	0.00	0.00	0.66	0.66	0.34	0.66	0.66	0.66	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.33
CCA	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.33	0.33	0.33	0.66	0.66	0.66	0.33	0.66	0.33	0.33	0.34	0.66	0.34	0.34
CPI	0.33	0.33	0.33	0.33	0.33	0.33	0.00	0.33	0.33	0.33	0.34	0.34	0.66	0.34	0.33	0.00	0.00	0.33	0.33	0.33	0.66	0.00
PPIC	0.33	0.33	0.66	0.00	0.33	0.33	0.00	0.33	0.33	0.34	0.34	0.33	0.33	0.34	0.00	0.33	0.34	0.00	0.00	0.34	0.33	0.33
PPIE	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.00	0.00	0.00	0.33	0.33
PPICA	0.34	0.00	0.00	0.33	0.34	0.34	0.33	0.34	0.33	0.34	0.33	0.66	0.66	0.34	0.66	0.66	0.34	0.00	0.00	0.33	0.33	0.33
EPI	0.33	0.33	0.33	0.00	0.00	0.00	0.33	0.66	0.33	0.33	0.34	0.66	0.66	0.34	0.66	0.66	0.34	0.33	0.00	0.00	0.33	0.33
IMPI	0.33	0.33	0.33	0.33	0.00	0.00	0.00	0.33	0.00	0.34	0.33	0.34	0.34	0.34	0.34	0.34	0.33	0.33	0.00	0.33	0.33	0.33
PPI	0.00	0.33	0.33	0.00	0.00	0.00	0.33	0.33	0.33	0.33	0.34	0.34	0.66	0.34	0.66	0.66	0.34	0.00	0.00	0.00	0.33	0.34
CARPASS	0.33	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.66	0.33	0.34	0.33	0.33	0.33	0.34	0.00	0.33	0.34	0.34
POLRATE	0.34	0.33	0.66	0.00	0.00	0.00	0.33	0.66	0.34	0.34	0.66	0.33	0.33	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.66
GOVTBND10	0.33	0.33	0.33	0.00	0.00	0.00	0.00	0.33	0.00	0.34	0.66	0.33	0.33	0.34	0.33	0.33	0.33	0.00	0.33	0.33	0.33	0.00
GOVTBND5	0.00	0.33	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.34	0.66	0.33	0.33	0.34	0.33	0.33	0.33	0.33	0.00	0.00	0.00	0.33
TREBIL	0.34	0.66	0.66	0.33	0.00	0.33	0.33	0.33	0.34	0.66	0.34	0.00	0.00	0.34	0.00	0.33	0.33	0.00	0.33	0.00	0.34	0.66
SEKEU	0.34	0.34	0.34	0.34	0.34	0.33	0.00	0.33	0.33	0.34	0.34	0.34	0.33	0.66	0.33	0.33	0.66	0.00	0.00	0.33	0.34	0.34
SEKUSD	0.34	0.34	0.34	0.00	0.33	0.33	0.33	0.33	0.33	0.34	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.00	0.33	0.33	0.66	0.66
GOVTDE	0.33	0.33	0.33	0.00	0.00	0.33	0.66	0.33	0.33	0.00	0.34	0.33	0.33	0.34	0.33	0.33	0.34	0.33	0.00	0.66	0.33	0.00

The entries in the table are computed as follows: first, compute the MSFE of the pooled forecast using the forecast combination mean; then, the quantiles of the pooled MSFE are computed in relation to the MSFE of individual models.

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