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Abstract
A two step forecasting approach for long memory time series is introduced. In the first step we estimate the fractional exponent and, applying the fractional differencing operator, we obtain the underlying weakly dependent series. In the second step, we perform the multi-step ahead forecasts for the weakly dependent series and obtain their long memory counterparts by applying the fractional cumulation operator. The methodology applies to stationary and nonstationary cases. Applications to sixteen macroeconomic and monetary series indicate that the new methodology provides better forecasts. Furthermore, a high-order AR model fitted to the original data also yields to comparable results.

Keywords
Forecasting, Infinite Autoregressions, Long Memory, MLE, Local Whittle

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1. Introduction

The issue of analysing economic and other series which possess hyperbolically decaying autocorrelations has long been of concern in the time series analysis literature. The work of Granger (1980), Granger and Joyeux (1980) and Hosking (1981), among others, has been influential in the study and modelling of such *long memory* series; see Beran (1994) and Baillie (1996) for an extensive survey of this field.

There has been a major debate on the estimation of long memory series in both full and semi parametric setups, e.g. see Sowell (1992), Robinson (1995), Beran et al. (1998), Bhansali and Kokoszka (2002), Robinson (2006), Shimotsu and Phillips (2006),Abadir, Distaso and Giraitis (2007), Hualde and Robinson (2012) and Baillie and Kapetanios (2008) for detailed discussion.

However, the topic of forecasting long memory series is still growing. Diebold and Lindner (1996), Chan and Palma (1998) and Bhardwaj and Swanson (2006) have been concerned with predictions from ARFIMA models. A well-known approach is to obtain the predictions by using a truncated version of the infinite autoregressive representation. Peiris (1987) and Peiris and Perrera (1988) discuss computationally feasible ways for calculating these predictions and Crato and Ray (1996) and Poskitt (2007) analyse information criteria in order to determine the lag of the autoregression.

In this paper, we suggest two methods for forecasting time series with long memory: (i) the use of a two-stage forecasting approach, henceforth TSF, and (ii) the fit of a high-order *AR* model to the original data when the parameters are estimated by Yule-Walker equations. Both methods result in better forecasts in finite samples than does the standard way in the literature: that is, to estimate the parameters of the model and then obtain the forecasts from a truncated AR version of the canonical representation of the model.

The TSF is a simple and intuitive methodology. To begin with, we estimate the long memory parameter with any consistent estimator, either in full or semi parametric setup. Then we apply the fractional differencing operator that results in an underlying weakly dependent series. Finally, we compute the multi-step ahead forecasts for the latter and we apply the fractional cumulation operator* in order to obtain the corresponding forecasts for the original long memory series. A similar approach is applied to the bootstrap of such series in Papailias, Kapetanios and Taylor (2013).

Our claim is that forecasts of the underlying weakly dependent series when translated to their long memory equivalents should provide, *on average*, smaller forecast errors, given that the weakly dependent series is less persistent. Hence, any "loss" from the truncation of the AR expansion is avoided. Asymptotically, this new method is equivalent to the standard choice in the literature as long as the long memory parameter has been consistently estimated. An exercise using a sample size of $T = 10000$ observations shows that both methods perform similarly in large samples. In particular, provided that the true parameters and disturbances are observed, we numerically show that as $T \longrightarrow \infty$, the reconstruction of the original series, leads to the same result when using the TSF and the standard method.

It should be noted that we are not concerned with the estimation of the series, i.e. full or semi parametric methods, and hence we do not discuss their advantages and/or disadvantages. We rely simply on the consistency of the estimators to carry out our forecasting methodology. Empirical results in sixteen macroeconomic and monetary series from three countries show the improvements in the two-stage forecasting method. Furthermore, we evaluate the performance of an autoregressive model of high order when is fitted directly to the original data by choosing to avoid the presence of long memory. We find that this procedure renders good forecasts and strengthens the obvious: "simpler is better".

The rest of the paper is organised as follows: Section 2 introduces some basic concepts regarding the concept of long memory and explains the algorithm of the proposed forecasting methodology, Section 3 explains the various implementations of the TSF algorithm and discusses the empirical results. Finally, Section 4 summarises the conclusions.

2. Long Memory: Concepts and Forecasting

*This is just the inverse of the fractional differencing operator.

2.1 Existing Framework

We start by considering the following general fractionally integrated model, $y_t \sim I(d)$,

$$(1-L)^d y_t = u_t, t = 1, ...T, \tag{1}$$

where L denotes the lag operator, d is the degree of long memory and u_t is a weakly dependent process, $u_t \sim I(0)$. Following Davidson and DeJong (2000), we define $I(0)$ processes such that their partial sums converge weakly to Brownian motion. Hence, u_t can be written as,

$$u_t = \psi(L)\varepsilon_t = \sum_{i=0}^{\infty} \psi_i L^i \varepsilon_t \tag{2}$$

with $E(\varepsilon_t) = 0$, $E(\varepsilon_t^2) = \sigma_\varepsilon^2$ and $E(\varepsilon_t \varepsilon_s) = 0$ for all $t \neq s$. We could also write the above as,

$$\pi(L) u_t = \sum_{i=0}^{\infty} \pi_i L^i u_t = \varepsilon_{t.} \tag{3}$$

In the case where u_t follows a stationary and invertible $ARMA(p,q)$, model then y_t becomes the widely known $ARFIMA(p,d,q)$ model. For $|d| < 0.5$ the process is stationary and invertible, whereas for $d > 0.5$ the process is nonstationary; see Robinson (2005) for definitions regarding nonstationary processes. Using the binomial expansion, the fractional differencing operator is defined as,

$$(1-L)^d = \frac{\Gamma(j-d)}{\Gamma(j+1)\Gamma(-d)} = 1 - dL + \frac{d(d-1)}{2} L^2 ..., \tag{4}$$

where $\Gamma(\cdot)$ denotes the gamma function. Equation (4) resumes to

$$(1-L)^d = \sum_{j=0}^{\infty} \alpha_j(d) L^j. \tag{5}$$

The model for y_t can be written as an infinite moving average in terms of u_t for all values of d (see, e.g., Beran (1994)),

$$y_t = \sum_{i=0}^{\infty} \beta_i u_{t-i}, \tag{6}$$

where $b_i = \frac{\Gamma(d+1)}{\Gamma(i+1)\Gamma(d-i+1)}(-1)^i$. It can equivalently be written as an infinite autoregression, follows:

$$y_t = -\sum_{i=1}^{\infty} \alpha_i y_{t-i} + u_t, \tag{7}$$

The above results follow from the definition of the fractional differencing operator, $(1-L)^d$, that is formally valid for any real d; see Hosking (1981) for more details. More information regarding the properties and estimation of long memory time series can be found in Beran (1994), Baillie (1996), Baillie and Kapetanios (2008), Baillie et al. (2013a) and Baillie et al. (2013b) among others.

The standard forecasting method in the literature suggests that, given knowledge of the parameters estimates and using Equation (7), the theoretical s-step ahead forecast at time t is given by

$$\widehat{y}_{T+s|T} = \sum_{i=0}^{s} \widehat{\tau}_{s,i}^{f} \widehat{y}_{T-i|T} + \sum_{i=s+1}^{\infty} \widehat{\tau}_{s,i}^{f} y_{T-i|T} \tag{8}$$

where $\widehat{\tau}_{s,i}^{f}$ is obtained using the expansions described in Equation (6) and Equation (7) as,

$$\widehat{\tau}_{s,i} = \sum_{k=1}^{s-1} \alpha_{k+i}\beta_{s-k} + \alpha_{s+i}. \tag{9}$$

A feasible application of the above relies on truncating the infinite summation in Equation (8) to some lag of order P, i.e. $\widehat{y}_{T+s|T} = \sum_{i=0}^{s} \widehat{\tau}_{s,i}^{f} \widehat{y}_{T-i} + \sum_{i=s+1}^{P} \widehat{\tau}_{s,i}^{f} y_{T-i}$. Crato and Ray (1996) and Poskitt (2007) discuss different alternatives in choosing the optimal lag order P such that Equation (8) is well approximated. It is important to notice here that, when for example we are dealing with $ARFIMA$ models, one usually estimates the model and, given the vector of parameters estimates, one obtains the truncated version of the infinite expansion using the canonical representation of the $ARFIMA$ model. These weights are not the same when one fits a high order AR model directly to the long memory series.

2.2 Two-Stage Forecasting Algorithm

Along the lines discussed in the previous subsection, we propose the use of a two-stage forecasting methodology, TSF, to tackle the issue of forecasting long memory series. The general idea, first, is to obtain the forecasts for the underlying weakly dependent series. Secondly, by using the fractional cumulation operator, we obtain the corresponding forecasts for the long memory series. A similar approach is applied to the bootstrap of such series in Papailias, Kapetanios and Taylor (2013). The TSF procedure can be implemented in the following steps:

1. Estimate the long memory parameter (full or semi parametrically) and obtain $\widehat{d}$. Note that we assume $\widehat{d}$ to be a consistent estimator of d with $\left(\widehat{d}-d\right) = O_p\left(T^{-\mu}\right)$, with μ being bounded, such that $0.5 \geq \mu > 0$. Using Equation (5), apply the differencing operator and obtain the weakly dependent process, η_t,

$$\eta_t = (1-L)^{\widehat{d}} y_t = (1-L)^{\widehat{d}-d} u_t, \tag{10}$$

   where obviously $\eta_t \sim I\left(\widehat{d}-d\right)$.

2. Since η_t is a weakly dependent process, fit an $AR\left(\widehat{p}_{IC}\right)$ with $\widehat{p}_{IC}$ denoting the lag length obtained using an information criterion[†]. The 1-step ahead forecast is then given by

$$\widehat{\eta}_{T+1|T}^{f} = \sum_{i=0}^{\widehat{p}} \widehat{\pi}_i \eta_{t-i}. \tag{11}$$

3. Expand the original weakly dependent series η_t by adding the above forecast, thus $\widetilde{\eta}_t = \left(\eta_1, ..., \eta_T, \widehat{\eta}_{T+1|T}^{f}\right)'$. Apply the fractional cumulation operator using $\widehat{d}$ and obtain the vector which includes the 1-step ahead forecast for the long memory series,

$$\widehat{y}_t^{f} = (1-L)^{-\widehat{d}} \widetilde{\eta}_t, \; t = 1, ..., T, T+1. \tag{12}$$

   The 1-step ahead forecast is then given by $\widehat{y}_{T+1}^{f}$.

4. By continuing to repeat the above steps, we can obtain the s-step ahead forecast for the long memory series, $\widehat{y}_{T+s}^{f}$.

[†]Here we use Akaike's Information Criterion (AIC) and the Bayesian (BIC) in the empirical exercises.

We also consider a simpler approach that turns out to provide good results when compared to the standard method and the TSF. This procedure consists of fitting a high order $AR\left(\widehat{P}\right)$ model to the original data, avoiding the presence of long memory. Following Baillie and Kapetanios (2008), we fit an $AR\left(\widehat{P}\right)$ with $\widehat{P} = \left\lfloor (\ln T)^2 \right\rfloor$ directly to the original strongly dependent data. This follows decomposition, as in Equation (7). The multi-step forecasts are thus obtained iteratively.

2.3 Numerical Validation

To check for the consistency and validity of the TSF methodology, we undertake a numerical exercise showing that the TSF procedure can reconstruct the true data, and is eligible therefore to be used as a forecasting tool. To this purpose, we generate an $ARFIMA(1,d,1)$ using various values for the autoregressive parameter, ϕ, the moving average parameter, θ, and the long memory parameter. The simulated innovations follow the normal distribution with zero mean and variance equal to one.

Using the true values ϕ, θ and d we obtain a truncated version of the weights from the canonical representation of the ARFIMA model. We compare it to the TSF where in the first step d is used to difference the series and ϕ and θ are used to forecast the underlying ARMA model as usual. Then, we continue with steps 3 and 4 of the TSF algorithm. Note that this is not a standard Monte Carlo exercise, since we do not estimate the parameters and our main target is to show that we are able to reconstruct the series for any value of the long memory parameter d. In Table 2, we evaluate the forecastability of the TSF compared to the standard approach. Results are reported in terms of relative squared errors. The general conclusion from this exercise is that, as expected, the TSF algorithm is able to retrieve the true data, performing almost identically to the standard methodology.

3. Empirical Application

3.1 Methods

We show the results of the TSF method and the high order $AR\left(\widehat{P}\right)$ in a set of applied exercises in inflation data and we compare the forecasts obtained from twelve methods. Our benchmark is an $AR(1)$ model fitted directly to the original data. All the forecast results are in relation to this benchmark and all forecasts are obtained iteratively.

Method 1: $AR(\widehat{p}_{AIC})$. This is a simple autoregressive model with order selected by Akaike's Information Criterion (AIC).

Method 2: $AR(\widehat{p}_{BIC})$. Similar to the above. The order is selected by the Bayesian Information Criterion (BIC).

Method 3: MLE. The (quasi-) maximum likelihood estimation; denotes the (vectors of the) parameter estimates by $\widehat{d}_{MLE}$, $\widehat{p}_{MLE}$ and $\widehat{q}_{MLE}$. We set the maximum order of both autoregressive and moving average parameters equal to 8; see Baillie and Kapetanios (2008) for a detailed discussion. We use the (quasi)-MLE estimates in the canonical representation of the ARFIMA in order to obtain a truncated version of the infinite AR expansion, as in Equation (8). In our empirical study, we use $T-10$ lags to truncate the infinite summation.

Method 4: $TSF-MLE$. In this method we use the parameters estimated by $(quasi)-MLE$ in Method 3 and we implement the TSF methodology as described in the previous section. To this end, we use the $\widehat{d}_{MLE}$ in the first step of the TSF algorithm and then we obtain the forecasts for the weakly dependent series using $\widehat{p}_{MLE}$ and $\widehat{q}_{MLE}$ as usual by assuming a simple $ARMA(\widehat{p}_{MLE},\widehat{q}_{MLE})$ model. Then we apply the fractional cumulation operator using $\widehat{d}_{MLE}$ in the vector of the weakly series which is now expanded with the forecast (step 3 of the algorithm).

Method 5: $TSF-MLE(\widehat{p}_{AIC})$. In this method we use the $\widehat{d}_{MLE}$ for the application of the fractional differencing operator and the fractional cumulation operator and we implement the TSF methodology. However, we model the underlying η_t as a simple autoregressive process, $AR(\widehat{p}_{AIC})$, as in Equation (11), where the order is selected using AIC. Then the TSF algorithm is repeated and the forecasts are obtained recursively.

Method 6: $TSF-MLE(\widehat{p}_{BIC})$. Similar to Method 5. The difference is that we adopt BIC to select the order as in Equation (11), i.e. we treat the underlying weakly dependent series as a normal $AR(\widehat{p}_{BIC})$.

Method 7: $FELW$. This is the Local Whittle Two-Step Estimation (LWTSE) as discussed in Baillie and Kapetanios (2008). In this estimation method we obtain an estimate for the long memory parameter in the first step, using the Fully Extended Local Whittle Estimator of Abadir, Distaso and Giraitis (2007), denoted by $\widehat{d}_{FELW}$, we apply the fractional differencing operator in a similar fashion to the TSF algorithm and then we estimate the parameters of the weakly dependent series by minimising the conditional sum of squares; denoting the (vectors) of these parameters by $\widehat{p}_{FELW}$ and $\widehat{q}_{FELW}$. Then we use the estimates in order to calculate a truncated version of the infinite AR expansion, with $\widehat{P}=\left\lfloor(\ln T)^2\right\rfloor$, as used in the iterative forecasts.

A simple definition of the FELW which can be found in Abadir, Distaso and Giraitis (2011) is the following. Let there be $d\in(p-1/2,p+1/2]$, for $p=0,1,2,....$ The periodogram of the y_t series is defined as

$$I^{FELW}(\omega_j)=\left|1-e^{i\omega_j}\right|^{-2p} I_{(1-L)^d y_t}(\omega_j). \quad (13)$$

Then the FELW is obtained by minimising,

$$R^{FELW}(\cdot)=\ln\left[\frac{1}{m}\sum_{j=1}^{m} j^{2d} I^{FELW}(\omega_j)\right]-\frac{2d}{m}\sum_{j=1}^{m}\ln(j). \quad (14)$$

The above estimator is consistent for stationary and nonstationary series. We use the common choice of $m=\left\lfloor T^{0.5}\right\rfloor$ bandwidth in the above estimation.

Method 8: $TSF-FELW$. Similar to Method 4 and Method 5, but FELW estimates are adopted. Here we use $\widehat{d}_{FELW}$ in the first step of the TSF algorithm and then we use $\widehat{p}_{FELW}$ and $\widehat{q}_{FELW}$. As before, instead of calculating the truncated version of the infinite AR expansion we use $\widehat{p}_{FELW}$ and $\widehat{q}_{FELW}$ to obtain the forecasts for η_t and subsequently, using the inverse fractional differencing operator with $\widehat{d}_{FELW}$, obtain the corresponding forecasts for y_t.

Method 9: $TSF-FELW(\widehat{p}_{AIC})$. Similar to Method 5, but FELW estimates are adopted.

Method 10: $TSF-FELW(\widehat{p}_{BIC})$. Similar to Method 6, but FELW estimates are adopted.

Method 11: This is the alternative approach that fits an $AR\left(\widehat{P}\right)$ in the spirit of Baillie and Kapetanios (2008), as discussed in the previous section of this study.

Method 12: $TSF-AR\left(\widehat{P}\right)$. In the last method we use $\widehat{d}_{FELW}$ to obtain η_t in the first step of the TSF algorithm. Then we fit an $AR\left(\widehat{P}\right)$ with $\widehat{P}=\left\lfloor(\ln T)^2\right\rfloor$ to the underlying weak dependent series and obtain $\widetilde{\eta}_t$. The rest of the TSF algorithm continues as before.

3.2 Forecasting Exercise

In the forecasting we use two approaches: (i) a recursive and (ii) a rolling exercise. The detailed steps of the experiments follow.

1. Define the out-of-sample observations for the purposes of cross-validation (i.e. the training set), T^{Eval}, and the forecasting horizon, $h^{\max}$. This leaves us with an initial in-sample size of $T^{In}=T-T^{Eval}-h^{\max}+1$ which we use in the estimation; T denotes the full sample size. The algorithm results in T^{Eval} out-of-sample forecasts which are used in calculating the statistics. In the case of the recursive procedure, the in-sample size increases by one observation at each round of the exercise, whereas in the case of the rolling procedure the window is fixed. It should be noted that the subtraction of

$h^{\max}$ allows us to result in exactly T^{Eval} out-of-sample forecasts for all the forecasting steps.

2. Given the different methods described in the previous subsection, we estimate the model and produce the $h^{\max}$ steps ahead forecasts iteratively.

3. Then we repeat the whole procedure until the last observation is used.

4. Results

4.1 Data Description and Settings

We use monthly data of macroeconomic and monetary series for three major economies: (i) the US, (ii) Germany (henceforth denoted by DE) and (iii) the UK. Our variables include: (i) the US M1, M2, MZM (Money Stock), CPI and Industrial Production, (ii) the DE M1, M2, M3, CPI and Industrial Production and (iii) the UK M1, M2 ,M3, M4, CPI and Industrial Production. The task of forecasting these series is of major importance for central banks, since the evolution of these economic series sheds light on the response of the economy to monetary policy. The data are collected using Macrobond Financial software. For all series we use the annual percentage change. Figures 1 to 3 illustrate the growth series and Figures 4 to 6 depict their first 120 autocorrelations. In analysing the autocorrelation plots we observe that all series present strong persistence with the autocorrelation values decaying at a slow rate.

We set the evaluation periods (training set) to $T^{Eval} = 120$ months, which includes the period 2002-2012, and a forecasting horizon equal to $h^{\max} = 12$ months. Consequently, the in-sample/rolling window varies for each series. In Table 1 we describe the first and last observations of the sample size for the annual percentage growth of each series along with the first and last out-of-sample forecast.

4.2 Discussion

Our results discuss the root mean squared forecast error (RMSFE) of each method relative to the relevant RMSFE of a simple AR(1) model. The p-value for the two-sided Diebold-Mariano is also provided to further illustrate the statistical significance of the different forecast methods. Table 3 through Table 18 present the above results. A direct comparison of the new TSF methods to the standard approaches can be found in the Appendix (Table 19 through Table 34).

In Table 3 we forecast the US M1 annual growth series. We see that in both the recursive and rolling approaches the $AR(\widehat{p}_{AIC})$ provides better forecasts than the benchmark and the standard MLE. Only in the longer horizon are $AR(\widehat{p}_{BIC})$ and MLE better. The TSF approach does not add any value to the standard MLE, it is in fact worse. However, when combining the TSF with AIC and/or BIC we have an RMSFE which is at least to equal or smaller than compared all the standard approaches. This is also the case with the FELW. $TSF-FELW(\widehat{p}_{AIC})$ and $TSF-FELW(\widehat{p}_{BIC})$ outperform the standard FELW approach using recursive looping. Another interesting fact is that the $TSF-AR\left(\widehat{P}\right)$ further improves the standard $AR\left(\widehat{P}\right)$ and provides more accurate forecasts.

Continuing with the US M2 annual growth series in Table 4, we generally find the same conclusions. $AR(\widehat{p}_{AIC})$ is the best of the "simple" models (i.e. AR(1), $AR(\widehat{p}_{AIC})$, $AR(\widehat{p}_{BIC})$, MLE). The $TSF-MLE(\widehat{p}_{AIC})$ and $TSF-FELW(\widehat{p}_{AIC})$ improve the relevant standard approaches and $AR\left(\widehat{P}\right)$ and $TSF-AR\left(\widehat{P}\right)$ perform arbitrarily the same. The above hold in both looping procedures.

We then move to the US MZM annual growth series in Table 5. In the first step-ahead the best forecasts are provided by $TSF-MLE(\widehat{p}_{AIC})$, $TSF-FELW(\widehat{p}_{AIC})$ and $TSF-AR\left(\widehat{P}\right)$. Their RMSFE relative to the AR(1) benchmark is 0.68. The same holds for the second- and third-step ahead with relative RMSFE equal to 0.73 and 0.76 respectively. For all other horizons $TSF-FELW(\widehat{p}_{AIC})$ and $TSF-AR\left(\widehat{P}\right)$ perform slightly better.

Forecasting the US CPI annual growth series, we see in Table 6 that, even though the series is very persistent (as shown in Figure 4), a simple $AR(\widehat{p}_{AIC})$ seems to outperform all other methods. $TSF-MLE(\widehat{p}_{AIC})$, $TSF-FELW(\widehat{p}_{AIC})$ and $TSF-AR\left(\widehat{P}\right)$ provide forecasts as good as the $AR(\widehat{p}_{AIC})$.

Using the US Industrial Production annual growth series, we see in Table 7 that in the first step ahead $TSF-AR\left(\widehat{P}\right)$ and $AR(\widehat{p}_{AIC})$ outperform the benchmark with a relative RMSFE of 0.67 and 0.68 respectively. These two methods compete very closely with each other in all subsequent steps ahead.

Next, we use the DE series. In Table 8 we have the DE M1 annual growth rate and we see that $TSF-MLE(\widehat{p}_{AIC})$ is a clear winner using both looping procedures. $TSF-MLE(\widehat{p}_{BIC})$, $TSF-FELW$, $TSF-FELW(\widehat{p}_{AIC})$, $TSF-FELW(\widehat{p}_{BIC})$ and $TSF-AR\left(\widehat{P}\right)$ also provide better forecasts than the standard approaches do.

For the DE M2 annual growth series we see in Table 9 that now the $TSF-AR\left(\widehat{P}\right)$ is the best of the methods and provides very good forecasts up to the fourth step ahead. In particular, the relative RSMFE is 0.87 using the recursive approach and 0.89 using the looping approach. The second best method seems to be the $TSF-MLE(\widehat{p}_{AIC})$. The same conclusion holds for the DE M3 annual growth series, as seen in Table 10. Again, the TSF algorithm improves the forecasting and leads to more accurate results.

We then analyse the results for the DE CPI annual growth rate in Table 11. As before the $TSF-MLE(\widehat{p}_{AIC})$, $TSF-FELW(\widehat{p}_{AIC})$ and the $TSF-AR\left(\widehat{P}\right)$ are the best methods using both looping approaches. It should be noted the significant differences between the recursive and the rolling approach.

This is due to the nature of the series, as seen in Figure 2. We see that for the first step ahead $TSF-MLE\left(\widehat{p}_{AIC}\right)$ provides a relative RMSFE of 0.92 with the recursive approach, compared to 0.77 of the rolling looping. It is generally believed that rolling window estimation/forecasting tends to be more robust to seasonal changes in the series.

Table 12 present the results for the DE Industrial Production annual growth series. We see that the $AR\left(\widehat{p}_{AIC}\right)$ is again one of the best methods across all horizons, using both looping procedures. The next best methods are the $AR\left(\widehat{P}\right)$ and the $TSF-MLE\left(\widehat{p}_{AIC}\right)$.

Moving on to the UK series, we have the UK M1 growth rate in Table 13, the UK M2 growth rate in Table 14 and the UK M3 growth rate in Table 15. For all these series, $TSF-FELW\left(\widehat{p}_{AIC}\right)$ provides the best forecasts across all steps ahead in both looping procedures.

However, we see in Table 16 that the best model for predicting the UK M4 annual growth series is the simple AR(1) benchmark. Only in the first three to four steps ahead does AR(1) underperform compared to $TSF-MLE\left(\widehat{p}_{AIC}\right)$, $TSF-FELW\left(\widehat{p}_{AIC}\right)$, $AR\left(\widehat{P}\right)$ and $TSF-AR\left(\widehat{P}\right)$ in the recursive looping procedure. None of these methods succeeds in retaining its forecasting ability using the rolling approach.

Then we have the UK CPI annual growth series in Table 17. It is clearly seen that the TSF algorithm combined with AIC or BIC criteria again improves the forecasting performance of the models. The best method in both looping procedures is the $TSF-AR\left(\widehat{P}\right)$. In the rolling approach, in particular, we see that $TSF-MLE\left(\widehat{p}_{AIC}\right)$ and $TSF-AR\left(\widehat{P}\right)$ are the best choices for all steps ahead.

Finally, Table 18 presents the results for the UK Industrial Production annual growth rates. $TSF-MLE\left(\widehat{p}_{AIC}\right)$, $TSF-FELW\left(\widehat{p}_{AIC}\right)$. $TSF-FELW\left(\widehat{p}_{BIC}\right)$ and $TSF-AR\left(\widehat{P}\right)$ are among the best choices. They outperform the benchmark and the simple $AR\left(\widehat{p}_{AIC}\right)$ and $AR\left(\widehat{p}_{BIC}\right)$ models.

5. Concluding Remarks

In this paper, we investigate the topic of forecasting long memory time series. We introduce a two-step approach, which consists of applying the fractional differencing operator using any consistent estimate of the long memory parameter to retrieve the underlying short memory series. Then we obtain forecasts of this weakly dependent series in the usual way and, using the fractional cumulation operator, we obtain the corresponding forecast estimates for the strongly dependent series. Furthermore, we suggest the use of a high order autoregressive model, $AR(P)$, directly with the original data by deciding to ignore the presence of long memory. Despite of its simplicity, the latter method performs well in our empirical study.

Analysing sixteen macroeconomic and monetary series for three countries, we find that the suggested two-stage forecasting approach improves the standard methods when we fit an autoregressive model to the underlying weakly dependent series. We find that AR specifications where the orders are selected by AIC[‡] deliver good results. Joining the TSF algorithm with the *MLE* and *LWTSE* estimates returns, on average, smaller forecast errors.

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6. Figures & Tables

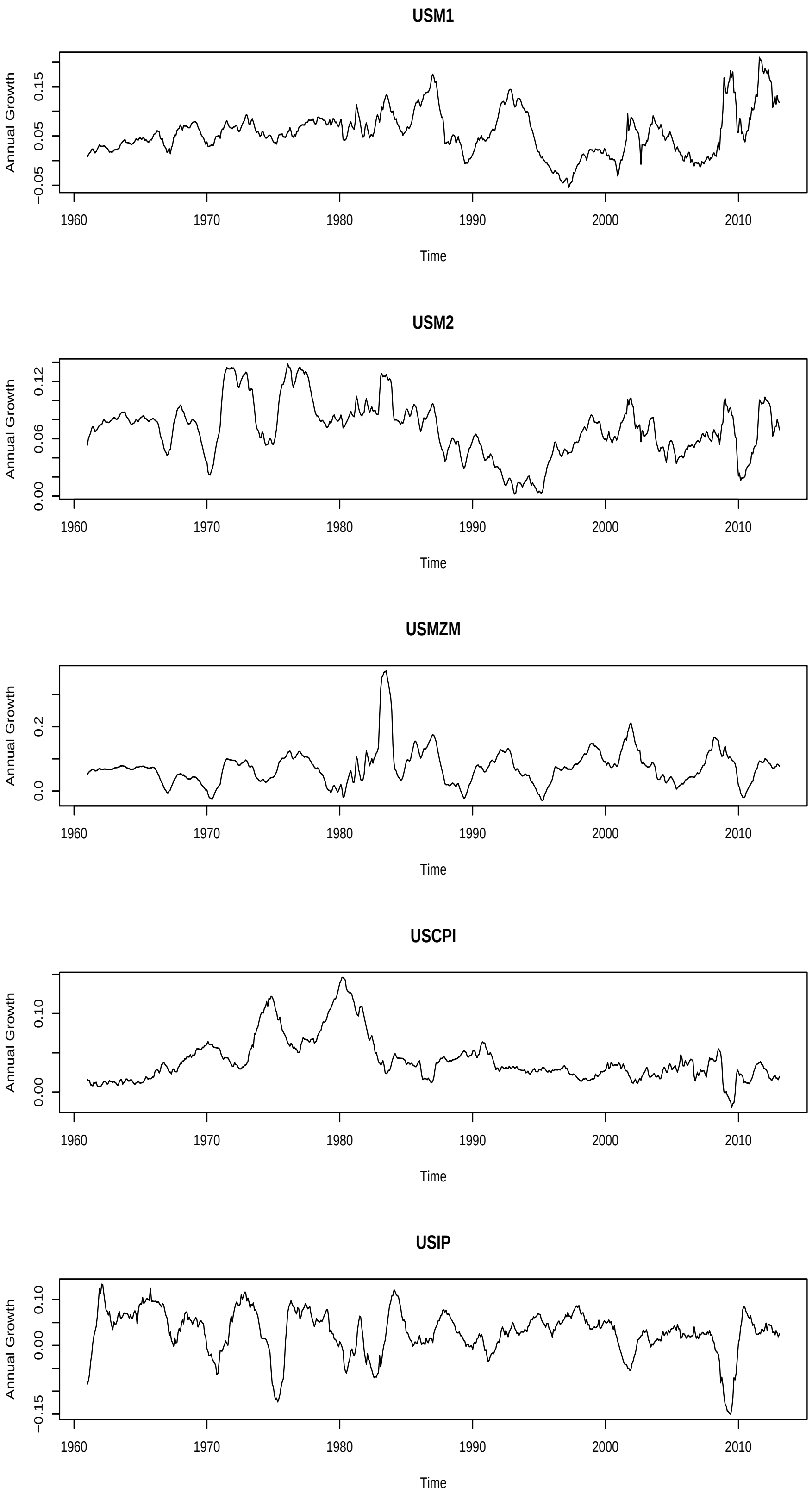

Figure 1. Plots of US Series

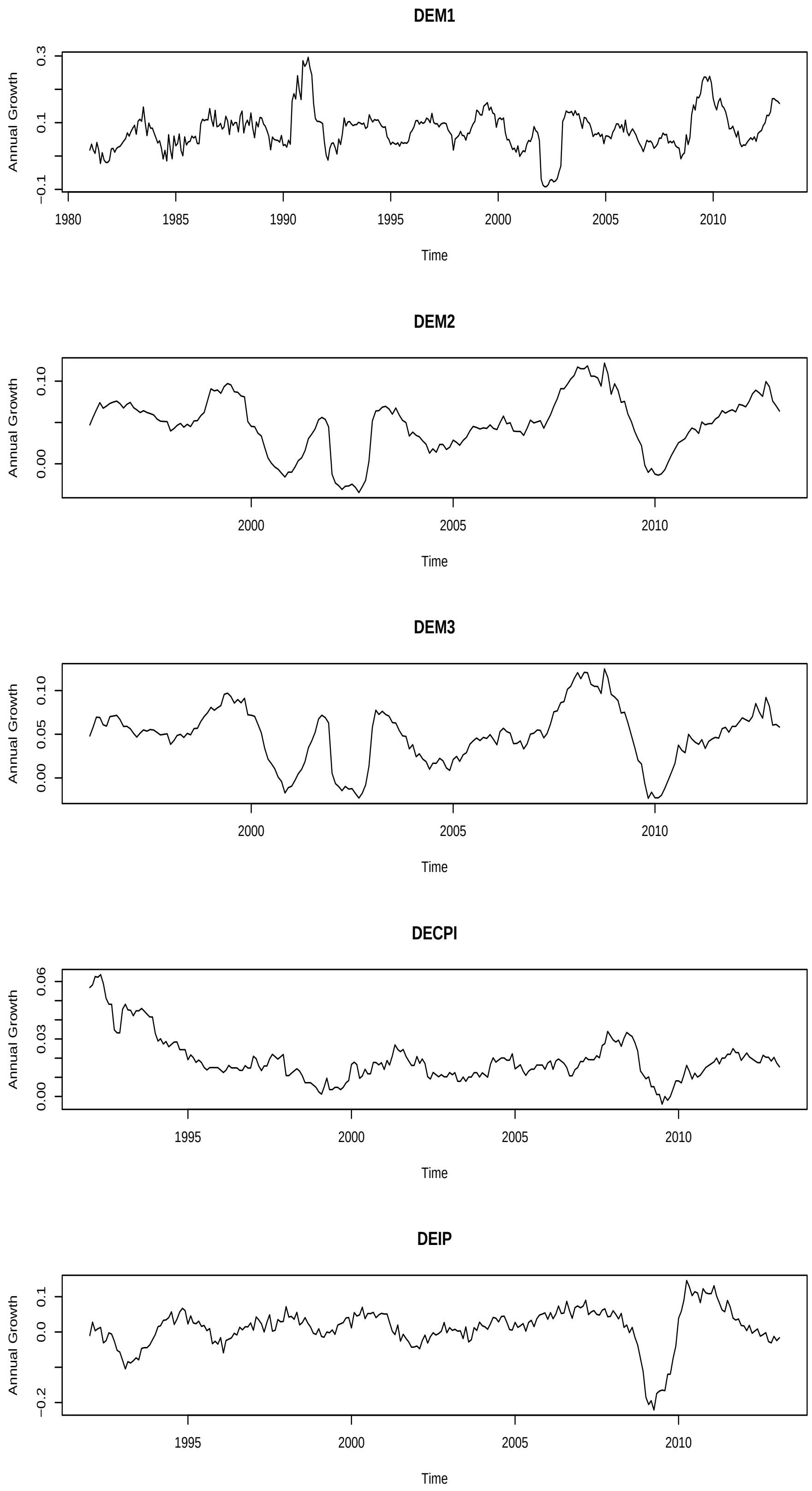

Figure 2. Plots of US Series

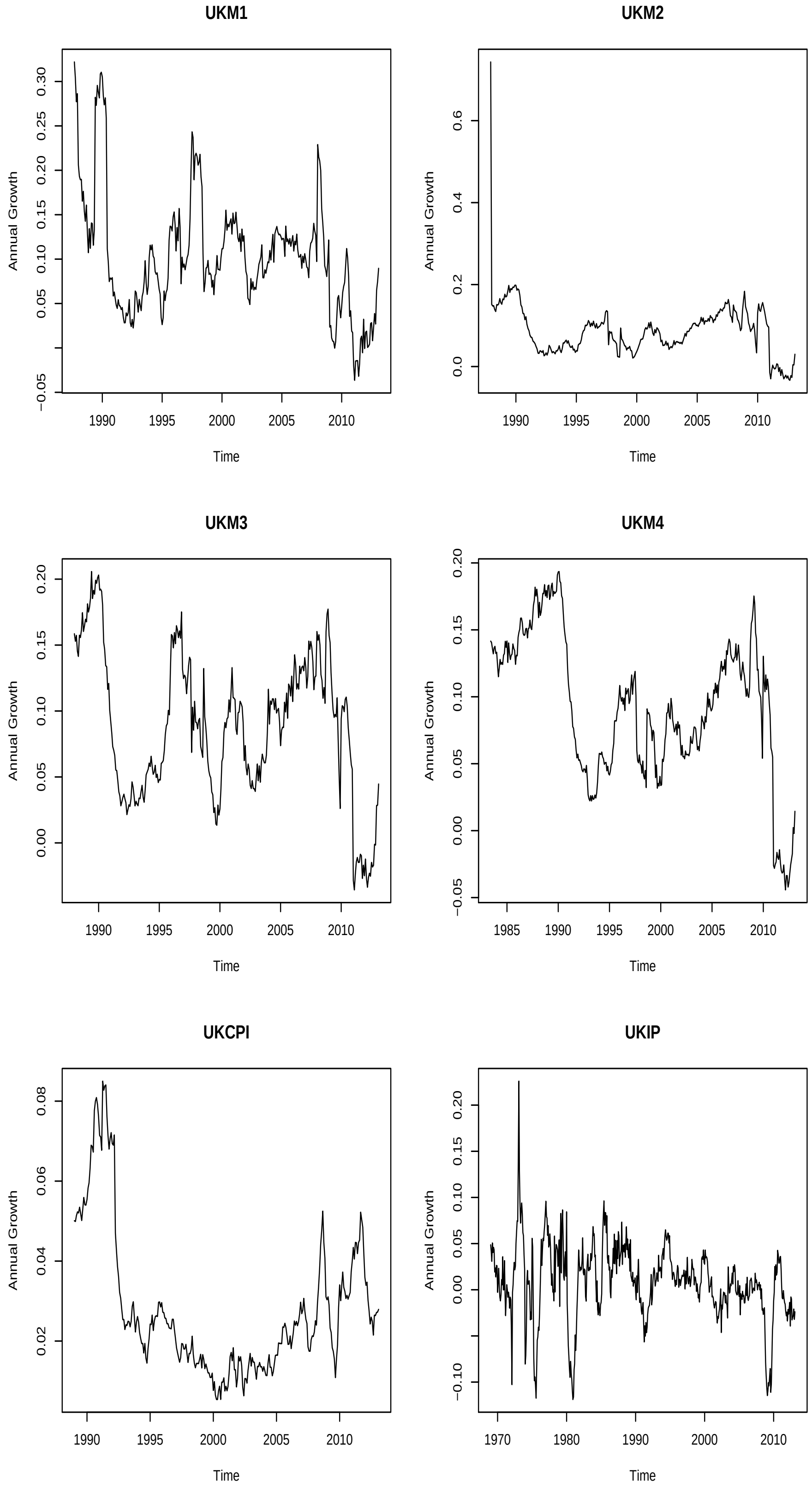

Figure 3. Plots of US Series

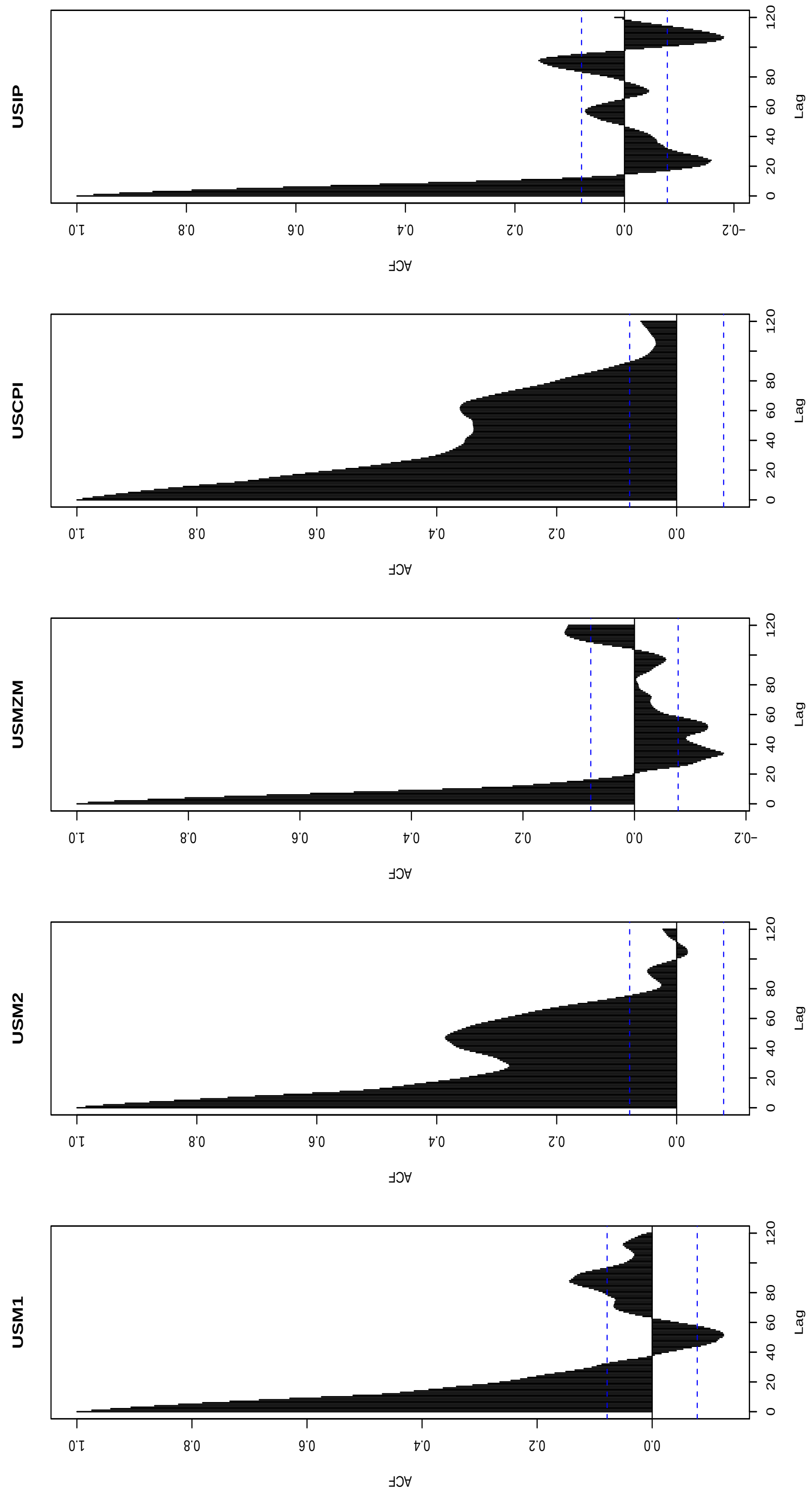

Figure 4. ACF Plots of US Series

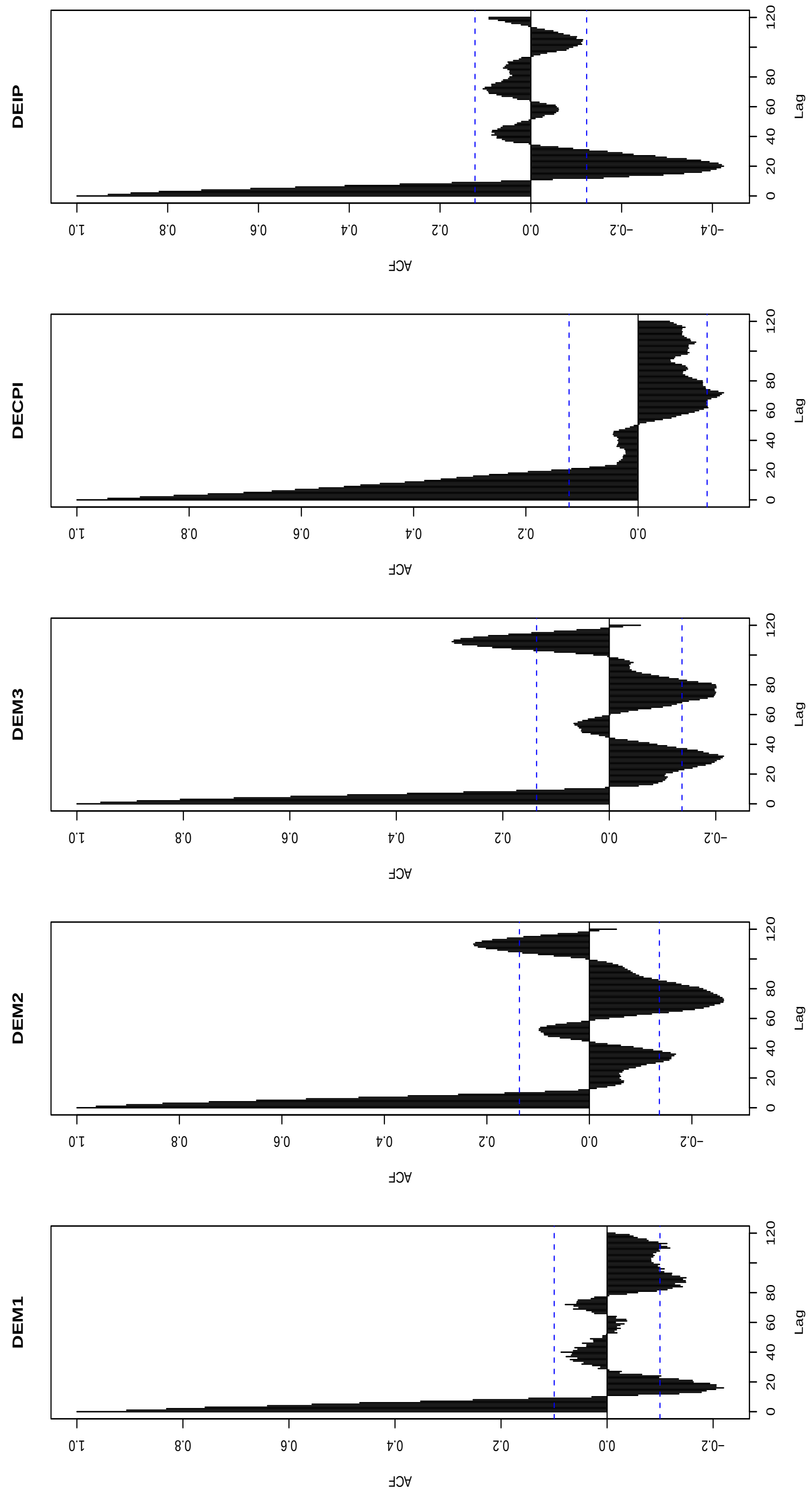

Figure 5. ACF Plots of DE Series

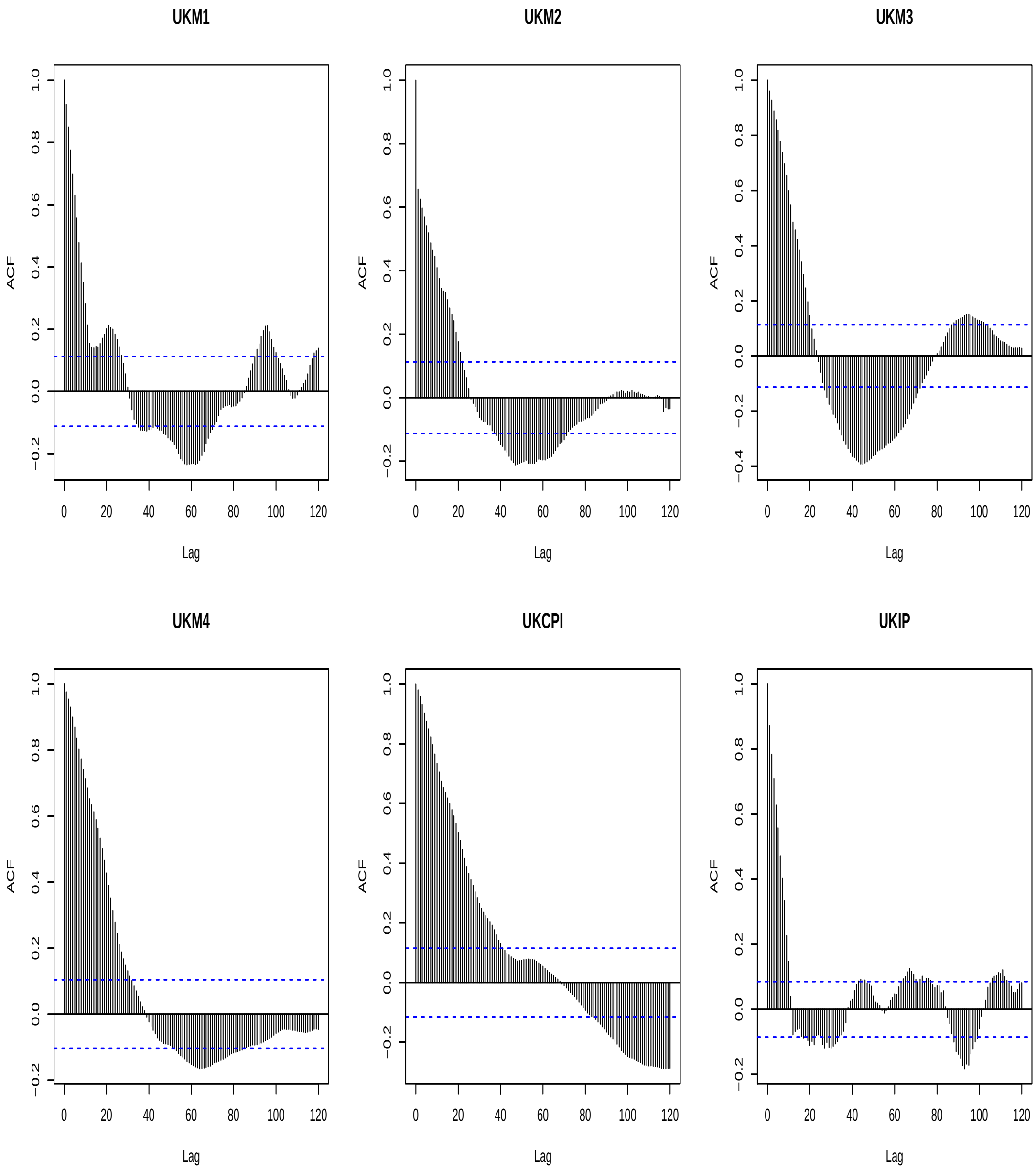

Figure 6. ACF Plots of UK Series

Table 1. Data Description

	Observations		Forecasts	
	First	Last	First	Last
US M1	1961-01	2013-02	2002-03	2012-02
US M2	1961-01	2013-02	2002-03	2012-02
US MZM	1961-01	2013-02	2002-03	2012-02
US CPI	1961-01	2013-02	2002-03	2012-02
US IP	1961-01	2013-02	2002-03	2012-02
DE M1	1981-01	2013-02	2002-03	2012-02
DE M2	1996-01	2013-02	2002-03	2012-02
DE M3	1996-01	2013-02	2002-03	2012-02
DE CPI	1992-01	2013-02	2002-03	2012-02
DE IP	1992-01	2013-02	2002-03	2012-02
UK M1	1987-09	2013-02	2002-03	2012-02
UK M2	1987-12	2013-02	2002-03	2012-02
UK M3	1988-01	2013-02	2002-03	2012-02
UK M4	1983-06	2013-02	2002-03	2012-02
UK CPI	1989-01	2013-02	2002-03	2012-02
UK IP	1969-01	2013-02	2002-03	2012-02

Table 1: Data Description (format: YYYY-mm).

Table 2. Numerical Validation

	T=10000. Relative Squared Errors: New Forecasting Method/Standard Forecasting Method															
	$\phi=0.5$	$\phi=0.5$	$\phi=0.5$	$\phi=0.5$	$\phi=0.9$	$\phi=0.9$	$\phi=0.9$	$\phi=0.9$	$\phi=0$	$\phi=0$	$\phi=0$	$\phi=0$	$\phi=0$	$\phi=0$	$\phi=0$	$\phi=0$
	$\theta=0$	$\theta=0$	$\theta=0$	$\theta=0$	$\theta=0$	$\theta=0$	$\theta=0$	$\theta=0$	$\theta=0.5$	$\theta=0.5$	$\theta=0.5$	$\theta=0.5$	$\theta=0.9$	$\theta=0.9$	$\theta=0.9$	$\theta=0.9$
h	$d=0.2$	$d=0.4$	$d=0.8$	$d=1.5$	$d=0.2$	$d=0.4$	$d=0.8$	$d=1.5$	$d=0.2$	$d=0.4$	$d=0.8$	$d=1.5$	$d=0.2$	$d=0.4$	$d=0.8$	$d=1.5$
1	0.999	0.999	1.000	1.000	1.000	1.000	1.000	1.000	1.040	0.999	0.999	0.999	1.001	1.000	0.999	0.999
2	1.003	1.002	1.000	1.000	1.000	1.000	1.000	1.000	0.988	0.998	0.998	0.999	1.001	1.000	0.999	0.999
3	1.001	0.995	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.998	1.010	1.000	1.002	1.000	1.000	0.999
4	1.001	0.999	1.000	1.000	1.000	1.000	1.000	1.000	0.986	0.998	1.001	1.000	0.999	1.000	1.000	0.999
5	1.002	0.999	1.000	1.000	1.000	1.000	1.000	1.000	1.008	0.999	1.001	1.000	0.999	1.000	0.999	0.999
6	1.003	0.999	1.000	0.999	1.000	1.000	1.000	1.000	0.994	0.999	1.001	0.999	0.999	1.000	0.999	0.999
7	0.995	0.999	1.000	0.999	1.000	1.000	1.000	1.000	0.997	0.997	1.001	0.999	0.999	1.000	1.000	0.999
8	0.999	0.999	1.000	0.999	1.000	1.000	1.000	1.000	0.996	0.992	1.001	1.000	1.005	1.000	1.000	0.999
9	0.999	0.999	1.000	0.999	1.000	1.000	1.000	1.000	0.992	0.997	1.001	1.000	0.999	1.000	0.999	0.999
10	0.999	0.998	1.000	0.999	1.000	1.000	1.000	1.000	0.998	0.998	1.002	1.000	1.003	1.000	0.999	0.999
11	0.994	0.997	1.000	0.999	1.000	1.000	1.000	0.998	0.976	0.998	1.020	1.000	1.000	1.000	0.997	0.999
12	1.003	0.998	1.000	0.998	1.000	1.000	1.000	1.000	0.997	0.993	1.024	1.000	1.000	1.000	0.998	0.999
13	0.991	0.998	1.000	1.009	1.000	1.000	1.000	1.000	1.026	1.003	1.028	1.000	1.000	1.000	0.998	0.999
14	1.018	0.999	1.000	1.001	1.000	1.000	1.000	1.000	1.004	0.995	1.014	1.000	1.003	1.000	0.997	0.999
15	0.985	0.999	1.000	1.001	1.000	1.000	1.000	1.000	0.996	0.996	0.995	1.000	1.000	0.999	1.008	0.999
16	0.993	0.999	1.000	1.001	1.000	1.000	1.000	1.000	0.997	1.106	0.996	1.000	1.001	1.000	1.002	0.999
17	0.789	0.999	1.000	1.001	1.000	1.000	1.000	1.000	0.997	1.004	0.981	1.000	1.000	1.001	1.002	0.999
18	0.996	0.999	1.000	1.000	1.000	1.000	1.000	1.000	0.984	0.996	1.004	1.000	1.000	1.000	1.002	0.999
19	0.997	0.999	1.000	1.000	1.000	1.000	1.000	1.000	0.984	0.999	1.001	1.000	1.001	1.000	1.002	0.999
20	0.998	0.999	1.000	1.000	1.000	1.000	1.000	1.000	0.993	0.999	1.001	1.000	1.000	1.001	1.003	0.998
21	0.996	0.999	1.000	1.001	1.000	1.000	1.000	1.000	0.990	0.997	1.001	1.000	1.000	1.006	1.007	0.998
22	0.996	0.999	1.000	1.001	1.000	1.000	1.000	1.000	0.985	0.950	1.002	1.000	1.001	1.001	0.988	0.997
23	0.996	0.996	1.000	1.001	1.000	1.000	1.000	1.000	0.994	1.008	1.003	1.000	0.986	1.000	0.995	0.996
24	0.909	0.994	1.000	1.001	1.000	1.000	1.000	1.000	0.995	0.994	1.002	1.000	1.000	1.000	0.996	0.993
25	1.006	1.022	1.000	1.001	1.000	1.000	1.000	1.000	0.995	0.997	1.009	1.000	1.000	1.000	0.994	0.990
26	1.004	1.007	1.000	1.001	1.000	1.000	1.000	1.000	1.006	0.998	0.996	1.000	1.000	1.003	0.997	0.991
27	1.032	1.003	1.000	1.001	1.000	1.000	1.000	1.000	1.015	0.994	0.990	1.000	1.000	1.006	0.999	0.993
28	1.002	0.993	1.000	1.001	1.000	1.001	1.000	1.000	0.996	0.996	1.031	1.000	1.010	0.995	0.999	0.994
29	1.001	0.998	1.000	1.001	1.000	1.001	1.000	1.000	0.997	0.995	0.995	1.000	1.000	0.999	0.999	0.996
30	1.001	0.998	1.000	1.001	1.000	1.002	1.000	0.999	0.998	1.016	0.997	1.000	1.000	1.000	0.998	0.997

Table 2: Comparing the "asymptotic" results of the two-stages forecasting method and the standard one using ARFIMA(1,d,1) models. *h* denotes the forecast steps ahead.

Table 3. US M1

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.82 (0.022)	0.91 (0.147)	0.93 (0.291)	1.15 (0.288)	0.82 (0.024)	0.94 (0.392)	0.94 (0.375)	0.99 (0.934)	0.82 (0.021)	0.93 (0.286)	0.82 (0.022)	0.82 (0.022)
2	0.78 (0.014)	0.85 (0.037)	0.87 (0.095)	1.25 (0.172)	0.78 (0.022)	0.88 (0.1)	0.87 (0.09)	0.96 (0.705)	0.77 (0.014)	0.87 (0.061)	0.78 (0.014)	0.77 (0.015)
3	0.80 (0.023)	0.83 (0.035)	0.85 (0.044)	1.35 (0.197)	0.79 (0.024)	0.85 (0.052)	0.85 (0.042)	0.97 (0.78)	0.79 (0.016)	0.84 (0.039)	0.81 (0.024)	0.79 (0.018)
4	0.82 (0.028)	0.84 (0.035)	0.85 (0.015)	1.48 (0.085)	0.80 (0.01)	0.86 (0.021)	0.85 (0.018)	0.97 (0.722)	0.80 (0.009)	0.85 (0.022)	0.83 (0.029)	0.80 (0.01)
5	0.83 (0.051)	0.83 (0.037)	0.84 (0.035)	1.56 (0.119)	0.81 (0.016)	0.84 (0.038)	0.83 (0.025)	0.97 (0.74)	0.81 (0.014)	0.83 (0.025)	0.84 (0.054)	0.81 (0.015)
6	0.86 (0.126)	0.83 (0.061)	0.85 (0.08)	1.62 (0.092)	0.83 (0.034)	0.84 (0.077)	0.83 (0.048)	0.97 (0.715)	0.83 (0.035)	0.83 (0.044)	0.87 (0.134)	0.83 (0.037)
7	0.90 (0.302)	0.86 (0.096)	0.88 (0.14)	1.74 (0.079)	0.87 (0.057)	0.88 (0.134)	0.86 (0.068)	1.01 (0.944)	0.86 (0.084)	0.86 (0.066)	0.91 (0.326)	0.87 (0.089)
8	0.94 (0.578)	0.88 (0.111)	0.91 (0.208)	1.84 (0.071)	0.91 (0.123)	0.90 (0.187)	0.87 (0.085)	1.03 (0.784)	0.90 (0.196)	0.87 (0.081)	0.95 (0.628)	0.90 (0.219)
9	0.99 (0.911)	0.89 (0.167)	0.93 (0.367)	1.97 (0.105)	0.95 (0.324)	0.93 (0.345)	0.89 (0.138)	1.06 (0.618)	0.93 (0.413)	0.88 (0.128)	1.00 (0.982)	0.94 (0.467)
10	1.03 (0.826)	0.92 (0.222)	0.95 (0.537)	2.08 (0.098)	0.99 (0.716)	0.96 (0.577)	0.90 (0.19)	1.09 (0.489)	0.97 (0.677)	0.90 (0.172)	1.04 (0.747)	0.98 (0.76)
11	1.06 (0.664)	0.93 (0.281)	0.96 (0.697)	2.18 (0.097)	1.02 (0.662)	0.97 (0.759)	0.91 (0.265)	1.12 (0.446)	0.99 (0.933)	0.91 (0.235)	1.07 (0.589)	1.00 (0.974)
12	1.09 (0.537)	0.95 (0.425)	0.98 (0.856)	2.32 (0.105)	1.05 (0.197)	1.00 (0.987)	0.93 (0.371)	1.15 (0.394)	1.02 (0.812)	0.92 (0.324)	1.10 (0.466)	1.03 (0.726)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.82 (0.022)	0.98 (0.685)	0.98 (0.712)	1.11 (0.256)	0.82 (0.024)	0.99 (0.777)	0.99 (0.889)	1.02 (0.799)	0.82 (0.021)	1.00 (0.993)	0.82 (0.023)	0.82 (0.021)
2	0.79 (0.017)	0.99 (0.538)	0.98 (0.625)	1.15 (0.117)	0.79 (0.019)	0.99 (0.688)	0.99 (0.835)	1.02 (0.632)	0.78 (0.014)	1.00 (0.907)	0.79 (0.017)	0.78 (0.014)
3	0.80 (0.025)	0.99 (0.713)	0.97 (0.546)	1.15 (0.253)	0.80 (0.025)	0.98 (0.569)	0.99 (0.717)	1.01 (0.835)	0.79 (0.018)	0.99 (0.777)	0.80 (0.025)	0.79 (0.018)
4	0.82 (0.03)	1.00 (0.914)	0.97 (0.42)	1.18 (0.029)	0.82 (0.019)	0.98 (0.41)	0.99 (0.684)	1.00 (0.913)	0.80 (0.011)	0.99 (0.818)	0.82 (0.032)	0.80 (0.011)
5	0.84 (0.056)	1.00 (0.986)	0.97 (0.459)	1.21 (0.113)	0.82 (0.034)	0.97 (0.374)	0.99 (0.633)	1.00 (0.972)	0.81 (0.018)	1.00 (0.855)	0.83 (0.057)	0.81 (0.019)
6	0.86 (0.137)	1.00 (0.989)	0.97 (0.513)	1.20 (0.146)	0.85 (0.078)	0.97 (0.401)	0.98 (0.523)	1.00 (0.947)	0.83 (0.047)	0.99 (0.756)	0.86 (0.142)	0.83 (0.048)
7	0.91 (0.342)	1.00 (0.852)	0.97 (0.545)	1.22 (0.173)	0.89 (0.191)	0.97 (0.408)	0.99 (0.597)	1.01 (0.886)	0.87 (0.117)	0.99 (0.841)	0.91 (0.353)	0.87 (0.122)
8	0.95 (0.633)	1.00 (0.852)	0.98 (0.613)	1.25 (0.126)	0.92 (0.408)	0.98 (0.408)	0.99 (0.608)	1.01 (0.858)	0.90 (0.263)	0.99 (0.83)	0.95 (0.646)	0.91 (0.273)
9	0.99 (0.957)	1.01 (0.673)	0.99 (0.834)	1.27 (0.144)	0.97 (0.72)	0.99 (0.611)	0.99 (0.749)	1.02 (0.702)	0.94 (0.509)	1.00 (0.899)	0.99 (0.967)	0.94 (0.527)
10	1.04 (0.788)	1.01 (0.669)	1.01 (0.889)	1.32 (0.079)	1.01 (0.956)	1.00 (0.96)	0.99 (0.732)	1.03 (0.619)	0.98 (0.779)	0.99 (0.868)	1.04 (0.782)	0.98 (0.802)
11	1.07 (0.64)	1.02 (0.61)	1.02 (0.53)	1.37 (0.06)	1.04 (0.733)	1.01 (0.383)	0.99 (0.727)	1.04 (0.553)	1.00 (0.991)	0.99 (0.849)	1.07 (0.638)	1.00 (0.97)
12	1.10 (0.523)	1.02 (0.475)	1.04 (0.317)	1.43 (0.052)	1.07 (0.551)	1.03 (0.116)	0.99 (0.758)	1.05 (0.449)	1.03 (0.776)	0.99 (0.899)	1.10 (0.523)	1.03 (0.76)

Table 3: Forecasting M1 Annual Growth for the US. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 4. US M2

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.79 (0.013)	0.91 (0.248)	0.88 (0.042)	0.90 (0.098)	0.79 (0.015)	0.90 (0.17)	0.88 (0.043)	0.89 (0.096)	0.79 (0.015)	0.90 (0.183)	0.79 (0.013)	0.79 (0.014)
2	0.82 (0.043)	0.96 (0.609)	0.90 (0.123)	0.92 (0.25)	0.82 (0.046)	0.93 (0.373)	0.90 (0.123)	0.93 (0.273)	0.82 (0.044)	0.94 (0.398)	0.82 (0.045)	0.81 (0.043)
3	0.83 (0.075)	0.97 (0.696)	0.90 (0.154)	0.92 (0.284)	0.82 (0.063)	0.92 (0.372)	0.90 (0.149)	0.92 (0.319)	0.82 (0.061)	0.93 (0.391)	0.83 (0.081)	0.82 (0.06)
4	0.88 (0.24)	1.00 (0.996)	0.91 (0.196)	0.94 (0.386)	0.87 (0.173)	0.94 (0.509)	0.91 (0.185)	0.94 (0.411)	0.87 (0.164)	0.95 (0.535)	0.88 (0.256)	0.87 (0.167)
5	0.89 (0.325)	1.00 (0.969)	0.90 (0.151)	0.93 (0.308)	0.88 (0.22)	0.94 (0.458)	0.90 (0.144)	0.93 (0.318)	0.88 (0.206)	0.94 (0.468)	0.89 (0.36)	0.88 (0.219)
6	0.90 (0.399)	1.02 (0.879)	0.91 (0.131)	0.93 (0.276)	0.89 (0.248)	0.93 (0.426)	0.90 (0.13)	0.93 (0.324)	0.89 (0.232)	0.94 (0.435)	0.91 (0.458)	0.90 (0.257)
7	0.91 (0.449)	1.04 (0.759)	0.91 (0.107)	0.94 (0.245)	0.90 (0.243)	0.94 (0.372)	0.91 (0.121)	0.95 (0.368)	0.90 (0.222)	0.94 (0.378)	0.93 (0.53)	0.91 (0.264)
8	0.92 (0.457)	1.05 (0.676)	0.91 (0.076)	0.94 (0.157)	0.91 (0.201)	0.93 (0.282)	0.91 (0.105)	0.95 (0.35)	0.90 (0.178)	0.94 (0.284)	0.94 (0.569)	0.92 (0.234)
9	0.92 (0.456)	1.05 (0.649)	0.90 (0.089)	0.93 (0.181)	0.91 (0.158)	0.92 (0.224)	0.90 (0.121)	0.94 (0.375)	0.90 (0.137)	0.93 (0.224)	0.94 (0.591)	0.91 (0.195)
10	0.92 (0.441)	1.07 (0.582)	0.90 (0.105)	0.93 (0.198)	0.91 (0.11)	0.91 (0.161)	0.89 (0.146)	0.94 (0.418)	0.90 (0.094)	0.92 (0.175)	0.95 (0.607)	0.92 (0.158)
11	0.93 (0.476)	1.09 (0.467)	0.91 (0.168)	0.94 (0.303)	0.91 (0.132)	0.92 (0.211)	0.90 (0.207)	0.95 (0.528)	0.90 (0.113)	0.92 (0.25)	0.96 (0.679)	0.92 (0.205)
12	0.95 (0.563)	1.12 (0.33)	0.92 (0.275)	0.95 (0.478)	0.92 (0.201)	0.93 (0.319)	0.91 (0.301)	0.97 (0.723)	0.91 (0.168)	0.94 (0.387)	0.98 (0.807)	0.93 (0.3)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.81 (0.012)	0.98 (0.692)	0.92 (0.115)	0.95 (0.397)	0.80 (0.012)	0.94 (0.354)	0.92 (0.122)	0.92 (0.241)	0.80 (0.012)	0.94 (0.35)	0.80 (0.011)	0.80 (0.012)
2	0.83 (0.043)	1.02 (0.782)	0.92 (0.109)	0.96 (0.523)	0.83 (0.036)	0.96 (0.443)	0.93 (0.109)	0.94 (0.315)	0.83 (0.038)	0.95 (0.433)	0.83 (0.041)	0.82 (0.034)
3	0.84 (0.089)	1.02 (0.786)	0.92 (0.074)	0.95 (0.398)	0.83 (0.06)	0.93 (0.198)	0.92 (0.05)	0.94 (0.182)	0.83 (0.063)	0.93 (0.229)	0.84 (0.087)	0.83 (0.058)
4	0.89 (0.261)	1.07 (0.283)	0.94 (0.189)	0.99 (0.894)	0.88 (0.165)	0.95 (0.359)	0.94 (0.151)	0.96 (0.392)	0.88 (0.174)	0.96 (0.443)	0.89 (0.269)	0.88 (0.159)
5	0.90 (0.354)	1.08 (0.272)	0.93 (0.198)	0.98 (0.818)	0.89 (0.209)	0.95 (0.332)	0.93 (0.166)	0.95 (0.297)	0.89 (0.217)	0.96 (0.386)	0.90 (0.367)	0.89 (0.2)
6	0.92 (0.441)	1.08 (0.283)	0.92 (0.212)	0.98 (0.823)	0.90 (0.242)	0.94 (0.309)	0.93 (0.181)	0.95 (0.292)	0.91 (0.247)	0.95 (0.345)	0.92 (0.457)	0.91 (0.231)
7	0.93 (0.5)	1.09 (0.271)	0.93 (0.255)	0.99 (0.941)	0.91 (0.241)	0.94 (0.346)	0.92 (0.218)	0.94 (0.339)	0.92 (0.238)	0.94 (0.348)	0.93 (0.517)	0.92 (0.223)
8	0.94 (0.526)	1.09 (0.304)	0.93 (0.266)	1.00 (0.979)	0.92 (0.199)	0.94 (0.332)	0.92 (0.21)	0.94 (0.314)	0.93 (0.179)	0.94 (0.318)	0.94 (0.544)	0.93 (0.175)
9	0.94 (0.542)	1.10 (0.304)	0.93 (0.301)	1.01 (0.943)	0.92 (0.143)	0.93 (0.357)	0.91 (0.204)	0.94 (0.306)	0.93 (0.111)	0.93 (0.32)	0.94 (0.56)	0.93 (0.115)
10	0.95 (0.553)	1.10 (0.296)	0.92 (0.333)	1.02 (0.884)	0.93 (0.062)	0.93 (0.366)	0.90 (0.202)	0.93 (0.298)	0.93 (0.041)	0.92 (0.298)	0.95 (0.576)	0.93 (0.056)
11	0.96 (0.629)	1.11 (0.25)	0.93 (0.383)	1.03 (0.818)	0.94 (0.045)	0.93 (0.439)	0.90 (0.228)	0.94 (0.372)	0.94 (0.051)	0.93 (0.366)	0.96 (0.663)	0.94 (0.096)
12	0.98 (0.769)	1.13 (0.158)	0.94 (0.471)	1.05 (0.699)	0.95 (0.1)	0.94 (0.567)	0.91 (0.277)	0.95 (0.52)	0.95 (0.175)	0.94 (0.489)	0.98 (0.817)	0.96 (0.266)

Table 4: Forecasting M2 Annual Growth for the US. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 5. US MZM

h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
Recursive Looping												
RMSFE relative to AR(1)												
1	0.71 (0.001)	0.79 (0.008)	0.76 (0)	0.76 (0.001)	0.68 (0)	0.77 (0.002)	0.76 (0)	0.76 (0)	0.68 (0)	0.77 (0.002)	0.72 (0.001)	0.68 (0)
2	0.79 (0.036)	0.92 (0.405)	0.85 (0.055)	0.85 (0.061)	0.73 (0.005)	0.87 (0.098)	0.85 (0.053)	0.85 (0.061)	0.73 (0.005)	0.86 (0.092)	0.80 (0.049)	0.73 (0.006)
3	0.87 (0.257)	1.00 (0.971)	0.88 (0.152)	0.88 (0.167)	0.76 (0.021)	0.90 (0.243)	0.88 (0.146)	0.88 (0.165)	0.76 (0.02)	0.89 (0.226)	0.89 (0.312)	0.76 (0.02)
4	0.96 (0.737)	1.05 (0.664)	0.89 (0.219)	0.90 (0.239)	0.79 (0.061)	0.91 (0.302)	0.89 (0.208)	0.90 (0.234)	0.78 (0.058)	0.90 (0.279)	0.98 (0.845)	0.78 (0.059)
5	1.03 (0.815)	1.10 (0.458)	0.90 (0.268)	0.90 (0.289)	0.80 (0.101)	0.90 (0.322)	0.89 (0.253)	0.90 (0.282)	0.80 (0.098)	0.89 (0.297)	1.05 (0.686)	0.80 (0.098)
6	1.10 (0.473)	1.14 (0.294)	0.89 (0.295)	0.89 (0.311)	0.81 (0.128)	0.89 (0.317)	0.89 (0.277)	0.89 (0.307)	0.80 (0.126)	0.88 (0.29)	1.12 (0.359)	0.80 (0.126)
7	1.15 (0.287)	1.18 (0.197)	0.90 (0.327)	0.90 (0.338)	0.81 (0.155)	0.89 (0.337)	0.89 (0.307)	0.90 (0.339)	0.81 (0.153)	0.88 (0.307)	1.19 (0.203)	0.80 (0.152)
8	1.20 (0.195)	1.21 (0.154)	0.89 (0.304)	0.89 (0.308)	0.80 (0.138)	0.88 (0.298)	0.89 (0.282)	0.90 (0.314)	0.80 (0.136)	0.87 (0.267)	1.24 (0.132)	0.80 (0.134)
9	1.24 (0.124)	1.24 (0.129)	0.89 (0.29)	0.89 (0.291)	0.80 (0.125)	0.87 (0.262)	0.88 (0.265)	0.89 (0.295)	0.79 (0.124)	0.86 (0.23)	1.29 (0.08)	0.80 (0.121)
10	1.29 (0.079)	1.27 (0.11)	0.89 (0.296)	0.89 (0.294)	0.80 (0.119)	0.86 (0.246)	0.88 (0.266)	0.89 (0.297)	0.80 (0.118)	0.85 (0.211)	1.34 (0.05)	0.80 (0.113)
11	1.34 (0.059)	1.31 (0.096)	0.90 (0.344)	0.90 (0.337)	0.81 (0.128)	0.87 (0.268)	0.90 (0.306)	0.90 (0.343)	0.80 (0.126)	0.86 (0.226)	1.39 (0.038)	0.81 (0.12)
12	1.38 (0.047)	1.35 (0.079)	0.92 (0.458)	0.92 (0.445)	0.82 (0.157)	0.89 (0.341)	0.92 (0.409)	0.92 (0.457)	0.82 (0.152)	0.87 (0.287)	1.45 (0.031)	0.83 (0.145)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.72 (0.001)	0.80 (0.009)	0.76 (0)	0.76 (0)	0.68 (0)	0.77 (0.002)	0.76 (0)	0.76 (0)	0.68 (0)	0.77 (0.002)	0.72 (0.001)	0.68 (0)
2	0.81 (0.056)	0.93 (0.441)	0.85 (0.052)	0.86 (0.066)	0.73 (0.005)	0.86 (0.092)	0.85 (0.05)	0.86 (0.06)	0.73 (0.005)	0.86 (0.088)	0.81 (0.056)	0.73 (0.005)
3	0.91 (0.397)	1.01 (0.964)	0.88 (0.151)	0.89 (0.192)	0.76 (0.019)	0.90 (0.232)	0.88 (0.145)	0.89 (0.175)	0.76 (0.018)	0.90 (0.22)	0.91 (0.397)	0.76 (0.018)
4	1.00 (0.978)	1.07 (0.595)	0.89 (0.213)	0.90 (0.267)	0.79 (0.055)	0.91 (0.294)	0.89 (0.202)	0.90 (0.245)	0.79 (0.054)	0.90 (0.275)	1.00 (0.978)	0.79 (0.055)
5	1.09 (0.502)	1.11 (0.393)	0.90 (0.26)	0.90 (0.316)	0.80 (0.095)	0.90 (0.323)	0.89 (0.244)	0.90 (0.289)	0.80 (0.095)	0.90 (0.3)	1.09 (0.502)	0.80 (0.096)
6	1.17 (0.225)	1.16 (0.241)	0.89 (0.294)	0.90 (0.348)	0.81 (0.123)	0.89 (0.322)	0.89 (0.276)	0.90 (0.318)	0.81 (0.124)	0.89 (0.301)	1.17 (0.225)	0.81 (0.126)
7	1.23 (0.121)	1.20 (0.16)	0.90 (0.333)	0.91 (0.384)	0.81 (0.149)	0.89 (0.344)	0.89 (0.314)	0.90 (0.357)	0.81 (0.153)	0.89 (0.326)	1.23 (0.121)	0.81 (0.156)
8	1.28 (0.077)	1.23 (0.127)	0.90 (0.323)	0.90 (0.365)	0.80 (0.132)	0.88 (0.309)	0.89 (0.304)	0.90 (0.344)	0.80 (0.14)	0.88 (0.295)	1.28 (0.077)	0.80 (0.142)
9	1.34 (0.046)	1.26 (0.105)	0.89 (0.32)	0.90 (0.351)	0.80 (0.12)	0.87 (0.275)	0.89 (0.298)	0.90 (0.337)	0.80 (0.131)	0.87 (0.262)	1.34 (0.046)	0.80 (0.133)
10	1.39 (0.029)	1.30 (0.089)	0.89 (0.331)	0.89 (0.348)	0.80 (0.115)	0.87 (0.261)	0.89 (0.305)	0.90 (0.345)	0.80 (0.127)	0.86 (0.247)	1.39 (0.029)	0.80 (0.13)
11	1.44 (0.022)	1.34 (0.077)	0.91 (0.381)	0.90 (0.388)	0.81 (0.123)	0.87 (0.282)	0.90 (0.348)	0.91 (0.395)	0.81 (0.137)	0.87 (0.265)	1.44 (0.022)	0.81 (0.14)
12	1.49 (0.018)	1.37 (0.063)	0.93 (0.499)	0.93 (0.503)	0.82 (0.149)	0.89 (0.357)	0.92 (0.456)	0.93 (0.517)	0.82 (0.165)	0.88 (0.333)	1.49 (0.018)	0.82 (0.17)

Table 5: Forecasting MZM Annual Growth for the US. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 6. US CPI

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.70 (0.006)	0.81 (0.042)	0.78 (0.021)	0.78 (0.023)	0.70 (0.006)	0.80 (0.028)	0.81 (0.038)	0.81 (0.042)	0.71 (0.006)	0.82 (0.054)	0.70 (0.006)	0.71 (0.006)
2	0.77 (0.063)	0.89 (0.329)	0.86 (0.21)	0.87 (0.254)	0.77 (0.062)	0.87 (0.252)	0.90 (0.361)	0.90 (0.387)	0.77 (0.067)	0.91 (0.417)	0.77 (0.062)	0.77 (0.065)
3	0.81 (0.102)	0.96 (0.711)	0.92 (0.481)	0.95 (0.628)	0.82 (0.103)	0.94 (0.544)	0.98 (0.836)	0.98 (0.889)	0.82 (0.113)	0.99 (0.894)	0.82 (0.101)	0.82 (0.106)
4	0.86 (0.138)	1.03 (0.772)	0.99 (0.92)	1.02 (0.813)	0.87 (0.154)	1.01 (0.942)	1.05 (0.631)	1.06 (0.572)	0.88 (0.176)	1.06 (0.551)	0.87 (0.137)	0.87 (0.159)
5	0.92 (0.181)	1.10 (0.34)	1.06 (0.491)	1.11 (0.259)	0.93 (0.266)	1.08 (0.343)	1.13 (0.256)	1.14 (0.21)	0.93 (0.312)	1.14 (0.199)	0.92 (0.187)	0.93 (0.281)
6	0.97 (0.199)	1.16 (0.142)	1.12 (0.134)	1.19 (0.071)	0.98 (0.653)	1.14 (0.082)	1.19 (0.1)	1.21 (0.075)	0.99 (0.772)	1.21 (0.077)	0.97 (0.286)	0.98 (0.708)
7	1.02 (0)	1.21 (0.07)	1.16 (0.032)	1.26 (0.037)	1.03 (0)	1.19 (0.02)	1.23 (0.053)	1.25 (0.04)	1.04 (0)	1.26 (0.04)	1.02 (0)	1.03 (0.004)
8	1.05 (0)	1.24 (0.055)	1.20 (0.03)	1.33 (0.041)	1.07 (0.023)	1.24 (0.02)	1.27 (0.054)	1.30 (0.043)	1.08 (0.033)	1.30 (0.039)	1.06 (0)	1.08 (0.05)
9	1.08 (0)	1.27 (0.065)	1.23 (0.051)	1.38 (0.058)	1.10 (0.156)	1.27 (0.037)	1.30 (0.074)	1.34 (0.062)	1.11 (0.147)	1.33 (0.056)	1.08 (0.005)	1.11 (0.161)
10	1.11 (0.082)	1.29 (0.076)	1.24 (0.066)	1.42 (0.072)	1.13 (0.208)	1.29 (0.055)	1.31 (0.093)	1.35 (0.082)	1.14 (0.193)	1.35 (0.074)	1.11 (0.126)	1.13 (0.212)
11	1.13 (0.127)	1.29 (0.08)	1.25 (0.07)	1.45 (0.08)	1.15 (0.222)	1.30 (0.063)	1.30 (0.103)	1.36 (0.094)	1.16 (0.203)	1.35 (0.085)	1.13 (0.168)	1.16 (0.223)
12	1.17 (0.107)	1.29 (0.061)	1.26 (0.052)	1.48 (0.076)	1.20 (0.196)	1.32 (0.053)	1.30 (0.088)	1.36 (0.09)	1.21 (0.178)	1.36 (0.076)	1.17 (0.141)	1.21 (0.195)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.70 (0.007)	0.81 (0.043)	0.79 (0.015)	0.78 (0.016)	0.70 (0.007)	0.81 (0.048)	0.80 (0.019)	0.79 (0.021)	0.71 (0.007)	0.82 (0.057)	0.70 (0.007)	0.70 (0.007)
2	0.77 (0.068)	0.89 (0.341)	0.86 (0.177)	0.87 (0.201)	0.78 (0.073)	0.90 (0.398)	0.88 (0.223)	0.88 (0.243)	0.78 (0.074)	0.92 (0.462)	0.77 (0.068)	0.78 (0.072)
3	0.82 (0.113)	0.96 (0.726)	0.93 (0.459)	0.94 (0.507)	0.83 (0.124)	0.98 (0.863)	0.95 (0.601)	0.96 (0.635)	0.83 (0.127)	1.00 (0.984)	0.82 (0.113)	0.83 (0.124)
4	0.87 (0.156)	1.03 (0.769)	1.00 (0.969)	1.01 (0.9)	0.89 (0.191)	1.06 (0.585)	1.02 (0.798)	1.03 (0.738)	0.89 (0.21)	1.07 (0.482)	0.88 (0.16)	0.89 (0.2)
5	0.93 (0.214)	1.10 (0.341)	1.06 (0.405)	1.09 (0.246)	0.94 (0.351)	1.13 (0.218)	1.09 (0.257)	1.10 (0.197)	0.95 (0.438)	1.15 (0.17)	0.93 (0.242)	0.95 (0.403)
6	0.98 (0.237)	1.16 (0.147)	1.11 (0.097)	1.15 (0.055)	1.00 (0.984)	1.19 (0.088)	1.14 (0.057)	1.16 (0.036)	1.01 (0.815)	1.21 (0.067)	0.99 (0.473)	1.01 (0.891)
7	1.03 (0)	1.20 (0.075)	1.15 (0.024)	1.20 (0.022)	1.05 (0)	1.24 (0.044)	1.18 (0.019)	1.20 (0.013)	1.06 (0)	1.26 (0.035)	1.03 (0)	1.06 (0)
8	1.06 (0)	1.24 (0.059)	1.18 (0.022)	1.24 (0.023)	1.09 (0)	1.28 (0.04)	1.22 (0.024)	1.24 (0.019)	1.11 (0.03)	1.30 (0.033)	1.07 (0)	1.10 (0.017)
9	1.09 (0.001)	1.27 (0.069)	1.21 (0.042)	1.28 (0.041)	1.12 (0.076)	1.31 (0.056)	1.24 (0.044)	1.27 (0.039)	1.14 (0.117)	1.34 (0.048)	1.10 (0.006)	1.13 (0.114)
10	1.12 (0.094)	1.29 (0.08)	1.22 (0.055)	1.30 (0.052)	1.15 (0.134)	1.33 (0.073)	1.26 (0.06)	1.29 (0.055)	1.17 (0.161)	1.35 (0.064)	1.12 (0.099)	1.16 (0.167)
11	1.14 (0.139)	1.29 (0.081)	1.22 (0.058)	1.31 (0.057)	1.17 (0.157)	1.33 (0.082)	1.26 (0.069)	1.29 (0.065)	1.19 (0.175)	1.36 (0.076)	1.15 (0.14)	1.19 (0.184)
12	1.17 (0.12)	1.29 (0.06)	1.22 (0.045)	1.33 (0.051)	1.21 (0.143)	1.34 (0.07)	1.26 (0.06)	1.31 (0.061)	1.23 (0.157)	1.37 (0.069)	1.18 (0.12)	1.23 (0.163)

Table 6: Forecasting CPI Annual Growth for the US. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 7. US Industrial Production

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.68 (0.001)	0.88 (0.027)	0.92 (0.061)	1.15 (0.107)	0.69 (0.001)	0.93 (0.175)	0.92 (0.027)	0.90 (0.037)	0.68 (0.001)	0.92 (0.036)	0.68 (0.001)	0.67 (0.001)
2	0.62 (0.007)	0.81 (0.024)	0.88 (0.073)	1.25 (0.06)	0.63 (0.007)	0.89 (0.1)	0.89 (0.013)	0.87 (0.024)	0.62 (0.007)	0.89 (0.019)	0.62 (0.007)	0.62 (0.007)
3	0.62 (0.032)	0.78 (0.06)	0.88 (0.158)	1.36 (0.031)	0.64 (0.034)	0.88 (0.157)	0.89 (0.036)	0.86 (0.056)	0.62 (0.031)	0.88 (0.045)	0.62 (0.033)	0.62 (0.032)
4	0.63 (0.075)	0.77 (0.111)	0.89 (0.243)	1.48 (0.027)	0.65 (0.083)	0.88 (0.239)	0.89 (0.072)	0.86 (0.097)	0.62 (0.073)	0.88 (0.096)	0.63 (0.076)	0.63 (0.075)
5	0.65 (0.125)	0.78 (0.157)	0.91 (0.322)	1.55 (0.019)	0.68 (0.144)	0.89 (0.315)	0.90 (0.113)	0.87 (0.134)	0.65 (0.123)	0.89 (0.154)	0.65 (0.126)	0.65 (0.126)
6	0.66 (0.163)	0.79 (0.206)	0.93 (0.434)	1.67 (0.008)	0.70 (0.197)	0.91 (0.402)	0.91 (0.169)	0.89 (0.18)	0.66 (0.163)	0.89 (0.216)	0.66 (0.165)	0.67 (0.166)
7	0.68 (0.192)	0.80 (0.242)	0.94 (0.53)	1.80 (0.002)	0.73 (0.243)	0.91 (0.472)	0.91 (0.212)	0.90 (0.215)	0.68 (0.193)	0.89 (0.258)	0.68 (0.194)	0.68 (0.197)
8	0.69 (0.212)	0.80 (0.262)	0.95 (0.609)	1.92 (0.001)	0.74 (0.278)	0.92 (0.518)	0.91 (0.246)	0.90 (0.247)	0.69 (0.213)	0.88 (0.283)	0.69 (0.213)	0.69 (0.217)
9	0.70 (0.233)	0.80 (0.274)	0.96 (0.684)	2.06 (0)	0.76 (0.319)	0.92 (0.558)	0.91 (0.277)	0.91 (0.277)	0.70 (0.233)	0.87 (0.303)	0.70 (0.234)	0.71 (0.239)
10	0.72 (0.256)	0.81 (0.281)	0.97 (0.759)	2.20 (0)	0.79 (0.369)	0.92 (0.593)	0.91 (0.3)	0.91 (0.303)	0.72 (0.255)	0.87 (0.316)	0.72 (0.257)	0.73 (0.262)
11	0.73 (0.281)	0.81 (0.289)	0.98 (0.828)	2.36 (0)	0.82 (0.429)	0.92 (0.625)	0.91 (0.315)	0.91 (0.321)	0.74 (0.277)	0.86 (0.324)	0.73 (0.282)	0.74 (0.286)
12	0.75 (0.301)	0.81 (0.296)	0.99 (0.916)	2.56 (0)	0.84 (0.491)	0.93 (0.664)	0.91 (0.336)	0.91 (0.346)	0.75 (0.293)	0.87 (0.337)	0.75 (0.303)	0.76 (0.304)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.69 (0.002)	0.91 (0.107)	0.90 (0.052)	1.01 (0.901)	0.70 (0.002)	0.90 (0.075)	0.91 (0.073)	0.91 (0.121)	0.69 (0.002)	0.91 (0.098)	0.69 (0.002)	0.69 (0.002)
2	0.63 (0.008)	0.86 (0.045)	0.86 (0.038)	1.02 (0.82)	0.64 (0.008)	0.85 (0.029)	0.87 (0.023)	0.87 (0.034)	0.62 (0.007)	0.87 (0.037)	0.63 (0.008)	0.62 (0.007)
3	0.62 (0.034)	0.82 (0.076)	0.85 (0.093)	1.01 (0.899)	0.64 (0.036)	0.84 (0.061)	0.84 (0.047)	0.84 (0.052)	0.62 (0.031)	0.84 (0.065)	0.62 (0.034)	0.62 (0.031)
4	0.62 (0.079)	0.81 (0.133)	0.87 (0.158)	1.06 (0.682)	0.64 (0.086)	0.85 (0.116)	0.84 (0.091)	0.83 (0.094)	0.61 (0.073)	0.84 (0.122)	0.62 (0.079)	0.61 (0.072)
5	0.64 (0.131)	0.82 (0.186)	0.89 (0.218)	1.10 (0.499)	0.67 (0.146)	0.87 (0.16)	0.86 (0.136)	0.85 (0.138)	0.63 (0.121)	0.85 (0.182)	0.65 (0.131)	0.63 (0.121)
6	0.66 (0.171)	0.83 (0.238)	0.92 (0.295)	1.17 (0.258)	0.69 (0.194)	0.90 (0.227)	0.88 (0.176)	0.87 (0.176)	0.65 (0.159)	0.86 (0.232)	0.66 (0.171)	0.65 (0.158)
7	0.67 (0.201)	0.84 (0.273)	0.95 (0.376)	1.25 (0.108)	0.71 (0.234)	0.92 (0.297)	0.89 (0.211)	0.88 (0.207)	0.66 (0.186)	0.87 (0.271)	0.67 (0.202)	0.66 (0.186)
8	0.67 (0.22)	0.84 (0.288)	0.97 (0.464)	1.31 (0.051)	0.72 (0.262)	0.94 (0.38)	0.90 (0.237)	0.89 (0.233)	0.66 (0.202)	0.87 (0.29)	0.68 (0.221)	0.67 (0.202)
9	0.68 (0.239)	0.84 (0.291)	0.99 (0.589)	1.38 (0.025)	0.74 (0.293)	0.96 (0.481)	0.90 (0.255)	0.90 (0.253)	0.67 (0.218)	0.87 (0.298)	0.69 (0.24)	0.68 (0.218)
10	0.70 (0.26)	0.83 (0.287)	1.00 (0)	1.45 (0.017)	0.76 (0.328)	0.97 (0.643)	0.90 (0.261)	0.90 (0.262)	0.68 (0.233)	0.86 (0.297)	0.70 (0.262)	0.69 (0.234)
11	0.71 (0.283)	0.83 (0.29)	1.02 (0)	1.54 (0.023)	0.78 (0.364)	0.99 (0.853)	0.91 (0.274)	0.91 (0.277)	0.70 (0.247)	0.86 (0.299)	0.71 (0.285)	0.70 (0.249)
12	0.72 (0.301)	0.83 (0.294)	1.03 (0)	1.64 (0.022)	0.80 (0.396)	1.00 (0.939)	0.91 (0.287)	0.91 (0.294)	0.71 (0.255)	0.86 (0.301)	0.73 (0.303)	0.71 (0.257)

Table 7: Forecasting Industrial Production Annual Growth for the US. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 8. DE M1

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.98 (0.821)	1.01 (0.215)	0.97 (0.454)	0.98 (0.758)	0.87 (0.228)	0.98 (0.672)	0.94 (0.158)	0.94 (0.163)	0.92 (0.455)	0.98 (0.508)	1.00 (0.975)	0.94 (0.574)
2	0.93 (0.57)	0.98 (0.189)	0.90 (0.123)	0.95 (0.528)	0.76 (0.089)	0.91 (0.192)	0.87 (0.03)	0.88 (0.05)	0.83 (0.224)	0.92 (0.013)	0.96 (0.746)	0.85 (0.288)
3	0.93 (0.589)	0.97 (0.221)	0.88 (0.171)	0.97 (0.805)	0.70 (0.073)	0.89 (0.196)	0.84 (0.054)	0.86 (0.087)	0.80 (0.201)	0.90 (0.031)	0.96 (0.78)	0.82 (0.255)
4	0.98 (0.863)	0.98 (0.348)	0.90 (0.271)	0.99 (0.967)	0.70 (0.091)	0.91 (0.295)	0.85 (0.093)	0.86 (0.135)	0.82 (0.284)	0.92 (0.069)	1.02 (0.911)	0.84 (0.342)
5	0.99 (0.918)	0.98 (0.365)	0.90 (0.285)	1.02 (0.895)	0.68 (0.093)	0.91 (0.327)	0.84 (0.091)	0.86 (0.132)	0.82 (0.299)	0.91 (0.045)	1.02 (0.867)	0.83 (0.343)
6	1.02 (0.865)	0.98 (0.394)	0.90 (0.304)	1.05 (0.777)	0.68 (0.094)	0.92 (0.366)	0.84 (0.08)	0.85 (0.115)	0.83 (0.346)	0.90 (0.027)	1.07 (0.631)	0.85 (0.397)
7	1.07 (0.581)	0.98 (0.489)	0.90 (0.308)	1.05 (0.752)	0.69 (0.089)	0.92 (0.403)	0.84 (0.059)	0.85 (0.092)	0.86 (0.411)	0.90 (0.012)	1.12 (0.358)	0.88 (0.488)
8	1.12 (0.321)	0.99 (0.559)	0.90 (0.344)	1.07 (0.678)	0.71 (0.084)	0.92 (0.463)	0.84 (0.058)	0.86 (0.108)	0.89 (0.5)	0.90 (0.009)	1.18 (0.166)	0.91 (0.613)
9	1.16 (0.173)	0.99 (0.604)	0.90 (0.376)	1.08 (0.632)	0.72 (0.074)	0.93 (0.525)	0.85 (0.055)	0.87 (0.124)	0.92 (0.586)	0.90 (0.006)	1.23 (0.078)	0.95 (0.747)
10	1.21 (0.087)	0.99 (0.675)	0.91 (0.432)	1.12 (0.544)	0.74 (0.062)	0.94 (0.6)	0.86 (0.054)	0.89 (0.174)	0.95 (0.72)	0.89 (0.005)	1.28 (0.04)	0.98 (0.915)
11	1.24 (0.061)	1.00 (0.7)	0.91 (0.475)	1.17 (0.463)	0.75 (0.051)	0.94 (0.646)	0.87 (0.044)	0.90 (0.21)	0.96 (0.796)	0.89 (0.003)	1.32 (0.031)	1.00 (0.986)
12	1.25 (0.05)	1.00 (0.733)	0.91 (0.492)	1.21 (0.408)	0.75 (0.046)	0.94 (0.65)	0.87 (0.03)	0.91 (0.203)	0.97 (0.816)	0.88 (0.002)	1.34 (0.027)	1.01 (0.938)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	1.00 (0.974)	1.01 (0.248)	0.98 (0.423)	1.10 (0.078)	0.89 (0.295)	1.00 (0.894)	0.97 (0.278)	0.97 (0.234)	0.91 (0.414)	0.99 (0.469)	1.01 (0.937)	0.91 (0.399)
2	0.98 (0.846)	0.99 (0.32)	0.93 (0.211)	1.14 (0.029)	0.79 (0.153)	0.95 (0.359)	0.92 (0.02)	0.92 (0.044)	0.82 (0.212)	0.93 (0.011)	1.00 (0.974)	0.81 (0.205)
3	0.98 (0.9)	0.97 (0.234)	0.91 (0.263)	1.15 (0.057)	0.74 (0.126)	0.92 (0.329)	0.89 (0.027)	0.90 (0.062)	0.78 (0.168)	0.91 (0.019)	1.02 (0.881)	0.77 (0.171)
4	1.04 (0.792)	0.98 (0.249)	0.92 (0.414)	1.18 (0.026)	0.73 (0.147)	0.93 (0.49)	0.90 (0.041)	0.91 (0.113)	0.78 (0.191)	0.92 (0.029)	1.09 (0.546)	0.77 (0.197)
5	1.06 (0.692)	0.98 (0.229)	0.93 (0.464)	1.24 (0.013)	0.72 (0.153)	0.94 (0.544)	0.89 (0.037)	0.90 (0.109)	0.78 (0.191)	0.91 (0.025)	1.11 (0.461)	0.76 (0.192)
6	1.08 (0.543)	0.98 (0.234)	0.93 (0.507)	1.29 (0.011)	0.72 (0.159)	0.94 (0.601)	0.88 (0.027)	0.90 (0.078)	0.79 (0.198)	0.90 (0.02)	1.16 (0.298)	0.77 (0.2)
7	1.13 (0.348)	0.98 (0.269)	0.94 (0.532)	1.33 (0.027)	0.74 (0.168)	0.95 (0.654)	0.88 (0.02)	0.89 (0.058)	0.80 (0.213)	0.89 (0.017)	1.22 (0.145)	0.79 (0.227)
8	1.17 (0.197)	0.98 (0.296)	0.95 (0.601)	1.39 (0.017)	0.76 (0.176)	0.97 (0.754)	0.87 (0.018)	0.89 (0.07)	0.83 (0.231)	0.89 (0.014)	1.28 (0.066)	0.82 (0.263)
9	1.21 (0.119)	0.98 (0.312)	0.96 (0.681)	1.45 (0.02)	0.78 (0.183)	0.98 (0.873)	0.87 (0.016)	0.89 (0.082)	0.85 (0.242)	0.88 (0.012)	1.34 (0.037)	0.85 (0.302)
10	1.24 (0.074)	0.98 (0.326)	0.97 (0.78)	1.52 (0.03)	0.80 (0.189)	1.00 (0.989)	0.87 (0.016)	0.90 (0.138)	0.87 (0.263)	0.88 (0.01)	1.40 (0.026)	0.88 (0.36)
11	1.26 (0.055)	0.99 (0.33)	0.98 (0.859)	1.60 (0.051)	0.81 (0.178)	1.01 (0.932)	0.87 (0.014)	0.91 (0.178)	0.87 (0.254)	0.87 (0.008)	1.43 (0.023)	0.89 (0.396)
12	1.27 (0.044)	0.99 (0.336)	0.99 (0.911)	1.70 (0.049)	0.82 (0.177)	1.02 (0.888)	0.87 (0.01)	0.91 (0.165)	0.87 (0.237)	0.86 (0.005)	1.45 (0.023)	0.90 (0.424)

Table 8: Forecasting M1 Annual Growth for Germany. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 9. DE M2

h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
Recursive Looping – RMSFE relative to AR(1)												
1	0.92 (0.157)	1.00 (0.991)	0.93 (0.1)	1.08 (0.441)	0.90 (0.09)	0.93 (0.111)	0.97 (0.461)	1.03 (0.701)	0.91 (0.167)	0.97 (0.544)	0.93 (0.353)	0.87 (0.137)
2	0.95 (0.474)	1.04 (0.552)	0.90 (0.076)	1.11 (0.433)	0.91 (0.139)	0.91 (0.083)	0.97 (0.565)	1.11 (0.288)	0.95 (0.419)	0.97 (0.595)	0.97 (0.75)	0.88 (0.274)
3	0.97 (0.713)	1.05 (0.498)	0.87 (0.009)	1.07 (0.636)	0.90 (0.132)	0.87 (0.012)	0.96 (0.438)	1.15 (0.319)	0.97 (0.639)	0.95 (0.356)	1.01 (0.914)	0.90 (0.374)
4	1.02 (0.809)	1.09 (0.275)	0.89 (0.019)	1.14 (0.286)	0.93 (0.22)	0.89 (0.022)	1.00 (0.955)	1.23 (0.262)	1.01 (0.917)	0.99 (0.869)	1.08 (0.442)	0.95 (0.647)
5	1.05 (0.618)	1.11 (0.249)	0.89 (0.015)	1.16 (0.234)	0.94 (0.262)	0.89 (0.016)	1.01 (0.876)	1.29 (0.285)	1.03 (0.752)	1.01 (0.949)	1.13 (0.244)	0.98 (0.869)
6	1.07 (0.526)	1.11 (0.271)	0.89 (0.011)	1.15 (0.287)	0.94 (0.233)	0.89 (0.011)	1.03 (0.816)	1.35 (0.296)	1.03 (0.741)	1.02 (0.883)	1.16 (0.186)	0.99 (0.92)
7	1.10 (0.435)	1.12 (0.298)	0.89 (0.019)	1.17 (0.247)	0.94 (0.272)	0.89 (0.017)	1.04 (0.746)	1.39 (0.289)	1.04 (0.706)	1.03 (0.792)	1.19 (0.133)	1.00 (0.976)
8	1.12 (0.357)	1.12 (0.327)	0.89 (0.024)	1.17 (0.326)	0.95 (0.311)	0.89 (0.02)	1.05 (0.723)	1.44 (0.3)	1.05 (0.697)	1.04 (0.765)	1.23 (0.091)	1.01 (0.916)
9	1.15 (0.26)	1.12 (0.338)	0.90 (0.044)	1.19 (0.329)	0.96 (0.495)	0.90 (0.037)	1.07 (0.666)	1.51 (0.288)	1.07 (0.609)	1.06 (0.697)	1.27 (0.062)	1.05 (0.733)
10	1.19 (0.178)	1.12 (0.341)	0.90 (0.065)	1.22 (0.279)	0.98 (0.752)	0.90 (0.056)	1.09 (0.623)	1.56 (0.286)	1.09 (0.524)	1.08 (0.645)	1.30 (0.049)	1.08 (0.571)
11	1.22 (0.134)	1.12 (0.334)	0.91 (0.089)	1.24 (0.27)	1.00 (0.931)	0.91 (0.082)	1.10 (0.591)	1.64 (0.282)	1.11 (0.485)	1.09 (0.61)	1.33 (0.048)	1.11 (0.485)
12	1.24 (0.116)	1.12 (0.313)	0.92 (0.141)	1.30 (0.244)	1.01 (0.909)	0.91 (0.136)	1.12 (0.545)	1.71 (0.263)	1.12 (0.459)	1.12 (0.557)	1.34 (0.05)	1.13 (0.431)
Rolling Looping – RMSFE relative to AR(1)												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
1	1.00 (0.943)	1.01 (0.853)	0.93 (0.099)	1.06 (0.537)	0.90 (0.014)	0.92 (0.036)	0.92 (0.087)	1.00 (0.988)	0.91 (0.097)	0.90 (0.063)	1.07 (0.248)	0.89 (0.18)
2	1.09 (0.268)	1.11 (0.089)	0.90 (0.089)	1.17 (0.241)	0.88 (0.023)	0.89 (0.049)	0.89 (0.067)	1.03 (0.767)	0.89 (0.1)	0.87 (0.049)	1.23 (0.011)	0.88 (0.264)
3	1.18 (0.137)	1.19 (0.054)	0.89 (0.087)	1.22 (0.208)	0.86 (0.027)	0.88 (0.06)	0.87 (0.073)	1.01 (0.904)	0.88 (0.143)	0.85 (0.059)	1.34 (0.011)	0.88 (0.302)
4	1.25 (0.103)	1.24 (0.056)	0.92 (0.28)	1.36 (0.064)	0.90 (0.124)	0.91 (0.218)	0.91 (0.304)	1.07 (0.607)	0.93 (0.451)	0.90 (0.274)	1.46 (0.016)	0.94 (0.605)
5	1.29 (0.111)	1.27 (0.065)	0.94 (0.476)	1.49 (0.046)	0.91 (0.238)	0.94 (0.427)	0.93 (0.52)	1.11 (0.496)	0.95 (0.652)	0.93 (0.488)	1.53 (0.025)	0.97 (0.815)
6	1.30 (0.124)	1.28 (0.076)	0.95 (0.621)	1.60 (0.045)	0.92 (0.341)	0.95 (0.578)	0.96 (0.728)	1.15 (0.425)	0.97 (0.836)	0.95 (0.696)	1.55 (0.038)	0.98 (0.891)
7	1.30 (0.135)	1.28 (0.083)	0.97 (0.774)	1.76 (0.038)	0.94 (0.528)	0.97 (0.733)	0.99 (0.959)	1.19 (0.335)	1.01 (0.956)	0.99 (0.936)	1.56 (0.044)	1.00 (0.985)
8	1.29 (0.134)	1.27 (0.087)	0.98 (0.864)	1.88 (0.045)	0.95 (0.646)	0.98 (0.832)	1.02 (0.874)	1.24 (0.291)	1.04 (0.814)	1.02 (0.894)	1.57 (0.045)	1.03 (0.84)
9	1.28 (0.123)	1.26 (0.085)	1.00 (0.973)	2.04 (0.072)	0.97 (0.793)	0.99 (0.955)	1.06 (0.725)	1.31 (0.241)	1.08 (0.668)	1.06 (0.74)	1.57 (0.045)	1.07 (0.686)
10	1.26 (0.096)	1.25 (0.078)	1.01 (0.934)	2.25 (0.07)	1.00 (0.993)	1.01 (0.925)	1.10 (0.621)	1.37 (0.21)	1.12 (0.548)	1.09 (0.627)	1.56 (0.042)	1.10 (0.568)
11	1.25 (0.074)	1.24 (0.069)	1.02 (0.879)	2.42 (0.07)	1.01 (0.925)	1.03 (0.861)	1.13 (0.528)	1.44 (0.189)	1.17 (0.459)	1.13 (0.533)	1.55 (0.04)	1.14 (0.479)
12	1.24 (0.069)	1.23 (0.059)	1.04 (0.825)	2.64 (0.07)	1.03 (0.844)	1.04 (0.806)	1.18 (0.441)	1.53 (0.155)	1.22 (0.383)	1.18 (0.444)	1.52 (0.039)	1.18 (0.425)

Table 9: Forecasting M2 Annual Growth for Germany. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 10. DE M3

h	$AR(\hat{p}_{AIC})$	$AR(\hat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\hat{p}_{AIC})$	$TSF-MLE(\hat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\hat{p}_{AIC})$	$TSF-FELW(\hat{p}_{BIC})$	$AR(\hat{P})$	$TSF-AR(\hat{P})$
Recursive Looping												
RMSFE relative to AR(1)												
1	0.95 (0.39)	1.00 (0.996)	0.92 (0.061)	1.00 (0.952)	0.86 (0.009)	0.92 (0.069)	0.95 (0.255)	0.99 (0.859)	0.90 (0.083)	0.95 (0.31)	0.94 (0.376)	0.86 (0.064)
2	0.99 (0.931)	1.05 (0.427)	0.89 (0.048)	0.97 (0.807)	0.86 (0.024)	0.89 (0.06)	0.94 (0.277)	1.03 (0.669)	0.92 (0.221)	0.94 (0.296)	0.98 (0.85)	0.86 (0.168)
3	1.05 (0.574)	1.08 (0.253)	0.87 (0.016)	0.95 (0.656)	0.87 (0.054)	0.87 (0.022)	0.94 (0.268)	1.05 (0.606)	0.95 (0.453)	0.93 (0.245)	1.06 (0.559)	0.89 (0.326)
4	1.12 (0.31)	1.12 (0.17)	0.88 (0.021)	0.98 (0.83)	0.90 (0.131)	0.89 (0.029)	0.97 (0.584)	1.10 (0.429)	0.98 (0.797)	0.96 (0.517)	1.14 (0.213)	0.95 (0.628)
5	1.17 (0.228)	1.14 (0.173)	0.89 (0.033)	1.01 (0.933)	0.92 (0.197)	0.89 (0.041)	0.98 (0.827)	1.14 (0.392)	1.00 (0.948)	0.98 (0.753)	1.18 (0.137)	0.97 (0.803)
6	1.20 (0.22)	1.14 (0.203)	0.89 (0.043)	1.01 (0.951)	0.92 (0.211)	0.88 (0.05)	0.99 (0.933)	1.18 (0.387)	0.99 (0.943)	0.98 (0.86)	1.21 (0.128)	0.97 (0.792)
7	1.23 (0.211)	1.15 (0.232)	0.89 (0.076)	1.02 (0.851)	0.93 (0.307)	0.89 (0.078)	1.01 (0.955)	1.22 (0.363)	1.00 (0.973)	1.00 (0.988)	1.24 (0.114)	0.97 (0.792)
8	1.25 (0.193)	1.15 (0.257)	0.90 (0.113)	1.03 (0.791)	0.94 (0.41)	0.89 (0.109)	1.02 (0.871)	1.26 (0.347)	1.02 (0.882)	1.01 (0.92)	1.27 (0.09)	0.99 (0.918)
9	1.28 (0.179)	1.14 (0.274)	0.90 (0.155)	1.04 (0.78)	0.95 (0.483)	0.89 (0.146)	1.03 (0.807)	1.30 (0.318)	1.03 (0.815)	1.03 (0.849)	1.31 (0.078)	1.01 (0.926)
10	1.30 (0.161)	1.14 (0.279)	0.90 (0.191)	1.06 (0.711)	0.96 (0.573)	0.89 (0.181)	1.05 (0.751)	1.35 (0.305)	1.04 (0.737)	1.04 (0.785)	1.34 (0.07)	1.04 (0.732)
11	1.32 (0.137)	1.14 (0.278)	0.90 (0.214)	1.07 (0.688)	0.97 (0.635)	0.90 (0.213)	1.06 (0.717)	1.39 (0.302)	1.06 (0.678)	1.05 (0.745)	1.36 (0.065)	1.07 (0.581)
12	1.33 (0.124)	1.13 (0.266)	0.91 (0.265)	1.11 (0.566)	0.97 (0.703)	0.90 (0.27)	1.07 (0.672)	1.44 (0.292)	1.07 (0.641)	1.07 (0.689)	1.36 (0.065)	1.09 (0.512)
Rolling Looping												
h	$AR(\hat{p}_{AIC})$	$AR(\hat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\hat{p}_{AIC})$	$TSF-MLE(\hat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\hat{p}_{AIC})$	$TSF-FELW(\hat{p}_{BIC})$	$AR(\hat{P})$	$TSF-AR(\hat{P})$
RMSFE relative to AR(1)												
1	1.04 (0.461)	1.02 (0.653)	0.92 (0.08)	1.08 (0.391)	0.92 (0.068)	0.92 (0.076)	0.90 (0.041)	0.95 (0.446)	0.91 (0.099)	0.88 (0.027)	1.15 (0.02)	0.87 (0.105)
2	1.13 (0.082)	1.12 (0.045)	0.91 (0.119)	1.21 (0.174)	0.90 (0.056)	0.91 (0.07)	0.87 (0.041)	0.96 (0.655)	0.89 (0.151)	0.85 (0.03)	1.34 (0.003)	0.87 (0.198)
3	1.23 (0.035)	1.20 (0.023)	0.91 (0.165)	1.32 (0.147)	0.92 (0.128)	0.92 (0.122)	0.87 (0.094)	0.97 (0.739)	0.91 (0.325)	0.85 (0.079)	1.52 (0.005)	0.90 (0.387)
4	1.31 (0.032)	1.25 (0.032)	0.94 (0.4)	1.46 (0.082)	0.94 (0.336)	0.94 (0.321)	0.90 (0.298)	1.01 (0.915)	0.95 (0.675)	0.89 (0.261)	1.64 (0.012)	0.96 (0.759)
5	1.34 (0.042)	1.26 (0.051)	0.96 (0.618)	1.63 (0.075)	0.96 (0.631)	0.96 (0.59)	0.94 (0.555)	1.06 (0.703)	0.99 (0.931)	0.93 (0.508)	1.69 (0.023)	1.00 (0.968)
6	1.35 (0.056)	1.26 (0.072)	0.97 (0.75)	1.79 (0.062)	0.98 (0.789)	0.97 (0.754)	0.97 (0.785)	1.10 (0.558)	1.02 (0.912)	0.96 (0.744)	1.69 (0.04)	1.02 (0.904)
7	1.34 (0.068)	1.25 (0.094)	0.99 (0.904)	1.96 (0.077)	1.00 (0.986)	0.98 (0.87)	1.00 (0.984)	1.15 (0.422)	1.06 (0.756)	1.00 (0.985)	1.68 (0.056)	1.04 (0.8)
8	1.32 (0.077)	1.23 (0.113)	1.00 (0.977)	2.15 (0.071)	1.03 (0.813)	1.00 (0.985)	1.04 (0.804)	1.21 (0.324)	1.10 (0.639)	1.04 (0.823)	1.66 (0.068)	1.07 (0.677)
9	1.30 (0.084)	1.21 (0.128)	1.02 (0.903)	2.35 (0.073)	1.04 (0.743)	1.02 (0.891)	1.08 (0.684)	1.27 (0.258)	1.14 (0.562)	1.08 (0.696)	1.62 (0.078)	1.10 (0.618)
10	1.27 (0.082)	1.19 (0.139)	1.03 (0.853)	2.53 (0.081)	1.05 (0.711)	1.02 (0.875)	1.12 (0.598)	1.34 (0.229)	1.18 (0.496)	1.12 (0.603)	1.58 (0.083)	1.13 (0.558)
11	1.24 (0.073)	1.17 (0.145)	1.04 (0.82)	2.73 (0.088)	1.08 (0.585)	1.04 (0.772)	1.16 (0.519)	1.40 (0.2)	1.23 (0.432)	1.16 (0.522)	1.53 (0.084)	1.17 (0.488)
12	1.21 (0.059)	1.16 (0.144)	1.06 (0.771)	2.97 (0.096)	1.10 (0.56)	1.06 (0.729)	1.21 (0.453)	1.48 (0.168)	1.29 (0.381)	1.21 (0.452)	1.48 (0.085)	1.22 (0.442)

Table 10: Forecasting M3 Annual Growth for Germany. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 11. DE CPI

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.93 (0.213)	1.00 (1)	1.00 (0.863)	1.01 (0.714)	0.92 (0.076)	1.00 (0.947)	0.98 (0.477)	1.01 (0.758)	0.92 (0.102)	0.98 (0.398)	0.94 (0.326)	0.92 (0.11)
2	0.90 (0.077)	1.00 (1)	0.97 (0.585)	0.97 (0.605)	0.85 (0.013)	0.99 (0.886)	0.95 (0.36)	0.98 (0.743)	0.86 (0.025)	0.95 (0.4)	0.89 (0.082)	0.86 (0.032)
3	0.94 (0.346)	1.00 (1)	0.96 (0.615)	0.96 (0.575)	0.86 (0.06)	0.98 (0.811)	0.94 (0.451)	0.98 (0.789)	0.88 (0.127)	0.94 (0.483)	0.93 (0.246)	0.88 (0.156)
4	0.96 (0.471)	1.00 (1)	0.95 (0.598)	0.95 (0.652)	0.84 (0.092)	0.96 (0.736)	0.93 (0.496)	0.97 (0.766)	0.87 (0.218)	0.94 (0.528)	0.94 (0.3)	0.88 (0.277)
5	0.97 (0.615)	1.00 (1)	0.94 (0.606)	0.96 (0.77)	0.83 (0.105)	0.95 (0.676)	0.94 (0.587)	0.99 (0.929)	0.87 (0.285)	0.94 (0.59)	0.95 (0.4)	0.88 (0.348)
6	0.99 (0.867)	1.00 (1)	0.92 (0.598)	0.96 (0.783)	0.82 (0.137)	0.93 (0.655)	0.93 (0.621)	0.99 (0.931)	0.87 (0.372)	0.93 (0.627)	0.97 (0.595)	0.89 (0.454)
7	1.01 (0.815)	1.00 (1)	0.91 (0.594)	0.95 (0.79)	0.82 (0.207)	0.92 (0.641)	0.93 (0.68)	1.00 (0.983)	0.88 (0.484)	0.94 (0.691)	1.00 (0.994)	0.90 (0.562)
8	1.04 (0.497)	1.00 (1)	0.90 (0.568)	0.95 (0.784)	0.83 (0.26)	0.91 (0.606)	0.94 (0.721)	1.01 (0.949)	0.89 (0.571)	0.94 (0.734)	1.03 (0.483)	0.91 (0.645)
9	1.07 (0.318)	1.00 (1)	0.89 (0.548)	0.95 (0.802)	0.82 (0.282)	0.90 (0.573)	0.95 (0.778)	1.04 (0.854)	0.90 (0.62)	0.95 (0.785)	1.06 (0.224)	0.92 (0.696)
10	1.10 (0.134)	1.00 (1)	0.88 (0.524)	0.94 (0.8)	0.82 (0.306)	0.88 (0.545)	0.95 (0.793)	1.05 (0.839)	0.90 (0.658)	0.95 (0.8)	1.09 (0.075)	0.92 (0.728)
11	1.13 (0.051)	1.00 (1)	0.87 (0.496)	0.94 (0.791)	0.82 (0.319)	0.87 (0.512)	0.95 (0.813)	1.07 (0.805)	0.91 (0.691)	0.95 (0.82)	1.12 (0.026)	0.93 (0.759)
12	1.17 (0.009)	1.00 (1)	0.86 (0.471)	0.94 (0.812)	0.82 (0.325)	0.86 (0.475)	0.96 (0.844)	1.10 (0.746)	0.91 (0.718)	0.96 (0.844)	1.16 (0.004)	0.94 (0.791)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	1.03 (0.494)	1.00 (1)	0.84 (0.003)	0.91 (0.209)	0.77 (0)	0.84 (0.003)	0.82 (0.003)	0.85 (0.018)	0.80 (0.002)	0.82 (0.003)	1.35 (0)	0.80 (0.002)
2	1.08 (0.144)	1.00 (1)	0.75 (0.013)	0.84 (0.166)	0.67 (0.002)	0.75 (0.014)	0.74 (0.014)	0.80 (0.058)	0.72 (0.011)	0.75 (0.015)	1.47 (0)	0.73 (0.015)
3	1.09 (0.114)	1.00 (1)	0.72 (0.04)	0.85 (0.332)	0.67 (0.014)	0.72 (0.041)	0.72 (0.051)	0.80 (0.169)	0.72 (0.063)	0.72 (0.052)	1.49 (0)	0.73 (0.068)
4	1.12 (0.059)	1.00 (1)	0.71 (0.066)	0.86 (0.449)	0.66 (0.032)	0.71 (0.069)	0.72 (0.092)	0.80 (0.238)	0.73 (0.131)	0.72 (0.093)	1.55 (0)	0.73 (0.132)
5	1.13 (0.052)	1.00 (1)	0.70 (0.099)	0.93 (0.716)	0.65 (0.047)	0.70 (0.101)	0.74 (0.158)	0.84 (0.42)	0.75 (0.205)	0.75 (0.159)	1.55 (0)	0.75 (0.204)
6	1.14 (0.034)	1.00 (1)	0.69 (0.128)	0.95 (0.825)	0.64 (0.061)	0.69 (0.128)	0.75 (0.214)	0.86 (0.529)	0.75 (0.25)	0.75 (0.216)	1.55 (0)	0.75 (0.264)
7	1.17 (0.018)	1.00 (1)	0.69 (0.16)	0.99 (0.968)	0.64 (0.079)	0.69 (0.161)	0.76 (0.276)	0.89 (0.676)	0.77 (0.309)	0.76 (0.279)	1.56 (0)	0.77 (0.331)
8	1.21 (0.005)	1.00 (1)	0.69 (0.186)	1.04 (0.884)	0.65 (0.092)	0.70 (0.19)	0.78 (0.353)	0.93 (0.811)	0.79 (0.365)	0.78 (0.356)	1.63 (0)	0.80 (0.403)
9	1.26 (0.002)	1.00 (1)	0.70 (0.212)	1.11 (0.753)	0.66 (0.109)	0.70 (0.214)	0.81 (0.452)	1.00 (0.993)	0.82 (0.456)	0.81 (0.455)	1.69 (0)	0.83 (0.495)
10	1.31 (0.001)	1.00 (1)	0.71 (0.226)	1.16 (0.668)	0.66 (0.115)	0.71 (0.228)	0.83 (0.517)	1.03 (0.922)	0.83 (0.51)	0.83 (0.523)	1.72 (0.001)	0.85 (0.551)
11	1.36 (0.001)	1.00 (1)	0.71 (0.237)	1.21 (0.608)	0.66 (0.118)	0.71 (0.239)	0.85 (0.593)	1.09 (0.825)	0.85 (0.575)	0.85 (0.597)	1.78 (0.001)	0.87 (0.618)
12	1.43 (0.001)	1.00 (1)	0.72 (0.247)	1.28 (0.519)	0.67 (0.123)	0.72 (0.248)	0.89 (0.697)	1.16 (0.704)	0.88 (0.662)	0.89 (0.701)	1.86 (0.001)	0.90 (0.702)

Table 11: Forecasting CPI Annual Growth for Germany. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 12. DE Industrial Production

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.87 (0.015)	1.04 (0.19)	0.99 (0.88)	1.01 (0.903)	0.93 (0.218)	1.04 (0.427)	1.02 (0.721)	0.98 (0.791)	0.92 (0.171)	1.07 (0.187)	0.87 (0.013)	0.91 (0.097)
2	0.82 (0.053)	0.99 (0.879)	0.99 (0.893)	1.26 (0.227)	0.87 (0.188)	1.00 (0.994)	1.00 (0.955)	0.96 (0.715)	0.87 (0.148)	1.02 (0.744)	0.82 (0.049)	0.86 (0.125)
3	0.78 (0.117)	1.00 (0.997)	1.02 (0.81)	1.57 (0.137)	0.85 (0.259)	1.02 (0.823)	1.03 (0.777)	0.99 (0.947)	0.84 (0.21)	1.03 (0.754)	0.79 (0.115)	0.83 (0.184)
4	0.81 (0.189)	1.00 (0.986)	1.09 (0.442)	1.88 (0.115)	0.90 (0.441)	1.08 (0.503)	1.09 (0.438)	1.07 (0.638)	0.89 (0.368)	1.08 (0.512)	0.82 (0.188)	0.87 (0.307)
5	0.83 (0.216)	1.01 (0.858)	1.12 (0.398)	2.36 (0.088)	0.92 (0.466)	1.10 (0.494)	1.13 (0.393)	1.13 (0.496)	0.93 (0.466)	1.12 (0.47)	0.83 (0.217)	0.90 (0.351)
6	0.83 (0.237)	1.02 (0.704)	1.18 (0.339)	2.90 (0.083)	0.94 (0.504)	1.16 (0.374)	1.18 (0.362)	1.19 (0.422)	0.95 (0.505)	1.17 (0.413)	0.84 (0.245)	0.91 (0.334)
7	0.85 (0.288)	1.03 (0.599)	1.24 (0.3)	3.46 (0.08)	0.98 (0.835)	1.22 (0.302)	1.24 (0.321)	1.27 (0.362)	1.00 (0.969)	1.22 (0.351)	0.86 (0.311)	0.96 (0.52)
8	0.88 (0.364)	1.04 (0.503)	1.30 (0.282)	4.06 (0.082)	1.04 (0.473)	1.27 (0.273)	1.31 (0.291)	1.36 (0.317)	1.06 (0.296)	1.27 (0.305)	0.89 (0.411)	1.01 (0.854)
9	0.90 (0.424)	1.06 (0.427)	1.36 (0.275)	4.76 (0.083)	1.08 (0.246)	1.32 (0.256)	1.36 (0.268)	1.44 (0.289)	1.10 (0.173)	1.32 (0.27)	0.91 (0.491)	1.05 (0.422)
10	0.93 (0.53)	1.07 (0.391)	1.42 (0.256)	5.49 (0.084)	1.12 (0.132)	1.37 (0.229)	1.43 (0.246)	1.54 (0.256)	1.16 (0.138)	1.37 (0.236)	0.94 (0.623)	1.10 (0.259)
11	0.95 (0.632)	1.07 (0.376)	1.49 (0.249)	6.25 (0.085)	1.17 (0.147)	1.41 (0.223)	1.48 (0.23)	1.64 (0.236)	1.20 (0.17)	1.41 (0.212)	0.97 (0.755)	1.14 (0.238)
12	0.96 (0.712)	1.08 (0.372)	1.55 (0.238)	7.06 (0.115)	1.21 (0.156)	1.46 (0.215)	1.54 (0.22)	1.74 (0.222)	1.24 (0.185)	1.45 (0.198)	0.98 (0.85)	1.18 (0.229)

Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.88 (0.024)	0.99 (0.649)	0.95 (0.331)	1.25 (0.026)	0.98 (0.695)	1.06 (0.324)	0.96 (0.405)	0.93 (0.452)	0.92 (0.247)	1.00 (0.979)	0.88 (0.035)	0.93 (0.281)
2	0.81 (0.034)	0.93 (0.006)	0.92 (0.337)	1.79 (0.013)	0.95 (0.613)	1.05 (0.479)	0.89 (0.249)	0.91 (0.533)	0.89 (0.316)	0.91 (0.303)	0.81 (0.042)	0.90 (0.359)
3	0.79 (0.087)	0.93 (0.02)	0.97 (0.687)	2.42 (0.036)	0.99 (0.912)	1.09 (0.222)	0.90 (0.444)	0.99 (0.939)	0.89 (0.437)	0.91 (0.481)	0.78 (0.081)	0.90 (0.467)
4	0.83 (0.156)	0.93 (0.054)	1.04 (0.665)	3.19 (0.05)	1.09 (0.357)	1.16 (0.034)	0.96 (0.766)	1.10 (0.602)	0.97 (0.795)	0.97 (0.81)	0.81 (0.121)	0.98 (0.865)
5	0.84 (0.185)	0.94 (0.077)	1.11 (0.362)	4.24 (0.058)	1.17 (0.091)	1.23 (0.033)	1.03 (0.873)	1.25 (0.3)	1.02 (0.876)	1.03 (0.848)	0.82 (0.149)	1.03 (0.844)
6	0.84 (0.212)	0.95 (0.094)	1.17 (0.304)	5.42 (0.083)	1.24 (0.028)	1.29 (0.046)	1.08 (0.662)	1.35 (0.242)	1.07 (0.61)	1.09 (0.649)	0.83 (0.18)	1.07 (0.639)
7	0.86 (0.246)	0.96 (0.113)	1.25 (0.259)	6.82 (0.105)	1.33 (0.012)	1.36 (0.05)	1.16 (0.48)	1.50 (0.193)	1.15 (0.36)	1.16 (0.477)	0.86 (0.253)	1.15 (0.382)
8	0.88 (0.287)	0.98 (0.235)	1.32 (0.237)	8.41 (0.121)	1.41 (0.012)	1.42 (0.068)	1.23 (0.361)	1.64 (0.181)	1.24 (0.238)	1.23 (0.358)	0.90 (0.355)	1.24 (0.245)
9	0.90 (0.341)	1.00 (0.895)	1.41 (0.217)	10.28 (0.138)	1.51 (0.019)	1.50 (0.074)	1.30 (0.274)	1.79 (0.161)	1.33 (0.172)	1.30 (0.274)	0.92 (0.444)	1.32 (0.171)
10	0.93 (0.426)	1.01 (0.6)	1.48 (0.214)	12.32 (0.155)	1.59 (0.032)	1.55 (0.093)	1.37 (0.219)	1.96 (0.143)	1.42 (0.128)	1.37 (0.221)	0.95 (0.568)	1.41 (0.12)
11	0.96 (0.591)	1.03 (0.419)	1.56 (0.215)	14.59 (0.169)	1.68 (0.046)	1.62 (0.101)	1.45 (0.19)	2.15 (0.131)	1.52 (0.111)	1.45 (0.191)	0.98 (0.805)	1.51 (0.099)
12	0.98 (0.74)	1.04 (0.376)	1.64 (0.216)	17.11 (0.18)	1.76 (0.066)	1.68 (0.124)	1.52 (0.174)	2.35 (0.134)	1.61 (0.099)	1.52 (0.176)	1.00 (0.98)	1.60 (0.089)

Table 12: Forecasting Industrial Production Annual Growth for Germany. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 13. UK M1

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.90 (0.184)	1.00 (1)	0.99 (0.487)	1.14 (0.018)	0.87 (0.104)	0.99 (0.351)	0.99 (0.711)	1.02 (0.575)	0.83 (0.049)	1.01 (0.806)	0.94 (0.436)	0.83 (0.044)
2	0.96 (0.476)	1.00 (1)	0.96 (0.326)	1.14 (0.133)	0.91 (0.142)	0.97 (0.067)	0.95 (0.275)	0.97 (0.476)	0.84 (0.043)	0.95 (0.326)	1.07 (0.254)	0.83 (0.034)
3	1.00 (0.985)	1.00 (1)	0.94 (0.359)	1.15 (0.229)	0.93 (0.218)	0.96 (0.046)	0.92 (0.216)	0.94 (0.376)	0.82 (0.051)	0.92 (0.22)	1.16 (0.01)	0.82 (0.05)
4	1.05 (0.319)	1.00 (1)	0.93 (0.403)	1.17 (0.341)	0.97 (0.649)	0.95 (0.14)	0.89 (0.232)	0.92 (0.363)	0.82 (0.079)	0.90 (0.238)	1.25 (0.001)	0.82 (0.073)
5	1.09 (0.148)	1.00 (1)	0.92 (0.45)	1.17 (0.389)	1.00 (0.979)	0.96 (0.368)	0.87 (0.244)	0.90 (0.344)	0.81 (0.084)	0.87 (0.237)	1.33 (0)	0.82 (0.091)
6	1.12 (0.146)	1.00 (1)	0.92 (0.48)	1.19 (0.366)	1.03 (0.742)	0.95 (0.35)	0.86 (0.262)	0.88 (0.364)	0.80 (0.079)	0.86 (0.26)	1.40 (0)	0.80 (0.084)
7	1.16 (0.128)	1.00 (1)	0.91 (0.497)	1.21 (0.372)	1.07 (0.551)	0.95 (0.357)	0.84 (0.28)	0.87 (0.392)	0.77 (0.067)	0.84 (0.284)	1.48 (0)	0.78 (0.069)
8	1.19 (0.13)	1.00 (1)	0.89 (0.486)	1.17 (0.473)	1.10 (0.452)	0.94 (0.358)	0.83 (0.29)	0.85 (0.387)	0.75 (0.054)	0.82 (0.288)	1.55 (0.001)	0.76 (0.063)
9	1.22 (0.12)	1.00 (1)	0.89 (0.489)	1.17 (0.477)	1.14 (0.35)	0.94 (0.344)	0.81 (0.27)	0.84 (0.371)	0.74 (0.057)	0.81 (0.271)	1.60 (0.001)	0.75 (0.072)
10	1.26 (0.114)	1.00 (1)	0.88 (0.472)	1.16 (0.524)	1.16 (0.334)	0.93 (0.255)	0.79 (0.243)	0.82 (0.345)	0.73 (0.063)	0.79 (0.245)	1.66 (0.001)	0.74 (0.082)
11	1.29 (0.107)	1.00 (1)	0.87 (0.466)	1.18 (0.525)	1.17 (0.315)	0.91 (0.151)	0.77 (0.21)	0.81 (0.315)	0.73 (0.074)	0.77 (0.213)	1.70 (0.002)	0.73 (0.092)
12	1.31 (0.1)	1.00 (1)	0.87 (0.469)	1.26 (0.428)	1.17 (0.323)	0.89 (0.085)	0.76 (0.182)	0.81 (0.319)	0.73 (0.094)	0.76 (0.195)	1.73 (0.002)	0.73 (0.107)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.96 (0.497)	1.00 (1)	0.98 (0.639)	1.12 (0.052)	0.93 (0.2)	1.02 (0.562)	0.99 (0.71)	1.03 (0.508)	0.85 (0.01)	0.98 (0.59)	1.03 (0.617)	0.84 (0.04)
2	1.05 (0.311)	1.00 (1)	0.95 (0.53)	1.14 (0.181)	0.96 (0.434)	1.00 (0.958)	0.92 (0.245)	0.95 (0.491)	0.79 (0.005)	0.91 (0.23)	1.19 (0.001)	0.80 (0.031)
3	1.11 (0.076)	1.00 (1)	0.93 (0.514)	1.17 (0.238)	1.02 (0.795)	1.02 (0.773)	0.87 (0.194)	0.90 (0.291)	0.76 (0.02)	0.87 (0.207)	1.29 (0)	0.78 (0.068)
4	1.17 (0.044)	1.00 (1)	0.91 (0.519)	1.18 (0.396)	1.07 (0.452)	1.04 (0.728)	0.84 (0.194)	0.87 (0.276)	0.74 (0.038)	0.84 (0.203)	1.38 (0)	0.77 (0.097)
5	1.20 (0.042)	1.00 (1)	0.89 (0.515)	1.18 (0.434)	1.10 (0.396)	1.05 (0.691)	0.80 (0.178)	0.83 (0.242)	0.73 (0.051)	0.81 (0.191)	1.43 (0)	0.76 (0.135)
6	1.24 (0.049)	1.00 (1)	0.89 (0.564)	1.22 (0.376)	1.13 (0.352)	1.06 (0.663)	0.78 (0.192)	0.82 (0.268)	0.71 (0.06)	0.79 (0.202)	1.50 (0)	0.76 (0.155)
7	1.27 (0.061)	1.00 (1)	0.89 (0.587)	1.25 (0.368)	1.15 (0.371)	1.06 (0.676)	0.77 (0.207)	0.81 (0.308)	0.69 (0.064)	0.77 (0.211)	1.55 (0.001)	0.74 (0.169)
8	1.31 (0.065)	1.00 (1)	0.87 (0.576)	1.24 (0.439)	1.17 (0.401)	1.05 (0.745)	0.75 (0.212)	0.79 (0.316)	0.68 (0.072)	0.75 (0.217)	1.60 (0.001)	0.73 (0.175)
9	1.34 (0.07)	1.00 (1)	0.87 (0.583)	1.26 (0.403)	1.16 (0.418)	1.04 (0.817)	0.73 (0.204)	0.78 (0.308)	0.68 (0.085)	0.73 (0.208)	1.64 (0.002)	0.73 (0.192)
10	1.37 (0.075)	1.00 (1)	0.87 (0.591)	1.28 (0.399)	1.18 (0.421)	1.03 (0.851)	0.72 (0.193)	0.77 (0.292)	0.67 (0.091)	0.72 (0.198)	1.69 (0.004)	0.73 (0.211)
11	1.40 (0.077)	1.00 (1)	0.88 (0.618)	1.32 (0.375)	1.19 (0.423)	1.04 (0.852)	0.70 (0.183)	0.76 (0.292)	0.67 (0.107)	0.71 (0.186)	1.72 (0.005)	0.72 (0.234)
12	1.40 (0.081)	1.00 (1)	0.89 (0.661)	1.43 (0.305)	1.19 (0.447)	1.04 (0.842)	0.71 (0.183)	0.79 (0.336)	0.68 (0.123)	0.71 (0.181)	1.73 (0.006)	0.74 (0.269)

Table 13: Forecasting M1 Annual Growth for the UK. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 14. UK M2

						Recursive Looping						
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
						RMSFE relative to AR(1)						
1	0.85 (0.234)	1.00 (1)	1.01 (0.708)	1.29 (0.001)	0.88 (0.345)	1.02 (0.003)	1.01 (0.63)	1.03 (0.331)	0.82 (0.14)	1.02 (0.462)	0.86 (0.251)	0.84 (0.167)
2	0.90 (0.383)	1.00 (1)	1.00 (0.895)	1.57 (0.007)	0.95 (0.661)	1.04 (0.084)	1.02 (0.702)	1.05 (0.264)	0.85 (0.205)	1.02 (0.718)	0.90 (0.4)	0.88 (0.277)
3	0.97 (0.741)	1.00 (1)	1.00 (0.94)	1.86 (0.005)	1.07 (0.386)	1.06 (0.136)	1.02 (0.743)	1.06 (0.376)	0.91 (0.304)	1.02 (0.778)	0.98 (0.804)	0.95 (0.545)
4	1.04 (0.686)	1.00 (1)	1.00 (1)	2.08 (0.002)	1.17 (0.036)	1.08 (0.182)	1.02 (0.813)	1.06 (0.524)	0.96 (0.608)	1.02 (0.824)	1.04 (0.636)	1.00 (0.998)
5	1.09 (0.411)	1.00 (1)	1.00 (0.965)	2.24 (0.001)	1.24 (0.01)	1.09 (0.221)	1.02 (0.876)	1.06 (0.623)	0.98 (0.872)	1.02 (0.879)	1.10 (0.388)	1.03 (0.782)
6	1.13 (0.277)	1.00 (1)	0.99 (0.946)	2.39 (0.001)	1.28 (0.006)	1.09 (0.278)	1.01 (0.926)	1.06 (0.686)	0.99 (0.957)	1.01 (0.931)	1.13 (0.278)	1.04 (0.763)
7	1.17 (0.171)	1.00 (1)	0.98 (0.913)	2.58 (0)	1.33 (0.006)	1.09 (0.369)	1.00 (0.988)	1.05 (0.764)	1.00 (0.988)	1.00 (0.999)	1.17 (0.193)	1.03 (0.818)
8	1.23 (0.078)	1.00 (1)	0.98 (0.878)	2.75 (0.001)	1.38 (0.003)	1.09 (0.403)	0.99 (0.946)	1.03 (0.865)	1.01 (0.972)	0.99 (0.937)	1.21 (0.109)	1.03 (0.851)
9	1.28 (0.028)	1.00 (1)	0.97 (0.841)	2.90 (0)	1.45 (0.001)	1.09 (0.382)	0.98 (0.909)	1.01 (0.942)	1.01 (0.956)	0.98 (0.904)	1.26 (0.053)	1.03 (0.886)
10	1.33 (0.007)	1.00 (1)	0.96 (0.834)	3.03 (0)	1.50 (0)	1.09 (0.384)	0.97 (0.898)	1.01 (0.97)	1.01 (0.968)	0.97 (0.897)	1.31 (0.022)	1.02 (0.938)
11	1.38 (0.002)	1.00 (1)	0.96 (0.836)	3.14 (0)	1.56 (0)	1.10 (0.399)	0.98 (0.912)	1.01 (0.955)	1.01 (0.972)	0.98 (0.911)	1.35 (0.011)	1.01 (0.95)
12	1.43 (0.001)	1.00 (1)	0.96 (0.826)	3.40 (0)	1.60 (0)	1.08 (0.479)	0.98 (0.92)	1.02 (0.925)	1.01 (0.969)	0.97 (0.907)	1.40 (0.006)	1.02 (0.927)
						Rolling Looping						
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
						RMSFE relative to AR(1)						
1	0.99 (0.929)	1.00 (1)	0.92 (0.068)	1.01 (0.827)	0.87 (0.059)	0.95 (0.199)	0.95 (0.178)	0.99 (0.875)	0.81 (0.007)	0.95 (0.252)	0.97 (0.641)	0.79 (0.005)
2	1.07 (0.308)	1.00 (1)	0.88 (0.105)	1.06 (0.532)	0.90 (0.166)	0.91 (0.175)	0.91 (0.176)	1.00 (0.981)	0.81 (0.033)	0.91 (0.192)	1.02 (0.746)	0.78 (0.008)
3	1.15 (0.024)	1.00 (1)	0.84 (0.116)	1.18 (0.204)	0.94 (0.55)	0.89 (0.212)	0.86 (0.156)	0.99 (0.922)	0.81 (0.094)	0.86 (0.165)	1.09 (0.082)	0.78 (0.036)
4	1.18 (0.006)	1.00 (1)	0.80 (0.124)	1.23 (0.246)	0.95 (0.673)	0.86 (0.225)	0.81 (0.139)	0.96 (0.805)	0.80 (0.153)	0.82 (0.147)	1.12 (0.023)	0.77 (0.077)
5	1.22 (0.002)	1.00 (1)	0.77 (0.132)	1.29 (0.204)	0.96 (0.768)	0.84 (0.226)	0.78 (0.138)	0.94 (0.77)	0.78 (0.179)	0.79 (0.144)	1.15 (0.01)	0.76 (0.104)
6	1.25 (0.002)	1.00 (1)	0.75 (0.146)	1.37 (0.194)	0.98 (0.892)	0.84 (0.268)	0.76 (0.146)	0.94 (0.78)	0.77 (0.193)	0.76 (0.151)	1.18 (0.01)	0.74 (0.122)
7	1.30 (0.003)	1.00 (1)	0.73 (0.161)	1.47 (0.155)	1.01 (0.967)	0.84 (0.301)	0.74 (0.146)	0.93 (0.76)	0.75 (0.2)	0.74 (0.148)	1.23 (0.013)	0.72 (0.126)
8	1.35 (0.005)	1.00 (1)	0.72 (0.169)	1.55 (0.159)	1.03 (0.8)	0.84 (0.32)	0.70 (0.135)	0.90 (0.687)	0.74 (0.205)	0.70 (0.135)	1.29 (0.017)	0.71 (0.138)
9	1.40 (0.008)	1.00 (1)	0.70 (0.178)	1.63 (0.153)	1.05 (0.702)	0.83 (0.339)	0.68 (0.133)	0.87 (0.632)	0.73 (0.227)	0.68 (0.134)	1.33 (0.021)	0.69 (0.153)
10	1.45 (0.013)	1.00 (1)	0.70 (0.194)	1.70 (0.136)	1.08 (0.537)	0.83 (0.373)	0.67 (0.141)	0.87 (0.638)	0.72 (0.244)	0.67 (0.142)	1.39 (0.026)	0.68 (0.176)
11	1.50 (0.018)	1.00 (1)	0.70 (0.215)	1.78 (0.161)	1.11 (0.412)	0.85 (0.427)	0.67 (0.159)	0.88 (0.678)	0.71 (0.268)	0.67 (0.159)	1.44 (0.031)	0.68 (0.197)
12	1.56 (0.023)	1.00 (1)	0.70 (0.238)	1.97 (0.149)	1.15 (0.242)	0.87 (0.505)	0.68 (0.182)	0.91 (0.751)	0.71 (0.306)	0.68 (0.181)	1.50 (0.035)	0.68 (0.233)

Table 14: Forecasting M2 Annual Growth for the UK. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 15. UK M3

h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
Recursive Looping												
RMSFE relative to AR(1)												
1	0.96 (0.618)	1.00 (1)	1.00 (0.879)	1.16 (0.011)	0.92 (0.349)	1.02 (0.352)	1.02 (0.498)	1.05 (0.183)	0.89 (0.206)	1.03 (0.373)	0.99 (0.897)	0.91 (0.269)
2	1.05 (0.598)	1.00 (1)	1.00 (0.949)	1.22 (0.019)	0.99 (0.923)	1.01 (0.844)	1.03 (0.5)	1.09 (0.128)	0.96 (0.637)	1.03 (0.498)	1.09 (0.329)	0.97 (0.758)
3	1.11 (0.048)	1.00 (1)	0.99 (0.871)	1.36 (0.003)	1.05 (0.622)	1.00 (0.953)	1.03 (0.582)	1.12 (0.138)	0.99 (0.959)	1.03 (0.636)	1.16 (0.012)	1.01 (0.944)
4	1.20 (0.001)	1.00 (1)	0.98 (0.796)	1.40 (0.004)	1.13 (0.294)	1.00 (0.988)	1.03 (0.68)	1.13 (0.171)	1.05 (0.682)	1.03 (0.724)	1.26 (0.002)	1.07 (0.624)
5	1.27 (0)	1.00 (1)	0.97 (0.746)	1.44 (0.009)	1.17 (0.238)	0.99 (0.938)	1.02 (0.797)	1.14 (0.235)	1.07 (0.626)	1.02 (0.836)	1.34 (0.002)	1.09 (0.571)
6	1.34 (0)	1.00 (1)	0.96 (0.717)	1.50 (0.028)	1.21 (0.231)	0.98 (0.893)	1.01 (0.898)	1.14 (0.301)	1.09 (0.592)	1.01 (0.936)	1.42 (0.002)	1.10 (0.557)
7	1.41 (0)	1.00 (1)	0.94 (0.688)	1.51 (0.041)	1.23 (0.294)	0.97 (0.849)	1.00 (0.977)	1.14 (0.396)	1.10 (0.606)	1.00 (0.996)	1.51 (0.001)	1.11 (0.586)
8	1.49 (0)	1.00 (1)	0.93 (0.668)	1.59 (0.049)	1.26 (0.311)	0.97 (0.869)	0.99 (0.962)	1.14 (0.468)	1.10 (0.641)	0.99 (0.932)	1.60 (0.001)	1.11 (0.62)
9	1.56 (0)	1.00 (1)	0.92 (0.653)	1.64 (0.059)	1.27 (0.354)	0.97 (0.854)	0.98 (0.915)	1.13 (0.545)	1.10 (0.679)	0.98 (0.899)	1.68 (0)	1.10 (0.667)
10	1.62 (0.001)	1.00 (1)	0.92 (0.669)	1.69 (0.053)	1.27 (0.387)	0.96 (0.85)	0.99 (0.942)	1.14 (0.536)	1.09 (0.708)	0.98 (0.923)	1.76 (0)	1.09 (0.712)
11	1.68 (0.001)	1.00 (1)	0.92 (0.687)	1.74 (0.055)	1.26 (0.409)	0.96 (0.855)	0.99 (0.976)	1.15 (0.507)	1.09 (0.741)	0.99 (0.968)	1.83 (0.001)	1.09 (0.746)
12	1.74 (0.004)	1.00 (1)	0.92 (0.71)	1.83 (0.03)	1.28 (0.379)	0.97 (0.868)	1.02 (0.93)	1.19 (0.394)	1.09 (0.75)	1.01 (0.955)	1.91 (0.001)	1.08 (0.758)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.96 (0.415)	1.00 (1)	0.95 (0.218)	1.14 (0.023)	0.93 (0.256)	0.99 (0.775)	0.98 (0.64)	1.00 (0.964)	0.86 (0.044)	0.99 (0.786)	0.95 (0.422)	0.85 (0.029)
2	1.01 (0.79)	1.00 (1)	0.90 (0.201)	1.20 (0.036)	0.96 (0.657)	0.95 (0.485)	0.95 (0.515)	1.03 (0.778)	0.88 (0.213)	0.95 (0.531)	1.01 (0.778)	0.87 (0.149)
3	1.05 (0.291)	1.00 (1)	0.86 (0.2)	1.28 (0.024)	1.00 (0.989)	0.93 (0.472)	0.92 (0.447)	1.04 (0.752)	0.87 (0.332)	0.92 (0.439)	1.05 (0.268)	0.86 (0.27)
4	1.09 (0.029)	1.00 (1)	0.82 (0.175)	1.37 (0.037)	1.02 (0.855)	0.90 (0.395)	0.89 (0.379)	1.04 (0.799)	0.87 (0.418)	0.89 (0.379)	1.10 (0.023)	0.86 (0.359)
5	1.13 (0.004)	1.00 (1)	0.79 (0.161)	1.47 (0.033)	1.04 (0.782)	0.88 (0.367)	0.87 (0.335)	1.03 (0.85)	0.85 (0.407)	0.87 (0.339)	1.13 (0.002)	0.84 (0.364)
6	1.17 (0.001)	1.00 (1)	0.76 (0.169)	1.57 (0.043)	1.06 (0.677)	0.87 (0.354)	0.84 (0.328)	1.03 (0.888)	0.84 (0.408)	0.84 (0.33)	1.18 (0)	0.83 (0.386)
7	1.22 (0.001)	1.00 (1)	0.74 (0.186)	1.66 (0.052)	1.09 (0.521)	0.87 (0.396)	0.81 (0.332)	1.02 (0.938)	0.82 (0.389)	0.81 (0.334)	1.23 (0)	0.82 (0.392)
8	1.27 (0.004)	1.00 (1)	0.72 (0.193)	1.75 (0.075)	1.13 (0.362)	0.86 (0.398)	0.79 (0.317)	1.00 (0.998)	0.80 (0.37)	0.79 (0.315)	1.30 (0)	0.81 (0.415)
9	1.31 (0.007)	1.00 (1)	0.71 (0.207)	1.85 (0.099)	1.15 (0.307)	0.86 (0.408)	0.77 (0.313)	0.98 (0.95)	0.79 (0.368)	0.77 (0.313)	1.34 (0.001)	0.81 (0.436)
10	1.37 (0.013)	1.00 (1)	0.71 (0.231)	1.94 (0.099)	1.17 (0.231)	0.85 (0.406)	0.77 (0.344)	0.99 (0.986)	0.78 (0.389)	0.77 (0.344)	1.41 (0.002)	0.81 (0.483)
11	1.42 (0.019)	1.00 (1)	0.71 (0.256)	2.04 (0.092)	1.19 (0.179)	0.85 (0.42)	0.78 (0.377)	1.01 (0.976)	0.78 (0.404)	0.78 (0.377)	1.46 (0.004)	0.82 (0.52)
12	1.47 (0.029)	1.00 (1)	0.72 (0.283)	2.19 (0.093)	1.24 (0.124)	0.86 (0.45)	0.81 (0.441)	1.05 (0.877)	0.79 (0.45)	0.80 (0.437)	1.53 (0.008)	0.83 (0.582)

Table 15: Forecasting M3 Annual Growth for the UK. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 16. UK M4

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.94 (0.675)	1.00 (1)	1.01 (0.326)	1.13 (0.027)	0.94 (0.638)	1.01 (0.626)	1.01 (0.343)	1.05 (0.139)	0.94 (0.662)	1.01 (0.517)	0.92 (0.578)	0.92 (0.574)
2	0.95 (0.748)	1.00 (1)	1.02 (0.437)	1.21 (0.037)	0.97 (0.817)	1.03 (0.184)	1.01 (0.647)	1.05 (0.226)	0.96 (0.748)	1.00 (0.987)	0.93 (0.647)	0.94 (0.638)
3	0.97 (0.805)	1.00 (1)	1.02 (0.602)	1.27 (0.019)	0.99 (0.96)	1.04 (0.339)	1.01 (0.828)	1.05 (0.364)	0.97 (0.815)	0.99 (0.729)	0.95 (0.717)	0.96 (0.736)
4	0.98 (0.896)	1.00 (1)	1.02 (0.632)	1.33 (0.007)	1.02 (0.887)	1.04 (0.42)	1.01 (0.833)	1.06 (0.375)	0.98 (0.911)	1.00 (0.916)	0.97 (0.862)	0.98 (0.88)
5	1.00 (0.99)	1.00 (1)	1.03 (0.613)	1.38 (0.001)	1.05 (0.709)	1.05 (0.38)	1.01 (0.833)	1.06 (0.447)	1.01 (0.95)	1.00 (0.998)	1.00 (0.984)	1.00 (0.992)
6	1.01 (0.92)	1.00 (1)	1.03 (0.618)	1.42 (0)	1.07 (0.523)	1.06 (0.393)	1.02 (0.823)	1.06 (0.483)	1.03 (0.821)	1.01 (0.898)	1.01 (0.923)	1.01 (0.903)
7	1.03 (0.856)	1.00 (1)	1.04 (0.614)	1.44 (0)	1.10 (0.351)	1.06 (0.357)	1.02 (0.817)	1.06 (0.529)	1.04 (0.737)	1.01 (0.849)	1.03 (0.828)	1.03 (0.807)
8	1.04 (0.788)	1.00 (1)	1.04 (0.629)	1.48 (0)	1.12 (0.143)	1.07 (0.363)	1.02 (0.801)	1.06 (0.588)	1.04 (0.659)	1.02 (0.811)	1.05 (0.721)	1.03 (0.724)
9	1.05 (0.735)	1.00 (1)	1.05 (0.623)	1.49 (0)	1.13 (0.029)	1.08 (0.336)	1.03 (0.783)	1.06 (0.608)	1.04 (0.606)	1.03 (0.773)	1.07 (0.639)	1.03 (0.673)
10	1.06 (0.657)	1.00 (1)	1.05 (0.632)	1.54 (0)	1.15 (0.005)	1.09 (0.333)	1.03 (0.781)	1.06 (0.631)	1.04 (0.582)	1.03 (0.782)	1.10 (0.527)	1.04 (0.628)
11	1.08 (0.563)	1.00 (1)	1.05 (0.645)	1.56 (0)	1.17 (0.006)	1.09 (0.342)	1.04 (0.772)	1.07 (0.646)	1.04 (0.645)	1.04 (0.768)	1.13 (0.416)	1.05 (0.64)
12	1.09 (0.524)	1.00 (1)	1.06 (0.645)	1.61 (0)	1.18 (0.024)	1.10 (0.359)	1.04 (0.76)	1.07 (0.652)	1.04 (0.738)	1.05 (0.747)	1.15 (0.362)	1.05 (0.668)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	1.03 (0.738)	1.00 (1)	1.00 (0.825)	1.20 (0.052)	0.97 (0.733)	0.99 (0.656)	1.04 (0.318)	1.07 (0.15)	0.99 (0.907)	1.03 (0.447)	1.02 (0.881)	0.98 (0.83)
2	1.10 (0.266)	1.00 (1)	1.01 (0.919)	1.32 (0.07)	1.03 (0.69)	1.00 (0.952)	1.04 (0.541)	1.08 (0.302)	1.00 (0.978)	1.04 (0.583)	1.06 (0.584)	1.00 (0.962)
3	1.16 (0.021)	1.00 (1)	1.01 (0.903)	1.34 (0.076)	1.07 (0.42)	1.00 (0.968)	1.04 (0.7)	1.06 (0.521)	1.02 (0.834)	1.04 (0.714)	1.11 (0.293)	1.01 (0.888)
4	1.21 (0.002)	1.00 (1)	1.02 (0.892)	1.42 (0.048)	1.09 (0.303)	0.99 (0.929)	1.04 (0.786)	1.07 (0.589)	1.04 (0.71)	1.03 (0.797)	1.15 (0.171)	1.04 (0.723)
5	1.26 (0)	1.00 (1)	1.02 (0.877)	1.47 (0.015)	1.12 (0.12)	1.00 (0.989)	1.03 (0.852)	1.06 (0.662)	1.06 (0.618)	1.03 (0.858)	1.20 (0.094)	1.07 (0.601)
6	1.31 (0)	1.00 (1)	1.03 (0.862)	1.55 (0.006)	1.16 (0.029)	0.99 (0.931)	1.02 (0.901)	1.06 (0.703)	1.08 (0.581)	1.02 (0.907)	1.25 (0.059)	1.08 (0.55)
7	1.35 (0)	1.00 (1)	1.03 (0.849)	1.64 (0.005)	1.21 (0.003)	1.02 (0.833)	1.01 (0.945)	1.05 (0.742)	1.08 (0.597)	1.01 (0.951)	1.30 (0.05)	1.09 (0.54)
8	1.40 (0.001)	1.00 (1)	1.03 (0.849)	1.69 (0.007)	1.25 (0.007)	1.02 (0.825)	1.01 (0.973)	1.05 (0.788)	1.08 (0.632)	1.01 (0.976)	1.36 (0.046)	1.09 (0.58)
9	1.44 (0.003)	1.00 (1)	1.04 (0.826)	1.76 (0.006)	1.28 (0.012)	1.02 (0.819)	1.00 (1)	1.05 (0.807)	1.08 (0.668)	1.00 (0.996)	1.41 (0.049)	1.09 (0.628)
10	1.50 (0.008)	1.00 (1)	1.04 (0.83)	1.84 (0.005)	1.30 (0.027)	1.02 (0.866)	1.00 (0.99)	1.04 (0.84)	1.09 (0.698)	1.00 (0.993)	1.48 (0.053)	1.10 (0.657)
11	1.55 (0.013)	1.00 (1)	1.04 (0.84)	1.85 (0.005)	1.33 (0.023)	1.02 (0.842)	1.01 (0.981)	1.04 (0.87)	1.08 (0.741)	1.00 (0.983)	1.54 (0.061)	1.10 (0.697)
12	1.61 (0.021)	1.00 (1)	1.05 (0.823)	1.98 (0.014)	1.37 (0.017)	1.04 (0.746)	1.01 (0.977)	1.04 (0.863)	1.08 (0.772)	1.01 (0.98)	1.60 (0.072)	1.10 (0.731)

Table 16: Forecasting M4 Annual Growth for the UK. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 17. UK CPI

Recursive Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.94 (0.224)	1.00 (1)	0.99 (0.512)	1.01 (0.755)	0.91 (0.115)	0.99 (0.554)	1.01 (0.846)	1.01 (0.846)	0.91 (0.144)	1.01 (0.784)	0.91 (0.101)	0.90 (0.084)
2	0.96 (0.617)	1.00 (1)	0.99 (0.818)	1.04 (0.471)	0.92 (0.379)	0.99 (0.835)	1.02 (0.654)	1.03 (0.638)	0.93 (0.43)	1.02 (0.645)	0.95 (0.523)	0.92 (0.388)
3	0.98 (0.82)	1.00 (1)	1.00 (0.984)	1.06 (0.374)	0.92 (0.444)	1.00 (0.971)	1.04 (0.534)	1.05 (0.48)	0.93 (0.511)	1.04 (0.527)	0.97 (0.665)	0.92 (0.438)
4	1.01 (0.906)	1.00 (1)	1.01 (0.879)	1.08 (0.301)	0.94 (0.559)	1.01 (0.871)	1.05 (0.458)	1.07 (0.372)	0.95 (0.638)	1.05 (0.455)	0.99 (0.925)	0.93 (0.556)
5	1.05 (0.584)	1.00 (1)	1.02 (0.822)	1.09 (0.248)	0.96 (0.7)	1.02 (0.817)	1.07 (0.41)	1.09 (0.316)	0.97 (0.782)	1.07 (0.41)	1.02 (0.776)	0.95 (0.673)
6	1.08 (0.322)	1.00 (1)	1.02 (0.772)	1.11 (0.207)	0.98 (0.809)	1.02 (0.771)	1.08 (0.388)	1.11 (0.293)	0.99 (0.891)	1.08 (0.391)	1.05 (0.466)	0.97 (0.785)
7	1.11 (0.086)	1.00 (1)	1.03 (0.751)	1.12 (0.22)	1.00 (0.993)	1.03 (0.753)	1.09 (0.387)	1.12 (0.29)	1.01 (0.898)	1.09 (0.39)	1.09 (0.125)	1.00 (0.986)
8	1.15 (0.026)	1.00 (1)	1.03 (0.745)	1.14 (0.216)	1.02 (0.733)	1.03 (0.747)	1.09 (0.373)	1.13 (0.274)	1.03 (0.617)	1.09 (0.376)	1.12 (0.03)	1.02 (0.726)
9	1.18 (0.036)	1.00 (1)	1.04 (0.737)	1.14 (0.228)	1.03 (0.64)	1.03 (0.738)	1.10 (0.369)	1.14 (0.266)	1.05 (0.505)	1.10 (0.372)	1.16 (0.042)	1.04 (0.585)
10	1.23 (0.04)	1.00 (1)	1.04 (0.735)	1.15 (0.224)	1.04 (0.574)	1.04 (0.737)	1.11 (0.35)	1.15 (0.249)	1.07 (0.405)	1.11 (0.352)	1.20 (0.049)	1.06 (0.499)
11	1.26 (0.034)	1.00 (1)	1.04 (0.735)	1.16 (0.222)	1.05 (0.545)	1.04 (0.737)	1.11 (0.322)	1.16 (0.223)	1.08 (0.365)	1.11 (0.324)	1.24 (0.041)	1.07 (0.457)
12	1.31 (0.023)	1.00 (1)	1.04 (0.743)	1.18 (0.214)	1.07 (0.486)	1.04 (0.745)	1.12 (0.308)	1.18 (0.21)	1.10 (0.337)	1.12 (0.31)	1.29 (0.03)	1.09 (0.431)
Rolling Looping												
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
RMSFE relative to AR(1)												
1	0.93 (0.142)	1.00 (1)	0.89 (0.033)	0.92 (0.25)	0.86 (0.028)	0.90 (0.042)	0.90 (0.034)	0.94 (0.373)	0.87 (0.033)	0.94 (0.141)	0.88 (0.021)	0.82 (0.005)
2	0.92 (0.282)	1.00 (1)	0.86 (0.111)	0.90 (0.362)	0.83 (0.073)	0.87 (0.13)	0.88 (0.105)	0.93 (0.45)	0.85 (0.135)	0.94 (0.321)	0.90 (0.169)	0.82 (0.072)
3	0.93 (0.376)	1.00 (1)	0.85 (0.174)	0.92 (0.548)	0.82 (0.091)	0.86 (0.187)	0.88 (0.183)	0.96 (0.749)	0.85 (0.189)	0.94 (0.428)	0.89 (0.207)	0.81 (0.106)
4	0.94 (0.427)	1.00 (1)	0.84 (0.187)	0.92 (0.571)	0.81 (0.099)	0.84 (0.196)	0.86 (0.189)	0.97 (0.791)	0.84 (0.21)	0.92 (0.411)	0.90 (0.261)	0.80 (0.125)
5	0.94 (0.441)	1.00 (1)	0.83 (0.189)	0.91 (0.568)	0.80 (0.091)	0.83 (0.193)	0.85 (0.184)	0.95 (0.746)	0.84 (0.224)	0.90 (0.364)	0.91 (0.307)	0.80 (0.135)
6	0.93 (0.388)	1.00 (1)	0.82 (0.198)	0.92 (0.627)	0.79 (0.087)	0.82 (0.201)	0.83 (0.172)	0.95 (0.744)	0.83 (0.202)	0.89 (0.314)	0.91 (0.285)	0.79 (0.123)
7	0.91 (0.252)	1.00 (1)	0.81 (0.198)	0.92 (0.656)	0.77 (0.069)	0.81 (0.2)	0.82 (0.153)	0.95 (0.754)	0.82 (0.165)	0.87 (0.264)	0.91 (0.268)	0.78 (0.105)
8	0.91 (0.171)	1.00 (1)	0.80 (0.177)	0.92 (0.65)	0.75 (0.04)	0.79 (0.177)	0.80 (0.114)	0.94 (0.708)	0.80 (0.107)	0.85 (0.192)	0.92 (0.237)	0.77 (0.071)
9	0.90 (0.084)	1.00 (1)	0.78 (0.148)	0.91 (0.636)	0.73 (0.018)	0.78 (0.147)	0.78 (0.07)	0.93 (0.658)	0.78 (0.047)	0.83 (0.112)	0.92 (0.166)	0.76 (0.035)
10	0.90 (0.063)	1.00 (1)	0.77 (0.107)	0.91 (0.602)	0.70 (0.007)	0.77 (0.106)	0.77 (0.041)	0.92 (0.615)	0.76 (0.018)	0.81 (0.056)	0.94 (0.157)	0.75 (0.015)
11	0.90 (0.076)	1.00 (1)	0.75 (0.073)	0.90 (0.564)	0.68 (0.003)	0.75 (0.072)	0.76 (0.024)	0.92 (0.584)	0.74 (0.007)	0.79 (0.026)	0.95 (0.195)	0.73 (0.006)
12	0.92 (0.142)	1.00 (1)	0.74 (0.051)	0.90 (0.564)	0.66 (0.002)	0.73 (0.049)	0.75 (0.017)	0.92 (0.593)	0.73 (0.006)	0.77 (0.016)	0.96 (0.373)	0.72 (0.005)

Table 17: Forecasting CPI Annual Growth for the UK. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 18. UK Industrial Production

h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
	Recursive Looping											
	RMSFE relative to AR(1)											
1	0.85 (0.023)	0.92 (0.036)	0.91 (0.049)	0.97 (0.568)	0.84 (0.022)	0.87 (0.039)	0.92 (0.056)	0.92 (0.061)	0.85 (0.023)	0.92 (0.049)	0.85 (0.024)	0.85 (0.023)
2	0.81 (0.007)	0.85 (0.005)	0.85 (0.037)	0.90 (0.348)	0.81 (0.014)	0.83 (0.022)	0.85 (0.014)	0.85 (0.017)	0.81 (0.007)	0.85 (0.011)	0.81 (0.006)	0.81 (0.006)
3	0.79 (0.016)	0.82 (0.009)	0.84 (0.08)	0.90 (0.405)	0.80 (0.041)	0.82 (0.071)	0.82 (0.024)	0.82 (0.03)	0.79 (0.016)	0.82 (0.019)	0.79 (0.015)	0.79 (0.014)
4	0.80 (0.035)	0.81 (0.017)	0.84 (0.139)	0.94 (0.582)	0.80 (0.077)	0.84 (0.161)	0.81 (0.041)	0.81 (0.049)	0.80 (0.033)	0.82 (0.034)	0.79 (0.034)	0.79 (0.031)
5	0.81 (0.073)	0.81 (0.027)	0.85 (0.231)	1.01 (0.948)	0.82 (0.148)	0.86 (0.278)	0.81 (0.057)	0.81 (0.067)	0.81 (0.069)	0.82 (0.047)	0.80 (0.072)	0.80 (0.067)
6	0.83 (0.11)	0.82 (0.034)	0.89 (0.372)	1.06 (0.605)	0.85 (0.241)	0.90 (0.453)	0.82 (0.065)	0.83 (0.078)	0.83 (0.102)	0.83 (0.052)	0.82 (0.106)	0.82 (0.096)
7	0.85 (0.153)	0.83 (0.046)	0.92 (0.525)	1.14 (0.384)	0.87 (0.33)	0.94 (0.634)	0.84 (0.075)	0.84 (0.087)	0.85 (0.139)	0.84 (0.062)	0.84 (0.148)	0.84 (0.133)
8	0.89 (0.27)	0.85 (0.064)	0.97 (0.784)	1.24 (0.31)	0.92 (0.517)	0.98 (0.885)	0.86 (0.091)	0.87 (0.104)	0.88 (0.243)	0.87 (0.075)	0.88 (0.263)	0.88 (0.238)
9	0.93 (0.426)	0.88 (0.093)	1.03 (0.793)	1.35 (0.272)	0.97 (0.796)	1.05 (0.739)	0.90 (0.112)	0.91 (0.122)	0.92 (0.378)	0.90 (0.082)	0.93 (0.41)	0.92 (0.366)
10	0.97 (0.677)	0.90 (0.098)	1.08 (0.537)	1.46 (0.303)	1.03 (0.765)	1.10 (0.507)	0.93 (0.082)	0.93 (0.087)	0.96 (0.601)	0.93 (0.081)	0.96 (0.641)	0.96 (0.577)
11	1.00 (0.991)	0.93 (0.149)	1.15 (0.373)	1.58 (0.291)	1.07 (0.357)	1.17 (0.373)	0.96 (0.05)	0.97 (0.019)	0.99 (0.918)	0.96 (0.061)	1.00 (0.951)	0.99 (0.885)
12	1.04 (0.571)	0.96 (0.302)	1.21 (0.293)	1.75 (0.264)	1.13 (0.147)	1.22 (0.307)	0.99 (0)	1.00 (0)	1.03 (0.593)	0.99 (0.075)	1.03 (0.588)	1.03 (0.601)
	Rolling Looping											
h	$AR(\widehat{p}_{AIC})$	$AR(\widehat{p}_{BIC})$	MLE	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$FELW$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$AR(\widehat{P})$	$TSF-AR(\widehat{P})$
	RMSFE relative to AR(1)											
1	0.89 (0.075)	1.02 (0.409)	1.04 (0.331)	1.04 (0.303)	0.90 (0.116)	1.04 (0.315)	1.00 (0.999)	1.00 (0.877)	0.91 (0.129)	1.01 (0.729)	0.89 (0.088)	0.90 (0.103)
2	0.85 (0.018)	0.98 (0.565)	1.04 (0.71)	1.06 (0.541)	0.86 (0.034)	1.03 (0.753)	0.95 (0.338)	0.96 (0.517)	0.86 (0.031)	0.96 (0.309)	0.85 (0.023)	0.86 (0.032)
3	0.81 (0.025)	0.97 (0.573)	1.04 (0.791)	1.13 (0.292)	0.84 (0.036)	1.03 (0.804)	0.94 (0.39)	0.95 (0.58)	0.83 (0.036)	0.94 (0.342)	0.82 (0.029)	0.83 (0.038)
4	0.80 (0.031)	0.97 (0.633)	1.06 (0.718)	1.19 (0.105)	0.83 (0.039)	1.05 (0.737)	0.94 (0.494)	0.96 (0.709)	0.82 (0.043)	0.95 (0.426)	0.81 (0.038)	0.82 (0.053)
5	0.79 (0.06)	0.97 (0.721)	1.10 (0.617)	1.25 (0.088)	0.85 (0.098)	1.09 (0.631)	0.95 (0.614)	0.98 (0.867)	0.82 (0.084)	0.95 (0.523)	0.81 (0.076)	0.83 (0.105)
6	0.81 (0.083)	0.98 (0.806)	1.14 (0.516)	1.33 (0.104)	0.87 (0.177)	1.13 (0.525)	0.97 (0.732)	1.00 (0.981)	0.84 (0.114)	0.96 (0.612)	0.83 (0.114)	0.86 (0.166)
7	0.82 (0.108)	0.99 (0.918)	1.19 (0.419)	1.41 (0.139)	0.90 (0.292)	1.18 (0.424)	0.98 (0.863)	1.03 (0.819)	0.86 (0.15)	0.97 (0.714)	0.85 (0.154)	0.88 (0.236)
8	0.86 (0.162)	1.01 (0.935)	1.25 (0.333)	1.50 (0.178)	0.94 (0.513)	1.24 (0.335)	1.00 (0.997)	1.05 (0.679)	0.90 (0.247)	0.98 (0.811)	0.89 (0.244)	0.92 (0.412)
9	0.90 (0.183)	1.02 (0.757)	1.31 (0.285)	1.64 (0.143)	1.00 (0.949)	1.31 (0.286)	1.02 (0.822)	1.07 (0.544)	0.94 (0.377)	1.00 (0.939)	0.93 (0.361)	0.98 (0.748)
10	0.93 (0.23)	1.03 (0.556)	1.36 (0.268)	1.75 (0.131)	1.05 (0.529)	1.35 (0.27)	1.03 (0.603)	1.10 (0.434)	0.98 (0.694)	1.01 (0.833)	0.97 (0.608)	1.02 (0.755)
11	0.96 (0.289)	1.04 (0.393)	1.41 (0.253)	1.88 (0.132)	1.09 (0.369)	1.41 (0.253)	1.05 (0.42)	1.12 (0.362)	1.01 (0.814)	1.03 (0.526)	1.00 (0.976)	1.06 (0.381)
12	0.99 (0.684)	1.05 (0.305)	1.45 (0.241)	2.05 (0.124)	1.14 (0.277)	1.45 (0.242)	1.07 (0.331)	1.13 (0.323)	1.04 (0.445)	1.04 (0.346)	1.03 (0.457)	1.10 (0.193)

Table 18: Forecasting Industrial Production Annual Growth for the UK. Reporting relative results to AR(1). TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

7. Appendix: Direct Comparison of TSF to the Standard Approach

Table 19. US M1

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.24 (0.042)	0.88 (0.006)	1.01 (0.561)	1.05 (0.312)	0.87 (0.002)	0.99 (0.353)	1.00 (0.724)
2	1.44 (0.015)	0.89 (0.01)	1.02 (0.019)	1.10 (0.216)	0.88 (0.003)	0.99 (0.379)	0.99 (0.574)
3	1.60 (0.06)	0.93 (0.077)	1.00 (0.814)	1.14 (0.198)	0.93 (0.095)	0.99 (0.417)	0.98 (0.501)
4	1.74 (0.041)	0.94 (0.142)	1.01 (0)	1.15 (0.092)	0.94 (0.345)	1.00 (0.975)	0.97 (0.407)
5	1.85 (0.071)	0.96 (0.423)	1.00 (0.929)	1.17 (0.131)	0.97 (0.717)	1.00 (0.895)	0.96 (0.37)
6	1.91 (0.065)	0.98 (0.776)	0.99 (0.632)	1.17 (0.113)	1.00 (0.994)	1.00 (0.805)	0.96 (0.389)
7	1.97 (0.068)	0.98 (0.818)	0.99 (0.625)	1.17 (0.198)	1.01 (0.941)	1.00 (0.838)	0.95 (0.405)
8	2.04 (0.063)	1.00 (0.975)	1.00 (0.749)	1.18 (0.185)	1.03 (0.8)	1.00 (0.772)	0.95 (0.414)
9	2.12 (0.093)	1.02 (0.77)	1.00 (0.933)	1.20 (0.208)	1.05 (0.685)	1.00 (0.773)	0.94 (0.406)
10	2.20 (0.089)	1.04 (0.63)	1.01 (0.108)	1.21 (0.204)	1.07 (0.61)	1.00 (0.767)	0.94 (0.392)
11	2.28 (0.086)	1.06 (0.578)	1.01 (0.107)	1.22 (0.206)	1.09 (0.569)	1.00 (0.717)	0.94 (0.379)
12	2.37 (0.093)	1.07 (0.535)	1.02 (0.007)	1.24 (0.208)	1.10 (0.544)	0.99 (0.675)	0.93 (0.36)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.13 (0.052)	0.84 (0.01)	1.00 (0.603)	1.02 (0.387)	0.82 (0.003)	1.01 (0.265)	0.99 (0.51)
2	1.18 (0.018)	0.81 (0.019)	1.01 (0.573)	1.02 (0.344)	0.78 (0.009)	1.00 (0.75)	0.98 (0.414)
3	1.18 (0.084)	0.83 (0.062)	1.00 (0.713)	1.02 (0.454)	0.80 (0.018)	1.00 (0.838)	0.98 (0.533)
4	1.22 (0.002)	0.84 (0.096)	1.00 (0.77)	1.01 (0.559)	0.81 (0.018)	1.00 (0.574)	0.98 (0.447)
5	1.25 (0.023)	0.85 (0.147)	1.00 (0.961)	1.01 (0.568)	0.82 (0.035)	1.01 (0.423)	0.97 (0.439)
6	1.25 (0.029)	0.88 (0.248)	1.00 (0.995)	1.01 (0.649)	0.85 (0.091)	1.01 (0.489)	0.97 (0.454)
7	1.26 (0.054)	0.91 (0.391)	1.00 (0.974)	1.02 (0.509)	0.88 (0.186)	1.01 (0.467)	0.96 (0.459)
8	1.28 (0.043)	0.95 (0.622)	1.00 (0.979)	1.02 (0.394)	0.92 (0.394)	1.01 (0.431)	0.95 (0.436)
9	1.29 (0.075)	0.97 (0.827)	1.00 (0.879)	1.03 (0.283)	0.95 (0.637)	1.01 (0.435)	0.95 (0.419)
10	1.31 (0.044)	1.00 (0.998)	1.00 (0.849)	1.04 (0.169)	0.99 (0.904)	1.01 (0.313)	0.94 (0.395)
11	1.33 (0.04)	1.01 (0.93)	0.99 (0.727)	1.05 (0.13)	1.01 (0.901)	1.01 (0.249)	0.94 (0.385)
12	1.37 (0.038)	1.02 (0.847)	0.99 (0.646)	1.06 (0.112)	1.04 (0.743)	1.01 (0.12)	0.93 (0.371)

Table 19: Forecasting M1 Annual Growth for the US. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 20. US M2

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.02 (0.157)	0.90 (0.023)	1.02 (0.521)	1.01 (0.432)	0.90 (0.02)	1.02 (0.423)	1.00 (0.841)
2	1.02 (0.052)	0.90 (0.012)	1.03 (0.079)	1.02 (0.185)	0.90 (0.01)	1.04 (0.046)	0.99 (0.681)
3	1.02 (0.108)	0.92 (0.007)	1.03 (0.233)	1.03 (0.128)	0.91 (0.011)	1.03 (0.146)	0.99 (0.705)
4	1.03 (0.012)	0.95 (0.246)	1.03 (0.261)	1.03 (0.052)	0.95 (0.279)	1.04 (0.157)	0.99 (0.775)
5	1.02 (0.006)	0.97 (0.64)	1.03 (0.299)	1.03 (0.041)	0.97 (0.662)	1.04 (0.188)	0.99 (0.799)
6	1.03 (0)	0.99 (0.816)	1.03 (0.41)	1.03 (0.066)	0.99 (0.842)	1.04 (0.257)	0.99 (0.796)
7	1.03 (0)	0.99 (0.819)	1.02 (0.557)	1.04 (0.078)	0.99 (0.851)	1.04 (0.34)	0.98 (0.781)
8	1.03 (0)	1.00 (0.929)	1.02 (0.57)	1.04 (0.07)	1.00 (0.957)	1.04 (0.319)	0.98 (0.764)
9	1.03 (0)	1.00 (0.952)	1.02 (0.619)	1.05 (0.086)	1.00 (0.935)	1.04 (0.355)	0.97 (0.731)
10	1.03 (0.007)	1.01 (0.88)	1.01 (0.737)	1.05 (0.102)	1.01 (0.884)	1.03 (0.414)	0.96 (0.704)
11	1.03 (0.01)	1.01 (0.853)	1.01 (0.724)	1.06 (0.1)	1.01 (0.866)	1.03 (0.331)	0.96 (0.679)
12	1.03 (0.012)	1.00 (0.997)	1.01 (0.727)	1.06 (0.097)	1.00 (0.967)	1.03 (0.264)	0.95 (0.643)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.03 (0.048)	0.87 (0.036)	1.03 (0.301)	1.00 (0.846)	0.87 (0.043)	1.02 (0.326)	1.00 (0.758)
2	1.04 (0.114)	0.90 (0.07)	1.04 (0.129)	1.02 (0.523)	0.89 (0.087)	1.03 (0.212)	0.99 (0.564)
3	1.04 (0.142)	0.91 (0.2)	1.01 (0.671)	1.02 (0.313)	0.90 (0.229)	1.01 (0.587)	0.99 (0.632)
4	1.06 (0.001)	0.93 (0.443)	1.02 (0.384)	1.02 (0.232)	0.93 (0.478)	1.02 (0.261)	0.99 (0.71)
5	1.06 (0.011)	0.96 (0.654)	1.02 (0.343)	1.02 (0.091)	0.96 (0.676)	1.02 (0.26)	0.99 (0.755)
6	1.06 (0.03)	0.98 (0.828)	1.01 (0.345)	1.02 (0.107)	0.98 (0.851)	1.02 (0.276)	0.99 (0.805)
7	1.07 (0.049)	0.99 (0.9)	1.01 (0.312)	1.02 (0.171)	0.99 (0.951)	1.02 (0.217)	0.99 (0.827)
8	1.08 (0.043)	1.00 (0.968)	1.01 (0.332)	1.02 (0.195)	1.01 (0.933)	1.02 (0.151)	0.99 (0.849)
9	1.09 (0.049)	1.00 (0.988)	1.01 (0.352)	1.03 (0.247)	1.02 (0.837)	1.02 (0.096)	0.98 (0.834)
10	1.10 (0.047)	1.00 (0.966)	1.00 (0.649)	1.03 (0.31)	1.03 (0.697)	1.02 (0.107)	0.98 (0.817)
11	1.11 (0.045)	1.01 (0.894)	1.01 (0.431)	1.04 (0.314)	1.04 (0.547)	1.03 (0.035)	0.98 (0.806)
12	1.12 (0.051)	1.01 (0.856)	1.01 (0.494)	1.05 (0.304)	1.05 (0.446)	1.04 (0.026)	0.97 (0.787)

Table 20: Forecasting M2 Annual Growth for the US. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 21. US MZM

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
RMSFE relative to standard approaches							
1	1.00 (0.27)	0.90 (0.022)	1.02 (0.259)	1.00 (0.057)	0.90 (0.023)	1.02 (0.284)	0.95 (0.06)
2	1.00 (0.192)	0.86 (0.005)	1.02 (0.141)	1.01 (0.012)	0.86 (0.005)	1.02 (0.189)	0.91 (0.02)
3	1.00 (0.317)	0.86 (0.009)	1.02 (0.139)	1.01 (0.016)	0.86 (0.009)	1.02 (0.187)	0.85 (0.009)
4	1.00 (0.527)	0.88 (0.022)	1.01 (0.423)	1.01 (0.026)	0.88 (0.023)	1.01 (0.523)	0.80 (0.005)
5	1.00 (0.756)	0.90 (0.047)	1.01 (0.776)	1.01 (0.035)	0.90 (0.049)	1.00 (0.903)	0.76 (0.004)
6	1.00 (0.976)	0.90 (0.091)	1.00 (0.907)	1.01 (0.047)	0.90 (0.097)	0.99 (0.784)	0.71 (0.003)
7	1.00 (0.846)	0.90 (0.142)	0.99 (0.766)	1.01 (0.059)	0.90 (0.152)	0.99 (0.664)	0.68 (0.004)
8	1.00 (0.756)	0.90 (0.171)	0.99 (0.662)	1.01 (0.083)	0.90 (0.184)	0.98 (0.577)	0.65 (0.006)
9	1.00 (0.712)	0.90 (0.214)	0.98 (0.564)	1.01 (0.147)	0.90 (0.232)	0.97 (0.494)	0.62 (0.007)
10	0.99 (0.67)	0.90 (0.238)	0.97 (0.492)	1.01 (0.237)	0.90 (0.259)	0.96 (0.428)	0.60 (0.008)
11	0.99 (0.643)	0.90 (0.212)	0.96 (0.423)	1.01 (0.291)	0.90 (0.233)	0.96 (0.365)	0.58 (0.009)
12	0.99 (0.647)	0.89 (0.168)	0.96 (0.381)	1.01 (0.29)	0.89 (0.189)	0.95 (0.327)	0.57 (0.01)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
RMSFE relative to standard approaches							
1	1.01 (0.039)	0.90 (0.032)	1.02 (0.324)	1.00 (0.057)	0.90 (0.033)	1.02 (0.338)	0.95 (0.078)
2	1.01 (0.011)	0.86 (0.007)	1.02 (0.154)	1.01 (0.013)	0.86 (0.007)	1.02 (0.191)	0.90 (0.021)
3	1.01 (0.022)	0.86 (0.01)	1.02 (0.154)	1.01 (0.01)	0.86 (0.011)	1.02 (0.2)	0.84 (0.01)
4	1.01 (0.075)	0.88 (0.022)	1.01 (0.391)	1.01 (0.016)	0.88 (0.025)	1.01 (0.467)	0.78 (0.006)
5	1.01 (0.17)	0.90 (0.04)	1.01 (0.667)	1.01 (0.028)	0.90 (0.049)	1.01 (0.745)	0.74 (0.005)
6	1.01 (0.297)	0.90 (0.065)	1.00 (0.984)	1.01 (0.059)	0.91 (0.082)	1.00 (0.936)	0.69 (0.005)
7	1.01 (0.39)	0.90 (0.097)	0.99 (0.737)	1.01 (0.051)	0.90 (0.12)	0.99 (0.729)	0.66 (0.007)
8	1.01 (0.509)	0.89 (0.11)	0.99 (0.535)	1.01 (0.043)	0.90 (0.138)	0.99 (0.557)	0.63 (0.008)
9	1.00 (0.706)	0.89 (0.142)	0.98 (0.404)	1.01 (0.079)	0.90 (0.182)	0.98 (0.451)	0.60 (0.009)
10	1.00 (0.965)	0.89 (0.163)	0.97 (0.353)	1.01 (0.147)	0.90 (0.214)	0.97 (0.404)	0.58 (0.01)
11	1.00 (0.884)	0.89 (0.145)	0.97 (0.306)	1.01 (0.2)	0.90 (0.199)	0.97 (0.356)	0.56 (0.011)
12	1.00 (0.87)	0.88 (0.11)	0.96 (0.272)	1.01 (0.194)	0.89 (0.16)	0.96 (0.317)	0.55 (0.011)

Table 21: Forecasting MZM Annual Growth for the US. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 22. US CPI

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.00 (0.857)	0.90 (0.034)	1.02 (0.077)	1.00 (0.813)	0.87 (0.01)	1.02 (0.071)	1.00 (0.255)
2	1.01 (0.403)	0.90 (0.103)	1.02 (0.234)	1.00 (0.386)	0.86 (0.043)	1.01 (0.332)	1.00 (0.535)
3	1.03 (0.129)	0.89 (0.121)	1.01 (0.328)	1.01 (0.017)	0.84 (0.069)	1.01 (0.527)	1.01 (0.705)
4	1.03 (0.063)	0.88 (0.154)	1.02 (0.191)	1.01 (0.016)	0.83 (0.097)	1.01 (0.395)	1.01 (0.754)
5	1.05 (0.019)	0.87 (0.166)	1.02 (0.042)	1.01 (0.043)	0.83 (0.113)	1.01 (0.167)	1.01 (0.753)
6	1.07 (0.009)	0.88 (0.192)	1.02 (0.009)	1.01 (0.08)	0.83 (0.143)	1.02 (0.015)	1.01 (0.734)
7	1.09 (0.023)	0.89 (0.247)	1.03 (0.007)	1.02 (0.121)	0.84 (0.195)	1.02 (0.001)	1.01 (0.691)
8	1.11 (0.044)	0.89 (0.284)	1.03 (0.023)	1.02 (0.149)	0.85 (0.237)	1.03 (0.02)	1.02 (0.634)
9	1.12 (0.064)	0.90 (0.296)	1.04 (0.04)	1.03 (0.167)	0.86 (0.262)	1.03 (0.049)	1.02 (0.6)
10	1.14 (0.08)	0.91 (0.349)	1.04 (0.045)	1.04 (0.186)	0.87 (0.313)	1.03 (0.055)	1.02 (0.577)
11	1.16 (0.091)	0.93 (0.445)	1.04 (0.046)	1.04 (0.198)	0.90 (0.395)	1.04 (0.046)	1.03 (0.546)
12	1.18 (0.101)	0.95 (0.596)	1.05 (0.043)	1.05 (0.191)	0.93 (0.52)	1.05 (0.038)	1.03 (0.507)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	0.99 (0.529)	0.90 (0.037)	1.04 (0.09)	1.00 (0.591)	0.89 (0.024)	1.03 (0.1)	1.01 (0.214)
2	1.00 (0.865)	0.90 (0.082)	1.05 (0.118)	1.00 (0.735)	0.89 (0.057)	1.04 (0.132)	1.01 (0.426)
3	1.01 (0.653)	0.89 (0.111)	1.05 (0.085)	1.00 (0.422)	0.88 (0.081)	1.05 (0.116)	1.01 (0.523)
4	1.01 (0.169)	0.89 (0.145)	1.06 (0.065)	1.01 (0.089)	0.87 (0.111)	1.05 (0.1)	1.01 (0.573)
5	1.02 (0.011)	0.89 (0.147)	1.06 (0.059)	1.01 (0.008)	0.87 (0.115)	1.06 (0.083)	1.02 (0.584)
6	1.03 (0.002)	0.90 (0.183)	1.07 (0.07)	1.01 (0.001)	0.88 (0.148)	1.06 (0.085)	1.02 (0.578)
7	1.04 (0.008)	0.91 (0.275)	1.08 (0.072)	1.01 (0.01)	0.90 (0.229)	1.07 (0.084)	1.02 (0.548)
8	1.05 (0.022)	0.92 (0.35)	1.08 (0.084)	1.02 (0.032)	0.91 (0.3)	1.07 (0.092)	1.03 (0.515)
9	1.06 (0.036)	0.93 (0.383)	1.08 (0.099)	1.02 (0.057)	0.92 (0.34)	1.07 (0.1)	1.03 (0.497)
10	1.07 (0.046)	0.94 (0.447)	1.09 (0.126)	1.03 (0.08)	0.93 (0.4)	1.08 (0.122)	1.03 (0.482)
11	1.08 (0.054)	0.96 (0.584)	1.09 (0.146)	1.03 (0.1)	0.95 (0.52)	1.08 (0.143)	1.04 (0.452)
12	1.09 (0.061)	0.99 (0.823)	1.09 (0.159)	1.04 (0.091)	0.98 (0.732)	1.08 (0.161)	1.04 (0.413)

Table 22: Forecasting CPI Annual Growth for the US. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 23. US Industrial Production

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
RMSFE relative to standard approaches							
1	1.25 (0.001)	0.74 (0.001)	1.02 (0.194)	0.99 (0.265)	0.74 (0.001)	1.00 (0.766)	1.00 (0.8)
2	1.42 (0.001)	0.72 (0.005)	1.01 (0.71)	0.97 (0.233)	0.70 (0.011)	1.00 (0.86)	1.00 (0.808)
3	1.55 (0)	0.73 (0.014)	1.00 (0.91)	0.97 (0.253)	0.70 (0.034)	0.99 (0.751)	1.00 (0.916)
4	1.66 (0.001)	0.73 (0.044)	0.99 (0.759)	0.97 (0.291)	0.70 (0.077)	0.99 (0.711)	1.00 (0.959)
5	1.71 (0.001)	0.75 (0.103)	0.99 (0.653)	0.97 (0.325)	0.72 (0.132)	0.99 (0.618)	1.00 (0.997)
6	1.81 (0.001)	0.76 (0.146)	0.98 (0.5)	0.98 (0.329)	0.73 (0.163)	0.98 (0.532)	1.00 (0.939)
7	1.91 (0)	0.77 (0.186)	0.97 (0.422)	0.98 (0.312)	0.75 (0.185)	0.98 (0.452)	1.01 (0.9)
8	2.02 (0)	0.78 (0.219)	0.96 (0.364)	0.99 (0.283)	0.76 (0.198)	0.97 (0.39)	1.01 (0.872)
9	2.14 (0)	0.79 (0.251)	0.96 (0.331)	0.99 (0.156)	0.77 (0.214)	0.96 (0.363)	1.01 (0.848)
10	2.27 (0)	0.81 (0.294)	0.95 (0.313)	1.00 (0)	0.79 (0.236)	0.95 (0.348)	1.01 (0.84)
11	2.41 (0)	0.83 (0.35)	0.94 (0.316)	1.00 (0)	0.81 (0.262)	0.95 (0.339)	1.01 (0.835)
12	2.59 (0)	0.85 (0.39)	0.94 (0.313)	1.00 (0)	0.83 (0.272)	0.95 (0.337)	1.01 (0.839)

Rolling Looping							
h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
RMSFE relative to standard approaches							
1	1.12 (0.034)	0.78 (0.003)	1.00 (0.747)	1.00 (0.997)	0.76 (0.001)	1.00 (0.886)	1.00 (0.532)
2	1.18 (0.005)	0.74 (0.014)	0.99 (0.565)	1.00 (0.947)	0.72 (0.007)	1.00 (0.875)	0.99 (0.48)
3	1.19 (0.004)	0.75 (0.034)	0.99 (0.562)	0.99 (0.445)	0.73 (0.02)	1.00 (0.906)	0.99 (0.492)
4	1.22 (0.022)	0.74 (0.081)	0.98 (0.438)	0.98 (0.263)	0.73 (0.057)	0.99 (0.785)	0.98 (0.515)
5	1.23 (0.032)	0.75 (0.152)	0.98 (0.292)	0.99 (0.321)	0.74 (0.113)	0.99 (0.694)	0.98 (0.57)
6	1.27 (0.038)	0.75 (0.194)	0.98 (0.321)	0.99 (0.328)	0.74 (0.151)	0.98 (0.625)	0.98 (0.641)
7	1.32 (0.028)	0.75 (0.221)	0.97 (0.315)	0.99 (0.331)	0.74 (0.176)	0.98 (0.551)	0.98 (0.691)
8	1.35 (0.022)	0.75 (0.235)	0.97 (0.342)	0.99 (0.28)	0.74 (0.188)	0.97 (0.48)	0.98 (0.728)
9	1.40 (0.02)	0.75 (0.247)	0.97 (0.356)	1.00 (0.065)	0.75 (0.203)	0.96 (0.415)	0.98 (0.764)
10	1.45 (0.021)	0.76 (0.263)	0.97 (0.374)	1.00 (0)	0.76 (0.222)	0.96 (0.373)	0.98 (0.782)
11	1.51 (0.03)	0.77 (0.274)	0.97 (0.384)	1.00 (0)	0.77 (0.236)	0.95 (0.342)	0.98 (0.797)
12	1.59 (0.031)	0.78 (0.284)	0.97 (0.412)	1.00 (0.13)	0.78 (0.241)	0.95 (0.325)	0.98 (0.797)

Table 23: Forecasting Industrial Production Annual Growth for the US. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 24. DE M1

h	$TSF-MLE$	$TSF-MLE\,(\widehat{p}_{AIC})$	$TSF-MLE\,(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW\,(\widehat{p}_{AIC})$	$TSF-FELW\,(\widehat{p}_{BIC})$	$TSF-AR\left(\widehat{P}\right)$
				Recursive Looping			
				RMSFE relative to standard approaches			
1	1.02 (0.589)	0.90 (0.358)	1.01 (0.208)	1.00 (0.82)	0.98 (0.843)	1.04 (0.071)	0.94 (0)
2	1.07 (0.137)	0.84 (0.309)	1.02 (0.109)	1.01 (0.309)	0.96 (0.803)	1.06 (0.227)	0.89 (0)
3	1.11 (0.095)	0.79 (0.244)	1.01 (0.211)	1.02 (0.069)	0.95 (0.778)	1.06 (0.287)	0.85 (0)
4	1.11 (0.198)	0.77 (0.213)	1.01 (0.341)	1.02 (0.065)	0.96 (0.849)	1.08 (0.26)	0.82 (0)
5	1.13 (0.14)	0.76 (0.179)	1.01 (0.221)	1.02 (0.061)	0.97 (0.865)	1.08 (0.278)	0.81 (0)
6	1.16 (0.144)	0.76 (0.159)	1.02 (0.18)	1.01 (0.148)	0.99 (0.974)	1.08 (0.291)	0.79 (0)
7	1.17 (0.21)	0.77 (0.146)	1.02 (0.179)	1.01 (0.257)	1.02 (0.899)	1.08 (0.295)	0.78 (0)
8	1.19 (0.142)	0.79 (0.139)	1.02 (0.22)	1.02 (0.24)	1.06 (0.775)	1.07 (0.345)	0.78 (0)
9	1.21 (0.119)	0.80 (0.125)	1.03 (0.279)	1.02 (0.238)	1.08 (0.685)	1.05 (0.396)	0.77 (0)
10	1.24 (0.134)	0.81 (0.113)	1.03 (0.312)	1.03 (0.251)	1.10 (0.6)	1.04 (0.464)	0.77 (0)
11	1.28 (0.127)	0.82 (0.109)	1.03 (0.331)	1.04 (0.267)	1.11 (0.562)	1.03 (0.521)	0.76 (0)
12	1.33 (0.112)	0.82 (0.101)	1.03 (0.35)	1.04 (0.274)	1.11 (0.543)	1.02 (0.606)	0.76 (0)
				Rolling Looping			
h	$TSF-MLE$	$TSF-MLE\,(\widehat{p}_{AIC})$	$TSF-MLE\,(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW\,(\widehat{p}_{AIC})$	$TSF-FELW\,(\widehat{p}_{BIC})$	$TSF-AR\left(\widehat{P}\right)$
				RMSFE relative to standard approaches			
1	1.13 (0.012)	0.91 (0.408)	1.02 (0.207)	0.99 (0.453)	0.94 (0.566)	1.01 (0.164)	0.90 (0)
2	1.23 (0)	0.86 (0.328)	1.02 (0.238)	1.00 (0.839)	0.90 (0.465)	1.02 (0.245)	0.82 (0)
3	1.27 (0)	0.81 (0.274)	1.01 (0.427)	1.01 (0.677)	0.87 (0.427)	1.02 (0.386)	0.76 (0)
4	1.28 (0)	0.80 (0.24)	1.01 (0.521)	1.01 (0.634)	0.87 (0.449)	1.02 (0.307)	0.71 (0)
5	1.34 (0)	0.78 (0.197)	1.01 (0.452)	1.01 (0.514)	0.87 (0.448)	1.02 (0.34)	0.68 (0)
6	1.38 (0)	0.78 (0.162)	1.01 (0.412)	1.01 (0.51)	0.89 (0.493)	1.02 (0.317)	0.66 (0)
7	1.42 (0.011)	0.79 (0.151)	1.02 (0.381)	1.01 (0.572)	0.92 (0.59)	1.02 (0.256)	0.65 (0)
8	1.47 (0.015)	0.81 (0.136)	1.02 (0.36)	1.02 (0.501)	0.95 (0.712)	1.01 (0.342)	0.64 (0)
9	1.52 (0.019)	0.82 (0.115)	1.03 (0.361)	1.02 (0.448)	0.97 (0.824)	1.01 (0.431)	0.63 (0)
10	1.57 (0.024)	0.83 (0.089)	1.03 (0.367)	1.03 (0.413)	0.99 (0.942)	1.00 (0.694)	0.63 (0)
11	1.63 (0.037)	0.83 (0.063)	1.03 (0.371)	1.04 (0.4)	1.00 (0.983)	1.00 (0.926)	0.62 (0)
12	1.72 (0.033)	0.83 (0.049)	1.03 (0.366)	1.04 (0.392)	1.00 (0.986)	0.99 (0.559)	0.62 (0)

Table 24: Forecasting M1 Annual Growth for Germany. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 25. DE M2

h	$TSF-MLE$	$TSF-MLE\,(\widehat{p}_{AIC})$	$TSF-MLE\,(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW\,(\widehat{p}_{AIC})$	$TSF-FELW\,(\widehat{p}_{BIC})$	$TSF-AR\left(\widehat{P}\right)$
Recursive Looping							
RMSFE relative to standard approaches							
1	1.16 (0.045)	0.97 (0.519)	1.00 (0.737)	1.07 (0.332)	0.95 (0.291)	1.00 (0.688)	0.94 (0.088)
2	1.23 (0.059)	1.01 (0.894)	1.00 (0.585)	1.15 (0.182)	0.98 (0.684)	1.00 (0.892)	0.91 (0.086)
3	1.23 (0.091)	1.04 (0.474)	1.01 (0.406)	1.20 (0.206)	1.01 (0.825)	0.99 (0.288)	0.89 (0.13)
4	1.28 (0.02)	1.04 (0.428)	1.00 (0.61)	1.23 (0.208)	1.01 (0.803)	0.99 (0.401)	0.88 (0.212)
5	1.30 (0.021)	1.05 (0.313)	1.00 (0.77)	1.27 (0.217)	1.01 (0.746)	0.99 (0.301)	0.87 (0.258)
6	1.29 (0.035)	1.05 (0.315)	1.00 (0.996)	1.32 (0.221)	1.01 (0.851)	0.99 (0.133)	0.85 (0.268)
7	1.31 (0.034)	1.06 (0.313)	1.00 (0.725)	1.34 (0.22)	1.00 (0.989)	0.99 (0.17)	0.84 (0.267)
8	1.31 (0.073)	1.06 (0.309)	1.00 (0.609)	1.37 (0.228)	1.00 (0.951)	0.99 (0.082)	0.83 (0.277)
9	1.32 (0.099)	1.07 (0.259)	1.00 (0.556)	1.41 (0.223)	1.00 (0.99)	0.99 (0.075)	0.83 (0.301)
10	1.35 (0.087)	1.09 (0.204)	1.00 (0.596)	1.44 (0.228)	1.01 (0.936)	0.99 (0.085)	0.83 (0.332)
11	1.37 (0.095)	1.10 (0.186)	1.00 (0.714)	1.49 (0.232)	1.01 (0.931)	0.99 (0.071)	0.83 (0.369)
12	1.42 (0.105)	1.10 (0.162)	1.00 (0.805)	1.52 (0.219)	1.00 (0.969)	1.00 (0.081)	0.85 (0.424)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\,(\widehat{p}_{AIC})$	$TSF-MLE\,(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW\,(\widehat{p}_{AIC})$	$TSF-FELW\,(\widehat{p}_{BIC})$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.14 (0.127)	0.96 (0.027)	0.98 (0.069)	1.08 (0.157)	0.99 (0.559)	0.98 (0.173)	0.83 (0)
2	1.29 (0.035)	0.97 (0.104)	0.99 (0.319)	1.16 (0.076)	1.00 (0.904)	0.98 (0.217)	0.72 (0.001)
3	1.37 (0.041)	0.97 (0.283)	0.99 (0.543)	1.17 (0.105)	1.01 (0.599)	0.98 (0.188)	0.66 (0.006)
4	1.47 (0.014)	0.97 (0.354)	0.99 (0.476)	1.17 (0.111)	1.02 (0.468)	0.99 (0.176)	0.64 (0.024)
5	1.58 (0.012)	0.97 (0.396)	1.00 (0.787)	1.19 (0.104)	1.02 (0.47)	0.99 (0.169)	0.64 (0.049)
6	1.69 (0.013)	0.97 (0.405)	1.00 (0.857)	1.20 (0.099)	1.02 (0.464)	0.99 (0.189)	0.63 (0.076)
7	1.81 (0.015)	0.97 (0.463)	1.00 (0.831)	1.20 (0.073)	1.01 (0.449)	1.00 (0.327)	0.64 (0.1)
8	1.92 (0.023)	0.97 (0.523)	1.00 (0.856)	1.22 (0.065)	1.01 (0.446)	1.00 (0.372)	0.66 (0.13)
9	2.05 (0.051)	0.98 (0.546)	1.00 (0.894)	1.23 (0.059)	1.02 (0.348)	1.00 (0.304)	0.68 (0.168)
10	2.22 (0.053)	0.99 (0.735)	1.00 (0.976)	1.25 (0.063)	1.03 (0.216)	1.00 (0.591)	0.71 (0.212)
11	2.36 (0.055)	0.99 (0.757)	1.00 (0.937)	1.27 (0.081)	1.03 (0.213)	1.00 (0.59)	0.74 (0.273)
12	2.54 (0.057)	0.99 (0.79)	1.00 (0.965)	1.29 (0.078)	1.03 (0.215)	1.00 (0.975)	0.78 (0.366)

Table 25: Forecasting M2 Annual Growth for Germany. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 26. DE M3

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.09 (0.079)	0.94 (0.084)	1.00 (0.674)	1.04 (0.212)	0.95 (0.243)	1.00 (0.216)	0.91 (0.017)
2	1.09 (0.254)	0.97 (0.323)	1.00 (0.595)	1.09 (0.202)	0.98 (0.58)	1.00 (0.77)	0.87 (0.031)
3	1.09 (0.268)	1.00 (0.984)	1.00 (0.554)	1.12 (0.237)	1.01 (0.875)	0.99 (0.408)	0.85 (0.059)
4	1.11 (0.084)	1.02 (0.69)	1.00 (0.762)	1.14 (0.226)	1.02 (0.737)	0.99 (0.336)	0.84 (0.106)
5	1.13 (0.043)	1.03 (0.541)	1.00 (0.905)	1.16 (0.223)	1.01 (0.791)	0.99 (0.257)	0.82 (0.144)
6	1.13 (0.085)	1.04 (0.551)	1.00 (0.663)	1.19 (0.221)	1.00 (0.968)	0.99 (0.106)	0.80 (0.154)
7	1.14 (0.112)	1.04 (0.503)	0.99 (0.45)	1.21 (0.214)	1.00 (0.953)	0.99 (0.109)	0.78 (0.157)
8	1.15 (0.154)	1.05 (0.435)	0.99 (0.389)	1.23 (0.21)	1.00 (0.936)	0.99 (0.063)	0.78 (0.165)
9	1.16 (0.179)	1.06 (0.407)	0.99 (0.442)	1.26 (0.192)	0.99 (0.917)	0.99 (0.047)	0.77 (0.18)
10	1.18 (0.177)	1.07 (0.333)	0.99 (0.549)	1.29 (0.19)	0.99 (0.933)	0.99 (0.043)	0.78 (0.201)
11	1.19 (0.177)	1.07 (0.262)	1.00 (0.766)	1.31 (0.199)	1.00 (0.971)	0.99 (0.077)	0.79 (0.23)
12	1.22 (0.16)	1.07 (0.229)	1.00 (0.92)	1.34 (0.201)	1.00 (0.949)	1.00 (0.289)	0.80 (0.264)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.17 (0.035)	0.99 (0.703)	1.00 (0.94)	1.06 (0.147)	1.01 (0.537)	0.98 (0.125)	0.76 (0)
2	1.33 (0.028)	0.98 (0.463)	0.99 (0.772)	1.11 (0.127)	1.03 (0.37)	0.98 (0.163)	0.65 (0)
3	1.44 (0.045)	1.01 (0.805)	1.01 (0.757)	1.11 (0.131)	1.04 (0.331)	0.98 (0.221)	0.60 (0.005)
4	1.56 (0.032)	1.00 (0.892)	1.00 (0.951)	1.12 (0.137)	1.05 (0.277)	0.99 (0.174)	0.59 (0.021)
5	1.71 (0.041)	1.01 (0.804)	1.01 (0.819)	1.13 (0.136)	1.06 (0.292)	0.99 (0.152)	0.60 (0.048)
6	1.86 (0.035)	1.01 (0.783)	1.01 (0.8)	1.14 (0.123)	1.05 (0.323)	0.99 (0.115)	0.60 (0.083)
7	1.99 (0.054)	1.01 (0.774)	1.00 (0.966)	1.15 (0.09)	1.06 (0.31)	0.99 (0.101)	0.62 (0.122)
8	2.14 (0.051)	1.02 (0.578)	1.00 (0.953)	1.16 (0.063)	1.06 (0.29)	1.00 (0.228)	0.65 (0.177)
9	2.31 (0.054)	1.02 (0.601)	1.00 (0.97)	1.18 (0.035)	1.06 (0.273)	1.00 (0.39)	0.68 (0.24)
10	2.46 (0.063)	1.02 (0.629)	0.99 (0.8)	1.20 (0.031)	1.06 (0.245)	1.00 (0.683)	0.72 (0.312)
11	2.62 (0.07)	1.04 (0.308)	1.00 (0.953)	1.21 (0.037)	1.06 (0.226)	1.00 (0.903)	0.76 (0.41)
12	2.81 (0.079)	1.04 (0.044)	1.00 (0.965)	1.23 (0.033)	1.07 (0.219)	1.00 (0.856)	0.82 (0.546)

Table 26: Forecasting M3 Annual Growth for Germany. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 27. DE CPI

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\left(\hat{p}_{AIC}\right)$	$TSF-MLE\left(\hat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\hat{p}_{AIC}\right)$	$TSF-FELW\left(\hat{p}_{BIC}\right)$	$TSF-AR\left(\hat{P}\right)$
RMSFE relative to standard approaches							
1	1.01 (0.378)	0.92 (0.109)	1.01 (0.587)	1.03 (0.029)	0.94 (0.221)	1.00 (0.636)	0.97 (0.411)
2	1.00 (0.945)	0.87 (0.017)	1.02 (0.226)	1.03 (0.038)	0.90 (0.094)	1.00 (0.764)	0.96 (0.572)
3	1.00 (0.916)	0.89 (0.081)	1.02 (0.158)	1.04 (0.046)	0.93 (0.282)	1.00 (0.571)	0.95 (0.613)
4	1.01 (0.85)	0.89 (0.042)	1.02 (0.241)	1.04 (0.133)	0.94 (0.194)	1.00 (0.406)	0.94 (0.628)
5	1.03 (0.555)	0.89 (0.042)	1.01 (0.469)	1.05 (0.106)	0.93 (0.057)	1.00 (0.902)	0.93 (0.612)
6	1.04 (0.457)	0.89 (0.062)	1.01 (0.456)	1.06 (0.156)	0.93 (0.033)	1.00 (0.824)	0.91 (0.597)
7	1.04 (0.312)	0.90 (0.149)	1.01 (0.346)	1.07 (0.157)	0.94 (0.073)	1.00 (0.285)	0.90 (0.579)
8	1.05 (0.195)	0.92 (0.203)	1.01 (0.314)	1.08 (0.154)	0.95 (0.18)	1.00 (0.229)	0.88 (0.529)
9	1.06 (0.105)	0.92 (0.215)	1.01 (0.364)	1.10 (0.143)	0.95 (0.182)	1.00 (0.138)	0.87 (0.489)
10	1.07 (0.13)	0.93 (0.239)	1.00 (0.25)	1.11 (0.172)	0.96 (0.266)	1.00 (0.001)	0.85 (0.441)
11	1.08 (0.164)	0.94 (0.299)	1.00 (0.2)	1.13 (0.197)	0.96 (0.328)	1.00 (0)	0.83 (0.397)
12	1.09 (0.146)	0.95 (0.35)	1.00 (0.899)	1.15 (0.198)	0.96 (0.352)	1.00 (0)	0.81 (0.344)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\left(\hat{p}_{AIC}\right)$	$TSF-MLE\left(\hat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\hat{p}_{AIC}\right)$	$TSF-FELW\left(\hat{p}_{BIC}\right)$	$TSF-AR\left(\hat{P}\right)$
RMSFE relative to standard approaches							
1	1.09 (0.07)	0.91 (0.107)	1.00 (0.86)	1.04 (0.168)	0.98 (0.613)	1.00 (0.737)	0.60 (0)
2	1.11 (0.193)	0.89 (0.184)	1.00 (0.79)	1.07 (0.078)	0.96 (0.573)	1.00 (0.174)	0.50 (0)
3	1.18 (0.148)	0.92 (0.359)	1.00 (0.963)	1.10 (0.033)	1.00 (0.972)	1.00 (0.268)	0.49 (0)
4	1.22 (0.117)	0.93 (0.372)	1.00 (0.716)	1.10 (0.015)	1.01 (0.869)	1.00 (0.303)	0.47 (0.001)
5	1.32 (0.073)	0.93 (0.374)	1.00 (0.853)	1.13 (0.022)	1.01 (0.874)	1.00 (0.572)	0.48 (0.003)
6	1.37 (0.047)	0.92 (0.409)	1.00 (0.771)	1.15 (0.013)	1.01 (0.893)	1.00 (0.527)	0.49 (0.006)
7	1.43 (0.058)	0.93 (0.465)	1.00 (0.951)	1.18 (0.082)	1.02 (0.806)	1.00 (0.095)	0.49 (0.01)
8	1.50 (0.065)	0.93 (0.488)	1.00 (0.524)	1.20 (0.076)	1.01 (0.868)	1.00 (0.343)	0.49 (0.013)
9	1.57 (0.091)	0.93 (0.504)	1.00 (0.869)	1.23 (0.109)	1.01 (0.89)	1.00 (0.24)	0.49 (0.017)
10	1.64 (0.109)	0.93 (0.512)	1.00 (0.713)	1.25 (0.127)	1.00 (0.93)	1.00 (0.013)	0.49 (0.021)
11	1.71 (0.143)	0.93 (0.493)	1.00 (0.838)	1.27 (0.146)	1.00 (0.979)	1.00 (0.202)	0.49 (0.022)
12	1.79 (0.13)	0.93 (0.437)	1.00 (0.933)	1.31 (0.15)	0.99 (0.859)	1.00 (0.348)	0.48 (0.025)

Table 27: Forecasting CPI Annual Growth for Germany. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 28. DE Industrial Production

h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
Recursive Looping							
RMSFE relative to standard approaches							
1	1.02 (0.814)	0.94 (0.164)	1.05 (0.021)	0.97 (0.345)	0.91 (0.076)	1.05 (0.03)	1.04 (0.124)
2	1.27 (0.157)	0.88 (0.134)	1.01 (0.468)	0.95 (0.535)	0.87 (0.142)	1.02 (0.433)	1.05 (0.221)
3	1.53 (0.119)	0.83 (0.182)	1.00 (0.887)	0.96 (0.636)	0.82 (0.185)	1.00 (0.909)	1.05 (0.276)
4	1.73 (0.119)	0.83 (0.23)	0.99 (0.658)	0.99 (0.833)	0.82 (0.237)	0.99 (0.728)	1.07 (0.283)
5	2.11 (0.086)	0.82 (0.256)	0.98 (0.256)	1.00 (0.955)	0.82 (0.26)	0.99 (0.44)	1.08 (0.304)
6	2.46 (0.082)	0.80 (0.247)	0.99 (0.458)	1.01 (0.894)	0.80 (0.273)	0.99 (0.396)	1.09 (0.333)
7	2.80 (0.081)	0.80 (0.264)	0.99 (0.526)	1.02 (0.681)	0.80 (0.301)	0.98 (0.361)	1.11 (0.332)
8	3.12 (0.085)	0.80 (0.286)	0.98 (0.406)	1.04 (0.467)	0.81 (0.325)	0.98 (0.325)	1.13 (0.336)
9	3.50 (0.085)	0.79 (0.298)	0.97 (0.414)	1.05 (0.314)	0.81 (0.331)	0.97 (0.32)	1.15 (0.326)
10	3.86 (0.087)	0.79 (0.298)	0.96 (0.415)	1.08 (0.209)	0.81 (0.33)	0.96 (0.299)	1.17 (0.323)
11	4.21 (0.088)	0.79 (0.292)	0.95 (0.369)	1.10 (0.188)	0.81 (0.31)	0.95 (0.272)	1.18 (0.331)
12	4.55 (0.119)	0.78 (0.272)	0.94 (0.339)	1.13 (0.184)	0.81 (0.289)	0.94 (0.255)	1.20 (0.327)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
RMSFE relative to standard approaches							
1	1.32 (0.004)	1.03 (0.508)	1.12 (0.012)	0.98 (0.725)	0.96 (0.452)	1.04 (0.058)	1.05 (0.272)
2	1.94 (0.007)	1.03 (0.647)	1.14 (0.004)	1.02 (0.782)	1.00 (0.962)	1.02 (0.187)	1.11 (0.211)
3	2.50 (0.032)	1.02 (0.806)	1.13 (0.016)	1.10 (0.295)	0.99 (0.946)	1.01 (0.221)	1.16 (0.21)
4	3.08 (0.052)	1.05 (0.637)	1.12 (0.038)	1.15 (0.274)	1.01 (0.941)	1.01 (0.265)	1.20 (0.21)
5	3.81 (0.062)	1.05 (0.646)	1.10 (0.057)	1.22 (0.186)	1.00 (0.965)	1.00 (0.395)	1.25 (0.221)
6	4.62 (0.088)	1.06 (0.593)	1.10 (0.102)	1.25 (0.172)	0.99 (0.947)	1.00 (0.447)	1.29 (0.233)
7	5.46 (0.109)	1.07 (0.539)	1.09 (0.11)	1.30 (0.149)	1.00 (0.977)	1.00 (0.567)	1.34 (0.23)
8	6.35 (0.126)	1.07 (0.533)	1.08 (0.219)	1.34 (0.15)	1.01 (0.936)	1.00 (0.494)	1.38 (0.223)
9	7.31 (0.142)	1.08 (0.467)	1.07 (0.261)	1.37 (0.121)	1.02 (0.833)	1.00 (0.356)	1.43 (0.201)
10	8.32 (0.159)	1.08 (0.436)	1.05 (0.344)	1.43 (0.087)	1.04 (0.681)	1.00 (0)	1.48 (0.174)
11	9.38 (0.172)	1.08 (0.369)	1.04 (0.439)	1.49 (0.076)	1.05 (0.592)	1.00 (0)	1.54 (0.155)
12	10.45 (0.183)	1.07 (0.349)	1.03 (0.542)	1.54 (0.093)	1.06 (0.475)	1.00 (0)	1.60 (0.137)

Table 28: Forecasting Industrial Production Annual Growth for Germany. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 29. UK M1

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\,(\widehat{p}_{AIC})$	$TSF-MLE\,(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW\,(\widehat{p}_{AIC})$	$TSF-FELW\,(\widehat{p}_{BIC})$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.15 (0.01)	0.89 (0.203)	1.01 (0.795)	1.03 (0.009)	0.84 (0.102)	1.02 (0.033)	0.88 (0.01)
2	1.19 (0.053)	0.95 (0.587)	1.01 (0.836)	1.02 (0.119)	0.88 (0.199)	1.01 (0.384)	0.77 (0.005)
3	1.23 (0.068)	0.98 (0.891)	1.02 (0.813)	1.03 (0.102)	0.89 (0.25)	1.00 (0.72)	0.70 (0.005)
4	1.26 (0.101)	1.04 (0.782)	1.03 (0.764)	1.03 (0.202)	0.92 (0.434)	1.00 (0.865)	0.66 (0.004)
5	1.27 (0.084)	1.09 (0.608)	1.04 (0.672)	1.03 (0.229)	0.93 (0.533)	1.00 (0.909)	0.61 (0.003)
6	1.30 (0.064)	1.13 (0.529)	1.04 (0.709)	1.03 (0.17)	0.93 (0.549)	1.00 (0.945)	0.57 (0.002)
7	1.33 (0.034)	1.18 (0.449)	1.05 (0.711)	1.04 (0.125)	0.92 (0.498)	1.00 (0.982)	0.53 (0.003)
8	1.31 (0.01)	1.23 (0.39)	1.06 (0.681)	1.03 (0.114)	0.90 (0.415)	1.00 (0)	0.49 (0.003)
9	1.31 (0)	1.28 (0.325)	1.06 (0.678)	1.04 (0.09)	0.92 (0.485)	1.00 (0)	0.47 (0.004)
10	1.32 (0.001)	1.32 (0.296)	1.05 (0.719)	1.04 (0.103)	0.93 (0.548)	1.00 (0)	0.45 (0.005)
11	1.35 (0.018)	1.34 (0.275)	1.04 (0.792)	1.05 (0.101)	0.94 (0.636)	1.00 (0)	0.43 (0.006)
12	1.44 (0.043)	1.34 (0.266)	1.02 (0.891)	1.07 (0.047)	0.97 (0.771)	1.01 (0.261)	0.42 (0.007)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\,(\widehat{p}_{AIC})$	$TSF-MLE\,(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW\,(\widehat{p}_{AIC})$	$TSF-FELW\,(\widehat{p}_{BIC})$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.14 (0.012)	0.95 (0.536)	1.04 (0.111)	1.04 (0.015)	0.86 (0.089)	0.99 (0.279)	0.82 (0.003)
2	1.20 (0.044)	1.01 (0.943)	1.06 (0.059)	1.04 (0.147)	0.86 (0.075)	0.99 (0.478)	0.67 (0.001)
3	1.27 (0.039)	1.10 (0.406)	1.11 (0.051)	1.03 (0.317)	0.87 (0.121)	1.00 (0.941)	0.60 (0.002)
4	1.30 (0.089)	1.18 (0.29)	1.14 (0.088)	1.03 (0.352)	0.89 (0.215)	1.00 (0.711)	0.56 (0.003)
5	1.33 (0.084)	1.23 (0.279)	1.17 (0.096)	1.04 (0.34)	0.91 (0.321)	1.01 (0.237)	0.53 (0.003)
6	1.36 (0.055)	1.27 (0.296)	1.18 (0.122)	1.04 (0.194)	0.91 (0.351)	1.01 (0.227)	0.51 (0.004)
7	1.41 (0.036)	1.30 (0.318)	1.20 (0.133)	1.06 (0.082)	0.91 (0.34)	1.00 (0.388)	0.48 (0.006)
8	1.42 (0.032)	1.34 (0.333)	1.21 (0.162)	1.06 (0.078)	0.91 (0.352)	1.00 (0.077)	0.45 (0.008)
9	1.45 (0.006)	1.34 (0.314)	1.20 (0.138)	1.07 (0.055)	0.92 (0.441)	1.00 (0)	0.44 (0.011)
10	1.47 (0.006)	1.35 (0.312)	1.19 (0.143)	1.07 (0.02)	0.93 (0.501)	1.00 (0)	0.43 (0.013)
11	1.51 (0.016)	1.36 (0.303)	1.18 (0.145)	1.08 (0.006)	0.95 (0.586)	1.00 (0.161)	0.42 (0.016)
12	1.61 (0.033)	1.34 (0.314)	1.17 (0.16)	1.11 (0.003)	0.96 (0.637)	1.00 (0.287)	0.42 (0.02)

Table 29: Forecasting M1 Annual Growth for the UK. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 30. UK M2

h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
Recursive Looping							
RMSFE relative to standard approaches							
1	1.29 (0.001)	0.88 (0.364)	1.02 (0.281)	1.01 (0.386)	0.81 (0.165)	1.01 (0.338)	0.98 (0.53)
2	1.56 (0.008)	0.95 (0.693)	1.03 (0.174)	1.04 (0.115)	0.84 (0.244)	1.00 (0.96)	0.97 (0.701)
3	1.85 (0.005)	1.06 (0.562)	1.06 (0.037)	1.04 (0.067)	0.89 (0.279)	1.00 (0.607)	0.97 (0.728)
4	2.08 (0.002)	1.17 (0.141)	1.08 (0.016)	1.04 (0.051)	0.94 (0.448)	1.00 (0.848)	0.96 (0.71)
5	2.25 (0.001)	1.25 (0.062)	1.10 (0.012)	1.04 (0.059)	0.97 (0.694)	1.00 (1)	0.94 (0.65)
6	2.41 (0.001)	1.29 (0.047)	1.10 (0.018)	1.04 (0.057)	0.98 (0.833)	1.00 (0.848)	0.92 (0.564)
7	2.62 (0)	1.35 (0.039)	1.11 (0.033)	1.05 (0.043)	1.00 (0.962)	1.00 (0.492)	0.88 (0.452)
8	2.81 (0)	1.42 (0.021)	1.11 (0.061)	1.04 (0.084)	1.02 (0.84)	1.00 (0.509)	0.85 (0.35)
9	3.00 (0)	1.50 (0.008)	1.12 (0.096)	1.04 (0.157)	1.03 (0.672)	1.00 (0.665)	0.81 (0.275)
10	3.15 (0)	1.56 (0.001)	1.13 (0.087)	1.03 (0.18)	1.03 (0.564)	1.00 (0.896)	0.78 (0.228)
11	3.26 (0)	1.62 (0)	1.14 (0.061)	1.04 (0.215)	1.03 (0.535)	1.00 (0.924)	0.75 (0.211)
12	3.55 (0)	1.67 (0)	1.13 (0.133)	1.04 (0.185)	1.03 (0.581)	1.00 (0.257)	0.73 (0.217)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
RMSFE relative to standard approaches							
1	1.09 (0.039)	0.94 (0.516)	1.03 (0.222)	1.05 (0.123)	0.85 (0.118)	1.01 (0.17)	0.81 (0)
2	1.21 (0.042)	1.02 (0.837)	1.04 (0.188)	1.11 (0.124)	0.89 (0.289)	1.00 (0.559)	0.77 (0.001)
3	1.41 (0.009)	1.13 (0.14)	1.06 (0.15)	1.15 (0.106)	0.94 (0.473)	1.00 (0.874)	0.72 (0.005)
4	1.55 (0.021)	1.19 (0.041)	1.08 (0.085)	1.18 (0.099)	0.98 (0.815)	1.00 (0.595)	0.69 (0.012)
5	1.69 (0.017)	1.25 (0.018)	1.09 (0.077)	1.20 (0.098)	1.00 (0.999)	1.00 (0.556)	0.66 (0.018)
6	1.83 (0.025)	1.31 (0.01)	1.13 (0.036)	1.23 (0.095)	1.01 (0.912)	1.00 (0.663)	0.63 (0.026)
7	2.00 (0.027)	1.37 (0.009)	1.15 (0.02)	1.26 (0.094)	1.02 (0.82)	1.00 (0.959)	0.59 (0.031)
8	2.16 (0.038)	1.44 (0.007)	1.17 (0.023)	1.27 (0.099)	1.05 (0.707)	1.00 (0.759)	0.55 (0.036)
9	2.32 (0.048)	1.49 (0.01)	1.18 (0.022)	1.28 (0.097)	1.07 (0.616)	1.00 (0.85)	0.52 (0.043)
10	2.45 (0.048)	1.55 (0.009)	1.20 (0.022)	1.29 (0.09)	1.07 (0.626)	1.00 (0.989)	0.49 (0.05)
11	2.56 (0.076)	1.59 (0.009)	1.21 (0.016)	1.31 (0.082)	1.06 (0.688)	1.00 (0.943)	0.47 (0.056)
12	2.83 (0.086)	1.66 (0.007)	1.24 (0.006)	1.34 (0.081)	1.05 (0.719)	1.00 (0.477)	0.46 (0.064)

Table 30: Forecasting M2 Annual Growth for the UK. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 31. UK M3

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.16 (0.013)	0.92 (0.344)	1.02 (0.028)	1.03 (0.079)	0.88 (0.141)	1.01 (0.359)	0.92 (0.065)
2	1.23 (0.01)	0.99 (0.947)	1.01 (0.196)	1.06 (0.086)	0.93 (0.403)	1.00 (0.775)	0.89 (0.184)
3	1.37 (0.002)	1.06 (0.408)	1.01 (0.468)	1.08 (0.067)	0.96 (0.586)	1.00 (0.33)	0.87 (0.221)
4	1.43 (0.003)	1.15 (0.023)	1.02 (0.294)	1.10 (0.043)	1.02 (0.72)	1.00 (0.203)	0.84 (0.222)
5	1.49 (0.005)	1.21 (0.007)	1.03 (0.227)	1.11 (0.027)	1.05 (0.346)	1.00 (0.14)	0.81 (0.181)
6	1.57 (0.017)	1.26 (0.012)	1.03 (0.157)	1.13 (0.023)	1.07 (0.149)	0.99 (0.105)	0.77 (0.128)
7	1.61 (0.017)	1.30 (0.048)	1.03 (0.091)	1.14 (0.02)	1.09 (0.16)	1.00 (0.098)	0.73 (0.085)
8	1.72 (0.023)	1.36 (0.061)	1.05 (0.064)	1.15 (0.01)	1.11 (0.153)	0.99 (0.013)	0.69 (0.056)
9	1.79 (0.027)	1.38 (0.071)	1.05 (0.077)	1.15 (0.008)	1.12 (0.149)	1.00 (0.078)	0.66 (0.043)
10	1.84 (0.025)	1.38 (0.078)	1.05 (0.07)	1.15 (0.008)	1.11 (0.19)	1.00 (0.004)	0.62 (0.036)
11	1.90 (0.026)	1.38 (0.074)	1.05 (0.078)	1.16 (0.006)	1.09 (0.232)	1.00 (0.192)	0.59 (0.035)
12	1.99 (0.015)	1.39 (0.051)	1.05 (0.042)	1.17 (0.002)	1.07 (0.391)	0.99 (0)	0.57 (0.04)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.20 (0.001)	0.98 (0.778)	1.04 (0.037)	1.02 (0.298)	0.88 (0.073)	1.01 (0.289)	0.89 (0.012)
2	1.34 (0.001)	1.07 (0.339)	1.06 (0.032)	1.08 (0.195)	0.92 (0.296)	1.00 (0.296)	0.85 (0.045)
3	1.48 (0.001)	1.16 (0.058)	1.08 (0.028)	1.13 (0.133)	0.94 (0.412)	1.00 (0.554)	0.82 (0.067)
4	1.67 (0.006)	1.25 (0.006)	1.09 (0.026)	1.16 (0.1)	0.97 (0.69)	1.00 (0.701)	0.78 (0.071)
5	1.86 (0.011)	1.32 (0.007)	1.12 (0.026)	1.19 (0.08)	0.98 (0.799)	1.00 (0.958)	0.74 (0.067)
6	2.05 (0.02)	1.39 (0.009)	1.13 (0.034)	1.22 (0.072)	1.00 (0.998)	1.00 (0.819)	0.71 (0.067)
7	2.24 (0.03)	1.47 (0.017)	1.17 (0.052)	1.25 (0.074)	1.01 (0.814)	1.00 (0.924)	0.67 (0.066)
8	2.43 (0.049)	1.56 (0.026)	1.20 (0.058)	1.27 (0.065)	1.02 (0.514)	1.00 (0.586)	0.63 (0.067)
9	2.61 (0.073)	1.62 (0.043)	1.21 (0.079)	1.28 (0.065)	1.03 (0.348)	1.00 (0.968)	0.60 (0.074)
10	2.74 (0.083)	1.65 (0.056)	1.20 (0.089)	1.29 (0.071)	1.02 (0.626)	1.00 (0.508)	0.58 (0.083)
11	2.88 (0.087)	1.68 (0.075)	1.20 (0.105)	1.29 (0.064)	1.00 (0.963)	1.00 (0.76)	0.56 (0.091)
12	3.05 (0.095)	1.73 (0.087)	1.20 (0.129)	1.30 (0.049)	0.98 (0.721)	1.00 (0.181)	0.55 (0.104)

Table 31: Forecasting M3 Annual Growth for the UK. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 32. UK M4

h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
Recursive Looping							
RMSFE relative to standard approaches							
1	1.11 (0.036)	0.93 (0.596)	1.00 (0.73)	1.04 (0.225)	0.93 (0.617)	1.00 (0.66)	1.00 (0.897)
2	1.19 (0.036)	0.95 (0.728)	1.01 (0.134)	1.04 (0.212)	0.95 (0.71)	0.99 (0.511)	1.00 (0.935)
3	1.25 (0.019)	0.98 (0.858)	1.02 (0.073)	1.04 (0.293)	0.96 (0.792)	0.98 (0.406)	1.01 (0.932)
4	1.30 (0.007)	1.00 (0.987)	1.02 (0.054)	1.05 (0.209)	0.97 (0.871)	0.99 (0.492)	1.01 (0.949)
5	1.34 (0.001)	1.02 (0.89)	1.02 (0.014)	1.04 (0.172)	1.00 (0.976)	0.99 (0.481)	1.00 (0.967)
6	1.37 (0)	1.04 (0.759)	1.02 (0.028)	1.04 (0.14)	1.01 (0.943)	0.99 (0.591)	1.00 (0.995)
7	1.39 (0)	1.06 (0.625)	1.03 (0.018)	1.04 (0.132)	1.02 (0.897)	1.00 (0.699)	0.99 (0.951)
8	1.42 (0)	1.07 (0.443)	1.03 (0.032)	1.03 (0.103)	1.02 (0.893)	1.00 (0.798)	0.98 (0.875)
9	1.43 (0)	1.08 (0.286)	1.03 (0.04)	1.03 (0.089)	1.01 (0.912)	1.00 (0.987)	0.96 (0.815)
10	1.47 (0)	1.10 (0.099)	1.04 (0.037)	1.03 (0.131)	1.01 (0.918)	1.00 (0.819)	0.95 (0.766)
11	1.48 (0)	1.11 (0.011)	1.04 (0.081)	1.03 (0.154)	1.00 (0.973)	1.00 (0.91)	0.93 (0.732)
12	1.52 (0)	1.12 (0.018)	1.04 (0.114)	1.03 (0.16)	0.99 (0.87)	1.00 (0.507)	0.92 (0.717)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE(\widehat{p}_{AIC})$	$TSF-MLE(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW(\widehat{p}_{AIC})$	$TSF-FELW(\widehat{p}_{BIC})$	$TSF-AR(\widehat{P})$
RMSFE relative to standard approaches							
1	1.19 (0.062)	0.96 (0.724)	0.98 (0.157)	1.03 (0.389)	0.96 (0.682)	0.99 (0.381)	0.96 (0.298)
2	1.32 (0.078)	1.03 (0.755)	1.00 (0.837)	1.03 (0.489)	0.96 (0.732)	1.00 (0.483)	0.94 (0.389)
3	1.32 (0.105)	1.06 (0.459)	0.99 (0.588)	1.02 (0.562)	0.98 (0.868)	1.00 (0.555)	0.92 (0.444)
4	1.39 (0.067)	1.07 (0.425)	0.98 (0.567)	1.03 (0.406)	1.01 (0.947)	1.00 (0.565)	0.90 (0.47)
5	1.44 (0.02)	1.10 (0.291)	0.98 (0.646)	1.03 (0.317)	1.04 (0.695)	1.00 (0.591)	0.89 (0.476)
6	1.51 (0.006)	1.13 (0.222)	0.97 (0.615)	1.04 (0.283)	1.06 (0.412)	1.00 (0.535)	0.87 (0.452)
7	1.59 (0.001)	1.17 (0.138)	0.99 (0.882)	1.04 (0.294)	1.07 (0.261)	1.00 (0.453)	0.84 (0.415)
8	1.64 (0.001)	1.21 (0.164)	0.99 (0.883)	1.04 (0.34)	1.08 (0.084)	1.00 (0.609)	0.81 (0.37)
9	1.69 (0)	1.23 (0.184)	0.98 (0.842)	1.05 (0.322)	1.08 (0.002)	1.00 (0.414)	0.77 (0.338)
10	1.76 (0)	1.25 (0.186)	0.98 (0.81)	1.04 (0.341)	1.08 (0)	1.00 (0.549)	0.74 (0.325)
11	1.77 (0)	1.27 (0.166)	0.98 (0.845)	1.03 (0.357)	1.08 (0)	1.00 (0.707)	0.71 (0.316)
12	1.88 (0)	1.30 (0.174)	0.98 (0.899)	1.04 (0.337)	1.07 (0.049)	1.00 (0.457)	0.68 (0.315)

Table 32: Forecasting M4 Annual Growth for the UK. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 33. UK CPI

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.03 (0.231)	0.92 (0.138)	1.00 (0.396)	1.00 (0.889)	0.91 (0.09)	1.00 (0.247)	0.98 (0.387)
2	1.04 (0.025)	0.93 (0.412)	1.00 (0.603)	1.00 (0.636)	0.91 (0.224)	1.00 (0.677)	0.97 (0.421)
3	1.06 (0.008)	0.92 (0.415)	1.00 (0.403)	1.01 (0.287)	0.90 (0.202)	1.00 (0.523)	0.95 (0.398)
4	1.07 (0.002)	0.93 (0.487)	1.00 (0.346)	1.02 (0.097)	0.90 (0.247)	1.00 (0.499)	0.94 (0.396)
5	1.08 (0.001)	0.94 (0.595)	1.00 (0.477)	1.02 (0.115)	0.91 (0.3)	1.00 (0.765)	0.93 (0.393)
6	1.09 (0.001)	0.96 (0.642)	1.00 (0.789)	1.03 (0.123)	0.92 (0.293)	1.00 (0.779)	0.93 (0.397)
7	1.09 (0.001)	0.97 (0.723)	1.00 (0.742)	1.03 (0.117)	0.93 (0.307)	1.00 (0.458)	0.92 (0.39)
8	1.10 (0)	0.99 (0.844)	1.00 (0)	1.03 (0.106)	0.94 (0.301)	1.00 (0)	0.91 (0.366)
9	1.10 (0)	1.00 (0.935)	1.00 (0)	1.04 (0.093)	0.95 (0.334)	1.00 (0)	0.90 (0.32)
10	1.11 (0)	1.00 (0.938)	1.00 (0)	1.04 (0.088)	0.96 (0.41)	1.00 (0)	0.88 (0.25)
11	1.12 (0)	1.01 (0.837)	1.00 (0)	1.04 (0.075)	0.97 (0.44)	1.00 (0)	0.86 (0.181)
12	1.13 (0)	1.03 (0.586)	1.00 (0.206)	1.05 (0.069)	0.98 (0.595)	1.00 (0)	0.84 (0.121)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\left(\widehat{p}_{AIC}\right)$	$TSF-MLE\left(\widehat{p}_{BIC}\right)$	$TSF-FELW$	$TSF-FELW\left(\widehat{p}_{AIC}\right)$	$TSF-FELW\left(\widehat{p}_{BIC}\right)$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.03 (0.449)	0.96 (0.523)	1.01 (0.132)	1.04 (0.351)	0.97 (0.561)	1.05 (0.052)	0.93 (0.05)
2	1.04 (0.381)	0.96 (0.697)	1.01 (0.149)	1.05 (0.322)	0.97 (0.755)	1.06 (0.126)	0.91 (0.134)
3	1.07 (0.217)	0.96 (0.712)	1.01 (0.184)	1.09 (0.164)	0.97 (0.779)	1.06 (0.214)	0.90 (0.195)
4	1.09 (0.114)	0.96 (0.758)	1.00 (0.415)	1.12 (0.12)	0.98 (0.855)	1.07 (0.271)	0.89 (0.214)
5	1.10 (0.077)	0.96 (0.781)	1.00 (0.81)	1.12 (0.12)	0.99 (0.948)	1.07 (0.341)	0.88 (0.225)
6	1.12 (0.036)	0.96 (0.801)	1.00 (0.989)	1.14 (0.103)	0.99 (0.966)	1.06 (0.387)	0.87 (0.219)
7	1.14 (0.039)	0.96 (0.784)	1.00 (0.862)	1.16 (0.123)	1.00 (0.985)	1.06 (0.398)	0.86 (0.199)
8	1.15 (0.039)	0.95 (0.72)	1.00 (0.213)	1.17 (0.137)	1.00 (0.984)	1.06 (0.387)	0.84 (0.159)
9	1.16 (0.051)	0.93 (0.631)	1.00 (0)	1.18 (0.141)	0.99 (0.938)	1.06 (0.382)	0.82 (0.116)
10	1.18 (0.056)	0.91 (0.547)	1.00 (0)	1.19 (0.136)	0.98 (0.894)	1.04 (0.409)	0.80 (0.075)
11	1.19 (0.059)	0.90 (0.493)	1.00 (0)	1.20 (0.122)	0.98 (0.848)	1.03 (0.433)	0.78 (0.045)
12	1.22 (0.05)	0.89 (0.431)	1.00 (0.073)	1.23 (0.103)	0.97 (0.828)	1.03 (0.513)	0.75 (0.025)

Table 33: Forecasting CPI Annual Growth for the UK. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.

Table 34. UK Industrial Production

Recursive Looping							
h	$TSF-MLE$	$TSF-MLE\,(\widehat{p}_{AIC})$	$TSF-MLE\,(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW\,(\widehat{p}_{AIC})$	$TSF-FELW\,(\widehat{p}_{BIC})$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.06 (0.209)	0.92 (0.233)	0.96 (0.375)	1.00 (0.861)	0.92 (0.222)	1.00 (0.947)	1.00 (0.303)
2	1.06 (0.546)	0.95 (0.337)	0.97 (0.347)	1.00 (0.818)	0.96 (0.448)	1.00 (0.619)	1.00 (0.618)
3	1.07 (0.462)	0.95 (0.406)	0.99 (0.571)	1.00 (0.991)	0.97 (0.549)	1.01 (0.59)	1.00 (0.735)
4	1.12 (0.332)	0.96 (0.468)	1.00 (0.843)	1.00 (0.919)	0.99 (0.746)	1.01 (0.554)	1.00 (0.749)
5	1.18 (0.26)	0.96 (0.544)	1.01 (0.647)	1.00 (0.821)	1.00 (0.951)	1.01 (0.605)	1.00 (0.858)
6	1.19 (0.272)	0.95 (0.574)	1.01 (0.497)	1.00 (0.781)	1.00 (0.929)	1.01 (0.684)	1.00 (0.784)
7	1.24 (0.241)	0.95 (0.579)	1.02 (0.394)	1.00 (0.703)	1.01 (0.856)	1.01 (0.767)	1.00 (0.773)
8	1.29 (0.266)	0.95 (0.617)	1.01 (0.476)	1.01 (0.639)	1.02 (0.682)	1.00 (0.841)	1.00 (0.737)
9	1.30 (0.278)	0.94 (0.579)	1.01 (0.504)	1.01 (0.601)	1.02 (0.696)	1.00 (0.888)	1.00 (0.698)
10	1.34 (0.328)	0.95 (0.609)	1.02 (0.367)	1.01 (0.486)	1.04 (0.49)	1.00 (0.828)	1.00 (0.683)
11	1.37 (0.332)	0.93 (0.546)	1.01 (0.415)	1.01 (0.409)	1.04 (0.533)	1.00 (0.88)	1.00 (0.678)
12	1.44 (0.294)	0.93 (0.524)	1.01 (0.526)	1.01 (0.311)	1.04 (0.468)	1.00 (0.669)	1.00 (0.667)
Rolling Looping							
h	$TSF-MLE$	$TSF-MLE\,(\widehat{p}_{AIC})$	$TSF-MLE\,(\widehat{p}_{BIC})$	$TSF-FELW$	$TSF-FELW\,(\widehat{p}_{AIC})$	$TSF-FELW\,(\widehat{p}_{BIC})$	$TSF-AR\left(\widehat{P}\right)$
RMSFE relative to standard approaches							
1	1.00 (0.953)	0.87 (0.038)	1.00 (0.931)	1.00 (0.604)	0.91 (0.113)	1.01 (0.284)	1.00 (0.426)
2	1.02 (0.774)	0.83 (0.119)	0.99 (0.595)	1.01 (0.805)	0.91 (0.167)	1.01 (0.475)	1.01 (0.289)
3	1.09 (0.301)	0.81 (0.183)	1.00 (0.674)	1.01 (0.671)	0.89 (0.174)	1.01 (0.68)	1.01 (0.149)
4	1.13 (0.091)	0.79 (0.181)	0.99 (0.407)	1.02 (0.553)	0.87 (0.176)	1.00 (0.854)	1.02 (0.036)
5	1.14 (0)	0.77 (0.198)	0.99 (0.369)	1.03 (0.485)	0.87 (0.209)	1.00 (0.947)	1.03 (0.026)
6	1.17 (0)	0.77 (0.2)	0.99 (0.362)	1.04 (0.432)	0.87 (0.243)	0.99 (0.749)	1.03 (0.028)
7	1.18 (0.04)	0.76 (0.202)	1.00 (0.359)	1.05 (0.386)	0.88 (0.278)	0.99 (0.581)	1.04 (0.032)
8	1.21 (0.192)	0.76 (0.208)	1.00 (0.303)	1.05 (0.36)	0.90 (0.395)	0.98 (0.44)	1.04 (0.033)
9	1.25 (0.141)	0.77 (0.226)	1.00 (0.273)	1.06 (0.339)	0.93 (0.53)	0.98 (0.388)	1.05 (0.038)
10	1.29 (0.089)	0.77 (0.23)	1.00 (0.163)	1.06 (0.329)	0.95 (0.629)	0.98 (0.364)	1.05 (0.042)
11	1.33 (0.08)	0.77 (0.219)	1.00 (0)	1.06 (0.324)	0.96 (0.681)	0.97 (0.358)	1.06 (0.049)
12	1.41 (0.068)	0.78 (0.217)	1.00 (0)	1.06 (0.318)	0.98 (0.829)	0.97 (0.347)	1.06 (0.052)

Table 34: Forecasting Industrial Production Annual Growth for the UK. Reporting relative results to standard approach. TSF denotes that the suggested forecasting algorithm is implemented. AIC and BIC are used for order selection. Values inside the brackets denote the Diebold-Mariano two-sided test p-values.