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### Comparing the Forecasting of Iranian Inflation with many predictors

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**EXTENDED ABSTRACT****INTRODUCTION**

One of the most important economic problems in Iran during the last few decades is the phenomenon of inflation, to an extent that improving the conditions caused by inflation has always been one of the important goals of developmental plans in Iran. Achieving this goal requires the creation of a rigorous and purposeful mechanism for the economic policymaking process, which in its standard form involves forecasting, targeting and policy analysis. Given that inflation affects many macroeconomic indicators, therefore, explaining and forecasting inflation rates based on econometrics models can help improve policy making.

**METHODOLOGY**

In this study, 108 quarterly variables from 1990-2017 were used. The variables included the consumer price index as a dependent variable and 107 independent variables (predictors) which were included in nine blocks in order to extract the factors. Thus, 1) the price block included different values of the producer price index, GDP deflator and wage indexes (including 13 variables); 2) the demand block included components of GDP on the demand side and some other indexes related to capital stock (including 7 variables); 3) the fiscal block included all types of government revenues and expenditures (including 13 variables); 4) the international block included exports, imports, exchange rates, as well as the inflation and exchange rates of China and Germany (as Iran's largest trading partners) (including 17 variables); 5) the output block, where different types of production variables were used (including 14 variables); 6) the money block included liquidity and

monetary base components (including 21 variables); 7) the financial block, including stock market and insurance variable (including 6 variables); 8) the energy block included various variables related to crude oil, electricity and energy (including 7 variables); and 9) the labor force block which included various variables of unemployment, employment and productivity (including 9 Variables). All the variables of this paper were seasonally adjusted using X-13, TRAMO or STL. Also, the statics of the variables were investigated by the use of unit root tests without seasonal integration (Dickey Fuller and KPSS tests) and a unit root test with seasonal and semi-annual integration (HEGY test). In addition, all variables were standardized by differentiating from the mean and dividing by the standard deviation. Principal Component Analysis (PCA) was used to extract the factors using all the variables in each block.

The main purpose of this study was to compare DMA and DMS models (9 block factor methodes) with BMA, BVAR, TVP and AR. In addition, the interruptions of each model were determined using BIC. Similar to the study of Koop and Korobilis (2012), the predictions were considered with a short-run horizon ( $h = 1$ ), a medium-run horizon ( $h = 4$ ) and a long-run horizon ( $h = 8$ ).

In order to assess the prediction performance, Mean Squared Forecast Error (MSFE), Mean Absolute Forecast Error (MAFE), Mean Absolute Percentage Error (MAPE), the bias of the prediction error, the variance of the prediction error and the sum of log predictive likelihoods (PL) were used. In addition, the Diebold-Mariano (1995) test was used to compare the prediction accuracy.

## **FINDINGS**

The results show that the prediction of DMS and DMA is more efficient than other traditional predictive methods to predict the inflation rate in Iran. Findings indicated that in all forecast horizons, money and price blocks were the highest in using the optimal model over time and the fiscal block was the lowest. In general, it can be said that the DMA model is the average of many models and does not only use a single factor block (there is also no irrelevant factor block) and this is the most important feature of DMA / DMS use.

## **CONCLUSION**

Due to the fact that variables can be changed in DMA / DMS in any time period, so their use for economic policy is recommended.

## Reference

- Ang, A., Bekaert, G., & Wei, M. (2007). Do Macro Variables, Asset Markets, or Surveys Forecast Inflation Better? *Journal of Monetary Economics*, 54, 1163–1212.
- Atkeson, A., & Ohanian, L. E. (2001). Are Phillips curves useful for forecasting inflation? *Federal Reserve Bank of Minneapolis Quarterly Review*, 25(1), 2–11.
- Avramov, D. (2002). Stock Return Predictability and Model Uncertainty, *Journal of Financial Economics*, 64, 423–58.
- Aye, G., Gupta, R., Hammoudeh, SH., & Kim, W.J. (2015). Forecasting the Price of Gold Using Dynamic Model Averaging, University of Pretoria, *Department of Economics Working Paper Series*.
- Bayani, O. & Mohammadi, T.(2019). Factors Affecting Financial Crises: The Bayesian Model Averaging, *Quarterly Journal of Quantitative Economics (JQE)*, 16(2), 145-180. Available at: [https://jqe.scu.ac.ir/article\\_14275.html?lang=en](https://jqe.scu.ac.ir/article_14275.html?lang=en) [In Persian]
- Balcilar, R., Gupta, R., Eyden, R.V., Thompson, K., & Majumdar, A. (2018). Comparing the forecasting ability of financial conditions indices: The case of South Africa. *The Quarterly Review of Economics and Finance*, 69(C), 245-259.
- Barsoum, F., & Stankiewicz, S. (2015). Forecasting GDP growth using mixed-frequency models with switching regimes. *International Journal of Forecasting*, 31(1), 33-50.
- Belmonte, M., & Koop, G. (2014). Model Switching and Model Averaging in Time-Varying Parameter Regression Models. in Ivan Jeliazkov, Dale J. Poirier (ed.) *Bayesian Model Comparison (Advances in Econometrics, Volume (34) Emerald Group Publishing Limited*, 45 – 69.
- Bork, L., & Møller, S. V. (2015). Forecasting house prices in the 50 states using Dynamic Model Averaging and Dynamic Model Selection. *International Journal of Forecasting*, 31(1), 63-78.
- Brave, S., & Fisher, J. (2004). In search of a robust inflation forecast. *Federal Reserve Bank of Chicago, Economic Perspectives*, 28(4), 11–31.

- 
- Buncic, D. & G-M. Frey. (2012). Forecasting commodity currencies with dynamic Bayesian Models. Working paper, Institute of Mathematics and Statistics, University of St Gallen, Switzerland.
- Buncic, D., & Moretto, C. (2015). Forecasting copper prices with dynamic averaging and selection models. *North American Journal of Economics and Finance*, 33, 1–38.
- Carnot N., Koen, V., & Tissot, B. (2005). *Economic forecasting*, Palgrave Macmillan.
- Canova, F. (2007). G-7 inflation forecasts: random walk, Phillips Curve or what else? *Macroeconomic Dynamics*, 11, 1–30.
- Cechetti, SG. (1995). Inflation indicators and inflation policy. Working paper 5161, NBER.
- Cechetti, S., Chu, R., Steindel C. (2000). The unreliability of inflation indicators. *Current Issues in Economics and Finance*, 6(4), 1–6.
- Cogley, T. & Sargent, T. (2005). Drifts and volatilities: monetary policies and outcomes in The post WWII U.S., *Review of Economic Dynamics*, 8, 262–302.
- Cogley, T., Morozov, S. & Sargent, T. (2005). Bayesian fan charts for U.K. inflation: Forecasting and sources of uncertainty in an evolving monetary system. *Journal of Economic Dynamics and Control*, 29, 1893–1925.
- Cremers, K. (2002). Stock Return Predictability: A Bayesian Model Selection Perspective. *Review of Financial Studies*, 15, 1223–1249.
- De Bruyn, R., Gupta, R., & van Eyden, R. (2013). Forecasting the rand–dollar and rand–pound exchange rates using dynamic model averaging. Working paper 2013-07, University of Pretoria.
- Dupasquier, C., & Ricketts, N. (1998). Non-linearities in the output–inflation relationship: some empirical results for Canada. Working paper 98-14, Bank of Canada.
- Elliott, G., & Timmermann, A. (Eds.). (2013). *Handbook of economic forecasting*. 2, Elsevier.

- Ferreira, D., & Palma, A. (2015). Forecasting Inflation with the Phillips Curve: A Dynamic Model Averaging Approach for Brazil. *Revista Brasileira de Economia*, 69(4), 451-465.
- Filippo, D.G. (2015). Dynamic Model Averaging and CPI Inflation Forecasts: A Comparison between the Euro Area and the United States. *Journal of Forecasting*, 34(8), 619–648.
- Fisher, J., Liu, C., & Zhou, R. (2002). When can we forecast inflation? *Economic Perspectives*, 26(1), 32–44.
- Grassi, S., & De Magistris, P.S. (2015). It's all about volatility (of volatility): Evidence from a two-factor stochastic volatility model. *Journal of Empirical Finance*, 60, 62-78.
- Groen, J., Paap, R., & Ravazzolo, F. (2010). Real-time Inflation Forecasting in a Changing World, Federal Reserve Bank of New York Staff Report Number 388.
- Gupta, R., Hammoudeh, S.H., Kim, W.J. & Simo-Kengne, B.D. (2014). Forecasting China's foreign exchange reserves using dynamic model averaging: The roles of macroeconomic fundamentals, financial stress and economic uncertainty. *North American Journal of Economics and Finance*, 28, 170–189.
- Holden, K., Peel, D.A., & Thompson, J.L. (1999). *Economic forecasting: an introduction*, Cambridge University Press.
- Kim C-J., & Nelson CR. (1998). *State-Space Models with Regime-Switching: Classical and Gibbs-Sampling Approaches with Applications*. MIT Press: Cambridge, MA.
- Koop, G., & Potter, S. (2004). Forecasting in dynamic factor models using Bayesian model averaging. *The Econometrics Journal*, 7, 550–565.
- Koop, G., & Korobilis, D. (2011). UK macroeconomic forecasting with many predictors: Which models forecast best and when do they do so? *Economic Modelling*, 28, 2307–2318.
- Koop, G., & Korobilis, D. (2012). Forecasting Inflation Using Dynamic Model Averaging. *International Economic Review*, 53(3), 867-886.
- Koop, G., & Tole, L. (2012). Forecasting the European carbon market. *Journal of the Royal Statistical Society, Series A*, 176(3), 723–741.

- Lansing, KJ. (2002). Can the Phillips curve help forecast inflation? *Economic Letter No. 2002-29*, Federal Reserve Bank of San Francisco.
- Naser, H. & Alaali, F. (2018). Can Oil Prices Help Predict US Stock Market Returns: An Evidence Using a DMA Approach? *Empirical Economics*, 55(4), 1757-1777.
- Nicoletti, G., & Passaro, R. (2012). Sometimes it helps: the evolving predictive power of spreads on GDP dynamics. ECB working paper series 1447.
- Pesaran, M. H., & Timmermann, A. (2000). A Recursive Modelling Approach to Predicting UK Stock Returns. *The Economic Journal*, 110, 159–91.
- Primiceri, G. (2005). Time Varying Structural Autoregressions and Monetary Policy. *Review of Economic Studies*, 72, 821-852.
- Raftery, A., Karny, M., Andrysek, J., & Ettler, P. (2007). Online prediction under model uncertainty via dynamic model averaging: application to a cold rolling mill. Technical report, 525. Department of Statistics, University of Washington.
- Raftery, A., Karny, M., & Ettler, P. (2010). Online prediction under model uncertainty via dynamic model averaging: application to a cold rolling mill. *Technometrics*, 52(1), 52–66.
- Rahimpoor, A., Yarmohamadi, M., Chinipardaz, R. & Shadrokh, A. (2020). Modeling golden and dollar data by robust simulation-based estimation. *Quarterly Journal of Quantitative Economics (JQE)*, 17(1), 35-60. [https://jqe.scu.ac.ir/article\\_14619.html?lang=en](https://jqe.scu.ac.ir/article_14619.html?lang=en) [In Persian].
- Stock, J.H. & Watson, M.W. (1996). Evidence on Structural Instability in Macroeconomic Time Series Relations. *Journal of Business and Economic Statistics*, 14, 11-30.
- Stock, J.H. & Watson, M.W. (1999). Forecasting Inflation. *Journal of Monetary Economics*, 44, 293–335.
- Stock, J.H. & Watson, M.W. (2003). Forecasting output and inflation: the role of asset prices. *Journal of Economic Literature*, 41(3), 788–829.
- Stock, J.H. & Watson, M.W. (2007). Why has US inflation become harder to forecast? *Journal of Money, Credit, and Banking* 39(Suppl. 1), 3–33.



Stock, J.H. & Watson, MW. (2008). Phillips Curve Inflation Forecasts, NBER Working Paper No. 14322.

Tinbergen, J. (1939). *Business cycles in the United States of America: 1919-1932*. League of Nations.