ABSTRACT

DYNAMIC FACTOR AND BAYESIAN VAR (BVAR) PERFOMANCE OF MULTIVARIATE TIME SERIES MODELLING FOR MACROECONOMICS DATA

By

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Vector Autoregressive (VAR) has become popular in recent year by it's ability and flexibilty for macroeconomic modelling. The main problem in VAR modeling appears if many variables are used to model. A VAR(p) model with n variables have $n + n^2p$ parameters to be estimate. On Statistical ground, it causes overparameterization and overfitting. To handle it, there are two models with different approach. Dynamic Factor Model (DFM) is reducing the dimensions of data without losing its dynamism and Bayesian VAR (BVAR) is getting a priori information about parameters by Bayesian Inference. This study will show performance DFM and BVAR model for modelling Indonesia's Macroeconomic indicator based on forecast accuracy. Comparison of both models are considered in three different estimation methods and prior distribution. The result is Bayesian VAR with Minnesota prior give the best performance according to *mean error* (ME), *root mean square error* (RMSE) and *mean square error* (MSE).

Keywords *: VAR, DFM, Bayesian VAR, Bayesian Inference, Forecasting*

ABSTRAK

KEMAMPUAN FAKTOR DINAMIS DAN BAYESIAN VAR (BVAR) PADA PEMODELAN *MULTIVARIATE TIME-SERIES* UNTUK DATA MAKROEKONOMI

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Vector Autoregressive (VAR) menjadi populer beberapa tahun belakangan karena kamampuan dan fleksibelitasnya untuk pemodelan makroekonomi. Masalah utama dalam pemodelan VAR muncul jika banyak variabel yang digunakan ke model. Suatu model VAR(p) dengan n variabel memiliki $n + n^2p$ parameter. Pada bidang statistika, hal tesebut menyebabkan *overparameterization* dan *overfitting*. Untuk mengatasinya, ada dua model dengan pendekatan berbeda. Model Faktor Dinamis (FD) mereduksi dimensi data tanpa kehilangan kedinamisannya dan Model *Bayesian VAR* (BVAR) memperoleh informasi apriori tentang parameter berdasarkan Teorema Bayes dan *Bayesian Inference*. Penelitian ini akan menampilkan kemampuan FD dan BVAR untuk pemodelan makro ekonomi Indonesia berdasarkan keakuratan peramalannya. Perbandingan dari kedua model tersebut mempertimbangkan tiga metode pendugaan dan tiga distribusi prior yang berbeda. Hasilnya model Bayesian VAR memberikan hasil peramalan yang akurat berdasarkan *mean error* (ME), *root mean square error* (RMSE) dan *mean square error* (MSE).

Keywords *: VAR, DFM, Bayesian VAR, Bayesian Inference, Forecasting*