Journal of Housing Economics 18 (2009) 325–335

Contents lists available at ScienceDirect

Journal of Housing Economics

journal homepage: www.elsevier.com/locate/jhec

Could we have predicted the recent downturn in the South African housing market?

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ARTICLE INFO

Article history:
Received 14 October 2008
Available online 3 May 2009

JEL classification:
C11
C13
C33
C53

Keywords:
Dynamic factor model
BVAR
Forecast accuracy

ABSTRACT

This paper develops large-scale Bayesian Vector Autoregressive (BVAR) models, based on 268 quarterly series, for forecasting annualized real house price growth rates for large-, medium- and small-middle-segment housing for the South African economy. Given the in-sample period of 1980:01–2000:04, the large-scale BVARs, estimated under alternative hyperparameter values specifying the priors, are used to forecast real house price growth rates over a 24-quarter out-of-sample horizon of 2001:01–2006:04. The forecast performance of the large-scale BVARs are then compared with classical and Bayesian versions of univariate and multivariate Vector Autoregressive (VAR) models, merely comprising of the real growth rates of the large-, medium- and small-middle-segment houses, and a large-scale Dynamic Factor Model (DFM), which comprises of the same 268 variables included in the large-scale BVARs. Based on the one- to four-quarters-ahead Root Mean Square Errors (RMSEs) over the out-of-sample horizon, we find the large-scale BVARs to not only outperform all the other alternative models, but to also predict the recent downturn in the real house price growth rates for the three categories of the middle-segment-housing over the period of 2003:01–2008:02.

1. Introduction

This paper develops large-scale Bayesian Vector Autoregressive (BVAR) models, based on 268 quarterly series, for forecasting annualized real house price growth rates, where real house price is the ratio of the nominal house price to the Consumer Price Index (CPI), for large-, medium- and small-middle-segment housing for the South African economy.[3] Given the in-sample period of 1980:01–2000:04, the large-scale BVARs, estimated under alternative hyperparameter values specifying the priors, are used to forecast real house price growth rates over a

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doi:10.1016/j.jhe.2009.04.004

[3] Data on house prices are obtained from the ABSA Housing Price Survey, with ABSA being one of the leading private banks of South Africa. The ABSA Housing Price Survey, distinguishes between three price categories as – luxury houses (R2.6–R9.5 million), middle-segment houses (R226,000–R2.6 million) and affordable houses (R226,000 and below with an area in the range of 40–79 m^2); and further subdivides the middle segment category based on the square meters of house area into small (80–140 m^2), medium (141–220 m^2) and large (221–400 m^2). Given the easy accessibility of house price data for the middle-segment houses, we restrict our study to this category only. However, given that the market for different house-sizes within this category, behave differently (Burger and van Rensburg, 2008), we consider each of them separately, rather than investigating the overall house price of the middle-segment of the South African housing market.

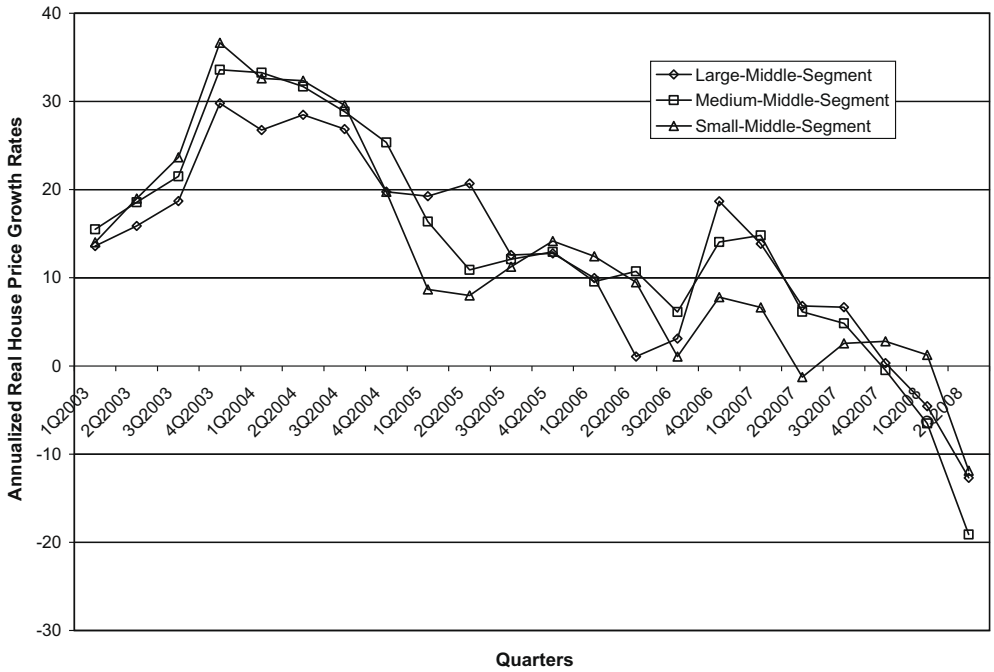

Fig. 1. Recent downturn in the middle-segment housing market (2003:01–2008:02).

24-quarter out-of-sample horizon of 2001:01–2006:04.[4] The forecast performance of the large-scale BVARs are then compared with classical and Bayesian versions of univariate and multivariate Vector Autoregressive (VAR) models, merely comprising of the real growth rates of the large-, medium- and small-middle-segment houses, and a large-scale Dynamic Factor Model (DFM), which comprises of the same 268 variables included in the large-scale BVARs. Once we determine a model that produces, on average, the minimum one- to four-quarters-ahead Root Mean Square Errors (RMSEs) over the out-of-sample horizon, we evaluate, how well the same would have been able to predict the recent downturn, depicted in Fig. 1, in the real house price growth rates for the three categories of the middle-segment-housing over the period of 2003:01–2008:02.

At this stage, two questions arise: First, why is forecasting real house price growth rates important? And second, why develop large-scale BVARs for this purpose? As far as the answer to the first question is concerned, the importance of predicting house price inflation is motivated by recent studies that conclude that asset prices help forecast both inflation and output (Forni et al., 2003; Stock and Watson, 2003; Gupta and Das, 2008 and Das et al., 2008). Since a large amount of individual wealth is imbedded in houses, similar to other asset prices, house price movements are thus important in signaling inflation.[5] As such, models that forecast real house price inflation can give policy makers an idea about the direction of overall inflation in the future, and hence, can provide a better control for designing of appropriate policies. Ideally, one would want to forecast key macroeconomic variables based on models that have strong theoretical structures, such as Dynamic Stochastic General Equilibrium Models which are immune to the Lucas (1976) critique. However, the usage of a *atheoretical* framework like that of the VAR allows one to provide a preliminary and quick analysis of where the economy is headed. The rationale for large-scale BVARs to forecast real house price growth rates emanates from the fact that a large number of economic variables help in predicting real housing price growth (Cho, 1996; Abraham and Hendershott, 1996; Johnes and Hyclak, 1999; Rapach and Strauss, 2007, 2009). For instance, income, interest rates, construction costs, labor market variables, stock prices, industrial production, consumer confidence index, and also variables containing information about the world economy and the major trading partners of South Africa – which are included in the large-scale BVARs, are potential predictors. In addition, given that movements in the housing market are likely to play an important role in the business cycle, not only because housing investment is a very volatile component of demand (Bernanke and Gertler, 1995), but also because changes in house prices tends to have important wealth effects on consumption (International Monetary Fund, 2000) and investment (Topel and Rosen, 1988), the importance of forecasting house price inflation is vital. The housing sector thus plays a significant role in acting as leading indicator of the real sector of the economy, and as such, predicting it correctly cannot be overemphasized, especially in the light of the recent credit crunch in the U.S. that started with the burst of the housing price bubble which, in

[4] The choice of the out-of-sample period is exactly the same as used by two recent studies on the South African housing market, namely, Gupta and Das (2008) and Das et al. (2008).

[5] Gupta and Das (2008) point out that in South Africa, housing inflation and CPI inflation tend to move together, though the former, understandably, is more volatile.