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The Analysis of House Prices and the Stance of Monetary Policy in the Republic of Kazakhstan

The work estimates the influence of monetary policy on actual growth of prices per square meter of housing in the Republic of Kazakhstan, using a data set comprising 76 quarters for the period from 1994:01 to 2012:04. Most aspects of the research are defined from statistical data on the economy of the Republic of Kazakhstan. The increment rate of the CPI ratio, the index of actual effective exchange rate for a group of CIS and non-CIS countries (24 countries), the average monthly rated salary per one employee, the M3 money supply, and rated house prices (1st, 2nd, 3rd , 4th class of comfort) have been calculated. A comparative analysis of the consequences of monetary policy options for the Republic of Kazakhstan with data for the Russian Federation and Republic of Belarus, shows that monetary policy in the Republic of Kazakhstan meets the standards of the leading countries.
Key words: real effective exchange rate, inflation, the money supply, the housing market, consumer price index, monetary policy shocks

Introduction

The global economic decline of 2008 attributed to the mortgage crisis, "infected" the housing sector worldwide, drawing the attention of scientists, politicians and economic agents. As a result of increased prices for residential real estate, much of Kazakhstan's mass media, and both foreign and Kazakh experts started talking about an "overheating" of the real estate market and the possible formation of a housing bubble. In world practice, a market is overheated when as a result of its profitability, demand runs ahead of supply, and prices cease to reflect the actual value of the goods. When the real estate market, a principal security on bank credits, is overheated, the prices of real estate fall abruptly. As a result, credits are unsecured and the profitability of investments in real estate is reduced. Considering the significance of this market in the economy of any country in the world, the consequences are felt not just by those involved in this field, but also by the economy of the country as a whole.

As Stock and Watson [1] note in their study, house prices are driving indicators of the real sector of economy and inflation rate and thus they can indicate how fast the real economy is growing. Results of studies by foreign scientists, e.g. Iacoviello and Neri [2, 4], Case et al [3], as well as Vargas-Silva [5, 6], show a strong correlation between house prices and economic activity in the USA. Furthermore, cyclic fluctuations in house prices are a concern to politicians [7, 8], as a burst housing bubble is always accompanied by a serious fall in the economy [4]. Taking all this into consideration, it is extremely important for the National Bank of the Republic of Kazakhstan to make a thorough analysis of the influence of monetary policy on the prices of assets in general, and the prices of real estate in particular, in order to understand the effect of monetary policy on the economy as a whole. This work contains a study on how the shock of monetary policy influences the actual growth in housing prices. The increment rates of the CPI ratio and rated house prices (1st, 2nd, 3rd , 4th classes of comfort) have been calculated using quarter-based sets of data: interest rates, construction costs, variables of the labour market, share prices, industrial output, and the consumer confidence index for the period from 1994 till

2012. The application of four principal segments of the housing market with properties of different sizes is due to the fact that demand for different classes of comfort has absolutely different effects on prices offers.

In 2008 the price of one square meter of new housing fell by 8.7% against the previous year, whereas the resale of comfortable housing fell by 20.4%. In 2009 the price of one square meter of new housing fell by 6.9% against the previous year, whereas the resale of comfortable housing remained unchanged. In 2010 the price of new housing increased by 3.1%, and the resale of comfortable housing increased by 3.8%, while the rental cost of comfortable housing increased by 2.8%. In 2011 (December 2011 against December 2010) the sale price of new housing increased by 6.7%, the resale of comfortable housing increased by 8.7%, and the rental cost of comfortable housing increased by 5.5%. In 2012 (December 2012 against December 2011) the sale price of new housing increased by 12.1%, the resale of comfortable housing increased by 16.8%, and the rental cost of comfortable housing increased by 14.4%.

In general, the mortgage crisis in the USA did not have a direct influence on the Republic of Kazakhstan as the banks here did not buy US mortgage bonds and did not have shares in funds that could have possessed these. The crisis had an indirect influence on Kazakhstan's banks. The effect of this crisis on the situation in the country was the deterioration of general terms of borrowing for developing countries. Nevertheless, the losses incurred by the Republic of Kazakhstan from the world liquidity crisis are, in the opinion of Russian analysts, the most serious among developing countries. This is because the Republic of Kazakhstan is the only CIS country where the volume of foreign borrowing is quite significant. Unlike Ukraine and Russia, where a significant portion of bank credit is secured by savings (personal deposits), Kazakh banks secure their creditworthiness with foreign loans.

Materials and methods of research

Suppose Y_t – is vector $M\times1$ of the examined economic variables controlling economic growth dynamics. The standard approach would comprise an estimation of the structural VAR model or other forms of multivariate models of time series based only on Y_t. In many cases additional economical information that cannot be covered in full by Y_t, and is required in the model, requires proper modelling of the dynamics of these series. Suppose F_t is vector $K\times1$ of non-examined factors, being small, K summarizes additional important information, not fully covered in variable Y_t. Note that F_t can also represent theoretical concepts, e.g. price impact, terms of financing or even the economic activity of companies, all together being a combination of economic variables that cannot be represented by a certain series of data. Suppose that the combined dynamic (F_t, Y_t) is defined by the following formula:

$$[F_t, Y_t] = \Phi(L)[F_{t-1}, Y_{t-1}] + v_t,$$

where $\Phi(L)$ is a conformable lag polynomial of finite order p;

v_t – is the error term with zero mean and a covariance matrix Q.

Equation (1) is a standard form of the VAR model for variables (F_t, Y_t) and embedded sets of the VAR model for variable Y_t, if polynomial lag $\Phi(L)$, related to Y_t/F_{t-1}, is equal to zero. Equation (1) is now called the model of vector autoregression augmented with factors (*FAVAR*). It is obvious that system defined by equation (1) helps to estimate the maximum scope of additional information in F_t. Moreover, if equation (1) was estimated without factors, we would get a biased estimation of the indexes of the VAR model and impulse responses. Suppose we have $N\times1$ vector X_t (and $N>>M+K$), critical set of available information related to examined (Y_t) and not examined (F_t) aspects is as follows:

$$X_t' = {}^{f}F_t' + {}^{y}Y_t' + e_t',$$

where Λ^f, Λ^y have the dimension $N\times K$, $N\times M$, respectively. The vectors of error e_t sized $N\times1$ with a mean of zero suggest a weak correlation or no correlation at all. Thus, equation (2) is based on the suggestion that vectors Y_t. and F_t can describe the behaviour of an economy in general.

The vector autoregression model (VAR) is usually applied in systems forecasting a correlated time series and for the analysis of the dynamic influence of random disturbances on a system of variables. The approach used to construct VAR-models omits mandatory structural modelling,

treating every endogenous variable in the system as a function of lagged values of all endogenous variables. The mathematic representation of the vector autoregression model is as follows:

$$y_t=A_1y_{t-1} + \ldots + A_py_{t-p} + Bx_t + \varepsilon_t$$

where y_t – k–dimensional vector of endogenous variables;

x_t – d–dimensional vector of exogenous variables;

$A_1,\ldots, A_p$ и B – coefficient matrix, which are subject evaluation;

ε_t – vector perturbation of residues.

Disturbances can be "simultaneously correlated", but not with their own lagged values and variables in the first part of the equation. As the right part of equations contains only lagged values of endogenous variables, simultaneity is not an issue and the ordinary least squares (OLS) method gives consistent estimates. Furthermore, even if disturbances ε_t can be simultaneously correlated, the *OLS*–method is effective and equivalent to the generalized least square (*GLS*) method, as all equations have identical regressors.

Results and discussion

As a result of correlation analysis, the moderate linear relationship between gross domestic product *(GDP)* and inflation *(INF)* (33%) has been established. GDP is strongly influenced by the money supply (*M*) (79%), average rated wages (*w*) (84%), currency exchange rate to the tenge (*E*) (78%) and costs to the state budget (*G*) (85%). A very weak and negative influence is made by labour volume (*L*) (-0.06%) and household consumption (*C*) (-0.04%). The strong relationship between informative variables, i.e. the availability of multicollinearity, was taken into account for the regression models. The time series used were analyzed in terms of their time invariance using the Dickey-Fuller (DF) test each time, to select the proper method of analysis. According to the results, the values of DF Prob statistics are equal to zero at a 5% confidence level, and therefore the hypotheses are rejected, i.e. no unit roots are available and the series is invariant.

There are different statistical approaches to defining the number of factors in dynamic models (DFM). For example, Bai and Ng [9] have developed a set of criteria to select factors in large-scale models. The principal component analysis (PCA) can be also used to establish a set of factors in DFM models. The PCA analysis stipulates that the selection of many factors q is based on the first eigenvalues of spectral density matrix X_t. Principal components are then added until the increase in explained dispersion is less than the set value $\alpha=0.05$. The first two dynamic principal components explain approximately 99% of the variation, whereas the eigenvalue of the third component equals $0.005<0.05$. Thus, we make use of two dynamic factors estimated according to FAVAR with lag length p equal to 4. Moreover, we have established that the results are not significantly influenced by an increased set of factors: reducing lag length or dividing the period in samples into smaller subgroups. The method based on Kilian [10] has been used to measure uncertainty while estimating aspects. It is required to make up a 90% confidence range for the impulse-response system.

The reaction of the rate of growth in house prices in 1st class of comfort to the shock of monetary policy is given in figure 1. Immediately after the shock, negative housing price growth was equal to about 0.045. The price level on the real estate market returns to its pre-shock value in 14 quarters. Shocks result in deflation and therefore the price level starts decreasing and the rated effective exchange rate strengthens. After an interest rate shock, the price level stabilizes in 15 quarters, having reduced by 1.16%. The influence of a retaining monetary policy on the price level growth for housing of 1st class of comfort is generally negative. Such results are in line with theory and we find no proof of the so-called "housing cost puzzle" observed in the work of Kasai and Gupta [11].

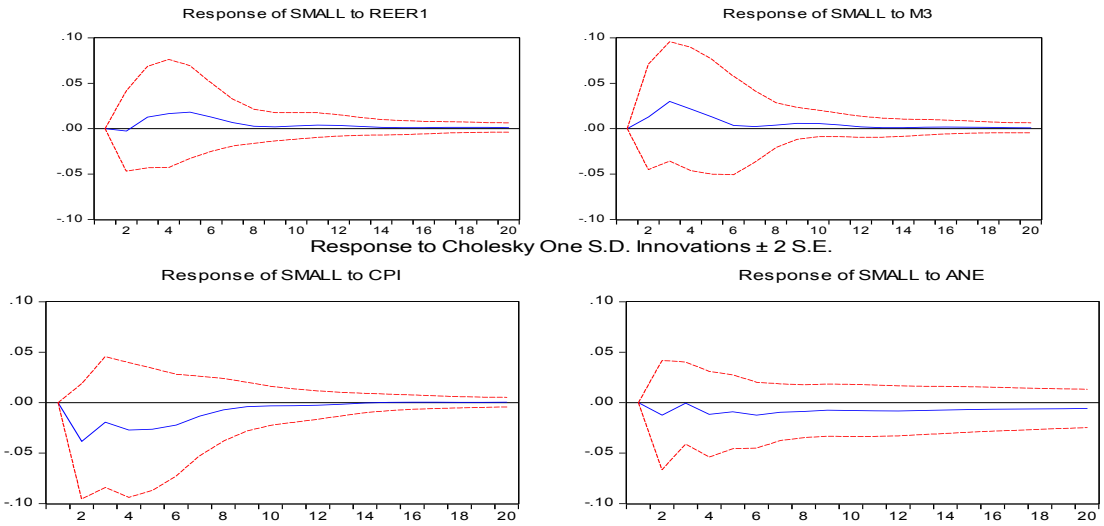

Figure 1 – The impulse response functions of house price inflation for the small segment following a monetary policy shocks

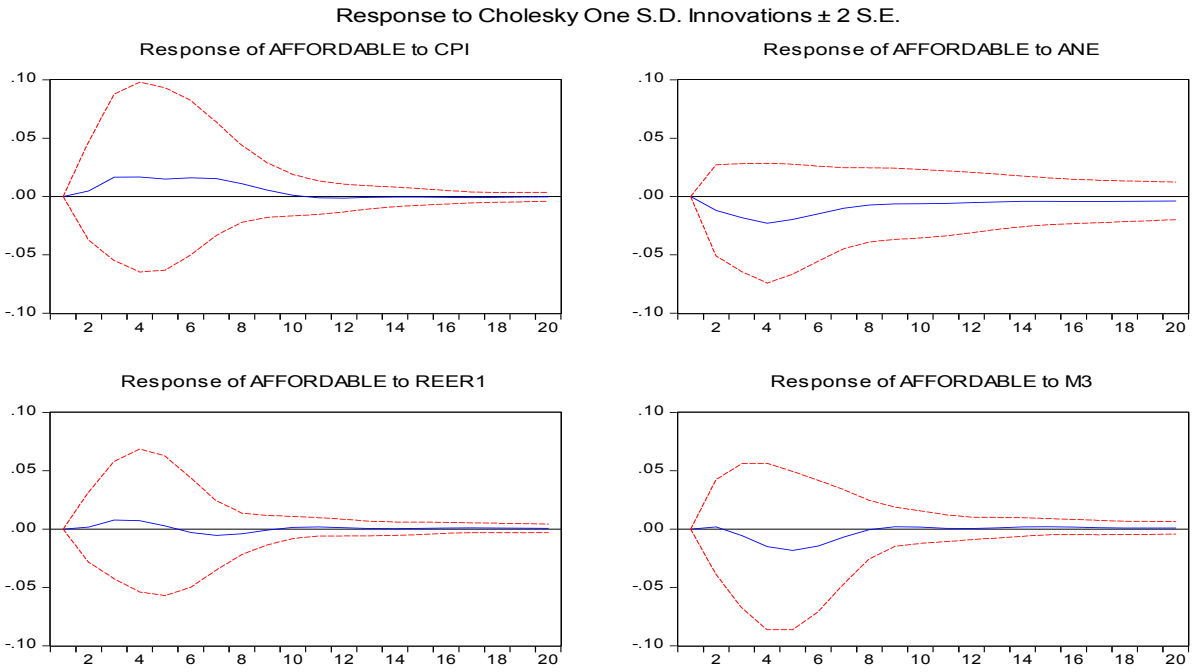

Figure 2 – The impulse response functions of house price inflation for the affordable segment following a monetary policy shocks

Note that the reaction of the price growth rate for residential real estate with regard to the shocks of a retaining monetary policy differs, in particular in terms of the scope and duration of the influence in all categories of housing, thus emphasizing that different segments of the housing market should be considered. Real estate of 1st and 2nd class of comfort shows a slight, but negative influence. Once the interest rate is increased, the growth rate of real prices of 1st and 2nd class of comfort falls by less than 0.05%. However, the initial negative effect turns to be insignificant and short-term for the small and medium housing segment. For affordable housing, the negative influence is significant from the very beginning, but also does not lasts long. It is interesting that in both

categories the growth rates for rated housing prices start falling after their initial recovery and reach negative values close to their initial level. Furthermore, the growth rate of rated housing prices for 1st and 2nd class of comfort reaches a positive level within approximately 10-12 quarters and remains so for the rest of period until the decline level.

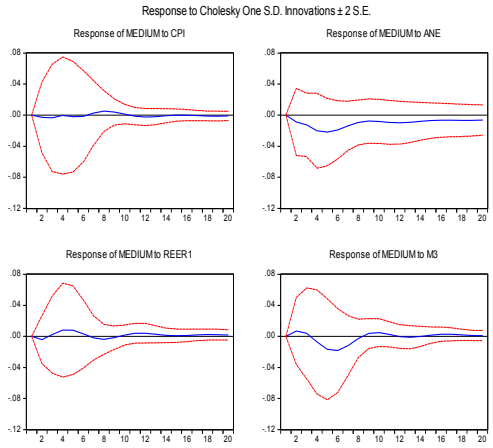

Figure 3 – The impulse response functions of house price inflation for the medium segment following a monetary policy shocks

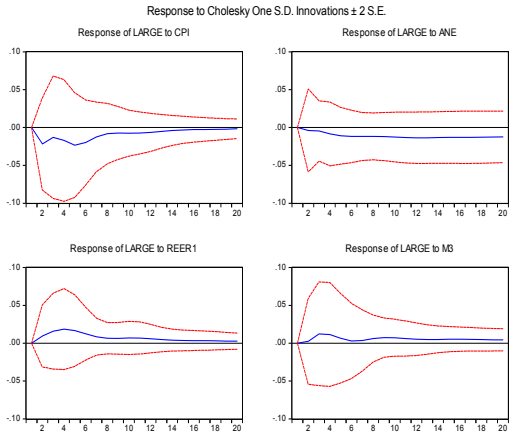

Figure 4 – The impulse response functions of house price inflation for the medium segment following a monetary policy shocks

The fall in the growth rate of rated housing prices for 3rd and 4th class of comfort is less evident but lasts relatively longer than for small and medium segments and affordable housing. The price growth rate for housing of 3rd and 4th class of comfort initially increases sharply to approximately 0.1% and then falls before rising sharply again. Prices remain inflexible for 20 quarters before showing a response to shocks of monetary policy, and then declining step-by-step, returning to their initial state. For the category of 5th class of comfort, the price growth rate shows a positive and significant response of 0.07% due to a stronger correlation with monetary variables accompanied with a further reduction by 0.1% and an abrupt recovery in approximately 8 quarters.

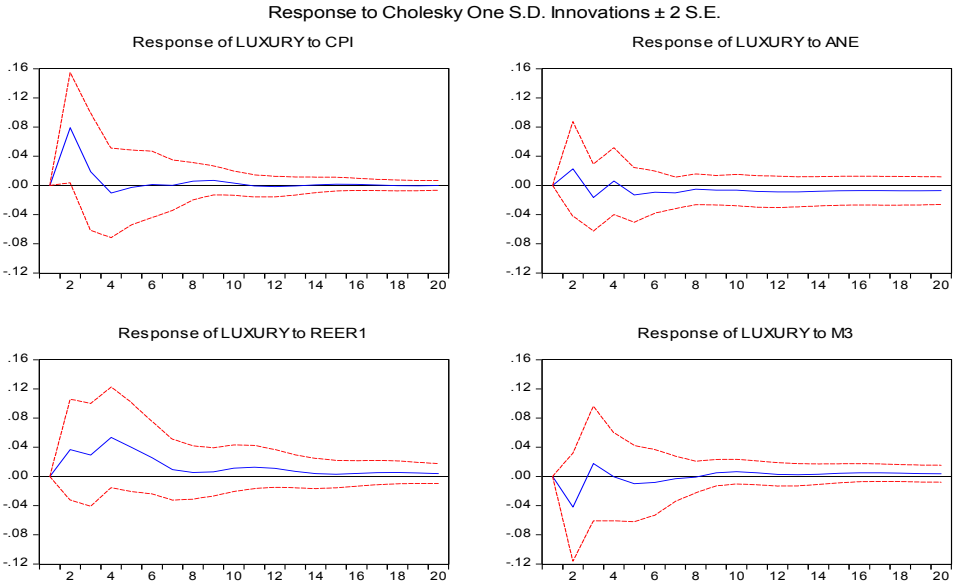

Figure 5 – The impulse response functions of house price inflation for the luxury segment following a monetary policy shocks

Comparing the analysis of consequences of monetary policy options for the Republic of Kazakhstan with data for the Russian Federation and Republic of Belarus in the works of Ivashchenko [12] and Drobyshevsky [13], we can conclude that monetary policy in the Republic of Kazakhstan meets the standards adopted in the leading countries: a clear anti-inflation policy is evident (a growth in inflation by 1 percentage point results in a rate increase of 0.75%).

An analysis of the efficiency of the monetary policy of the Bank of Russia in 2000 – first half of 2008 leads to some conclusions (for example see [13]): the interest rate channel in Russia is not effective. The analysis did not show any systematic influence of the the Bank of Russia's instruments of monetary policy on market interest rate. E.A. Leontyeva [14] suggested three main reasons for this: the absence of an indicative interest rate, the small volume of operations in the open market, and no possibility to carry out an independent monetary policy with a floating currency exchange rate. Contrary to this, the exchange rate channel proved to be effective. The Bank of Russia can influence the exchange rate dynamics of the national currency. According to the calculations of other authors, the general influence of a strengthened exchange rate on GDP is still negative.

In Belarus [12] and the Russian Federation [13, 14] monetary policy is sensitive neither to inflation rates, nor economic growth rates. The dissipation of inflation dispersion and the economic growth rates demonstrate such differences in a country's economic policy. In Belarus and Russia most of the dispersion, inflation and growth rates is stipulated by the activity of the state, whereas a key aspect for economic growth in Kazakhstan is the volume of labour resources available for households, and the inflation rate is explained by multiple factors, including shocks of liquidity preferences, shocks of intertemporal preferences, technological shocks, etc. Thus, the analysis shows the advantages of the monetary policy of the Republic of Kazakhstan over the monetary policy of the Russian Federation and the Republic of Belarus.

Conclusions

At this stage the behaviour of rated prices growth rates for five segments of residential real estate can only be explained by the retaining monetary policy in the Republic of Kazakhstan. Note that except for the luxury class segment, and regardless of the size and significance of the housing, a common specific feature is observed among the four other categories of housing. We see an initial fall in rated price growth rates for housing under the influence of shocks which then slows down and returns to the initial pre-crisis state. There may be three reasons for this: firstly, housing prices are inflexible variables, and secondly, and most importantly, the result matches the methodology of Stock and Watson [1]: a reduction and an increase in prices for real estate lead to the economic activity of households. Therefore, a delayed effect can result from a decline in the economy, which in its turn results from the price reduction in the housing sector. The third explanation corresponds to Iacoviello and Neri [4] and shows the significant associated effects of the real estate market that influence the real sector of the economy and the accompanying economic activity, further affecting other sectors of the economy, including the housing market. This decline has resulted in an increased demand for 1st and 2nd class of comfort of real estate among owners from the large and medium segments, and as a result prices for 1st and 2nd class of comfort recovered more quickly, whereas rated price growth rates for 3rd and 4th classes remained inflexible over quite a long period of time. Furthermore, works [12, 13] indicate that previous prices are more important for the small and medium segments of housing market when determining real price. This is characteristic for affordable housing, when the government establishes fixed rates. Finally, regarding the luxury segment, we observe an initial increase accompanied by a large reduction and a prompt recovery. The increased growth rate of rated prices for housing after an initial negative influence are evidence of the inflexibility of market for this category of housing regardless of the economic decline. Due to the economic nature of luxury housing, the owners of which are people with large incomes, this is a low effective market for fast sales transactions and the movement of buyers and sellers. The slow-moving nature of prices for real estate is therefore quite logical. At the same time, the swift recovery is not surprising, as luxury houses are bought mainly by the richest people in the country and foreigners, as well as citizens of the country resident abroad, all of whom are sufficiently insured from economic crisis.

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