Journal of Business and Economics, ISSN 2155-7950, USA
October 2014, Volume 5, No. 10, pp. 1854-1866
DOI: 10.15341/jbe(2155-7950)/10.05.2014/011

http://www.academicstar.us

A Comperative Regional Analysis for Housing Demand in Turkey

Selahattin Bekmez, Aslı Özpolat
(University of Gaziantep, Gaziantep, Turkey)

Abstract: Housing is both good and investment assets so that it plays an important role in the economy. Housing also can be characterized as the most complex economic good because of its durability, heterogeneity, locational fixity, the possibility to raise loans against housing collateral and the effect on well-developed secondary markets. On the other hand, income distribution, socio-economic justice and regional disparities imply that housing market is an important concept for social and cultural transformation as well. When compared with other countries in Europe, housing market has an excellent value in Turkey because of rapid economic growth, reasonable income tax rates, low interest rates, relatively lower risk and many other reasons. So, housing sector in Turkey is very important for those who are looking for new investments. This study aims to compare the dynamic relationship between the housing demand and the variables which determine housing demand for 11 regions of Turkey. Regions have been selected as SRE1 based on Turkish Statistical Institute classification. The model has been estimated using quarterly data from January 1992 to April 2012. Building Permits has been considered as housing demand indicator. The other variables used are GDP, Monetary Aggregate, Interest Rate and Inflation. The data used in this study were obtained from Turkish Statistical Institute (TUIK), OECD and Euro Stat. By using the variables mentioned, short term relationship between the series has been analyzed with Granger Causality Test in the first stage of the study. In the second stage of the study, long term relationship has been analyzed with Vector Autoregressive Model (VAR).

Key words: housing demand; VAR analysis; Turkey
JEL codes: R21, C13

1. Introduction

Housing is one of the most complex economic good to analyze because of its durability, heterogeneity, locational fixity, sensitivity to the specific financial and regulatory environment, the possibility to raise loans against housing collateral and a relatively high cost of supply (Renaud, 1996; Iacoviello, 2000, p. 8). Because of these features, unlike many other markets the housing is not only a good asset, but also an investment asset. These features of the housing market imply that it is a collection of loosely connected but segmented market (Iacoviello, 2000, p. 8).

Relying on mostly domestic capital, producing high value added, having the potential size of employment and relationship between other sectors—particularly manufacturing—makes Housing a locomotive market.

Selahattin Bekmez, Dr., Professor, Faculty of Economics & Administrative Sciences, Department of Economics, University of Gaziantep; research areas/interests: economics. E-mail: sbekmez@gantep.edu.tr.
Aslı Özpolat, Dr. Lecturer, Oguzeli Vocational School of Higher Education, University of Gaziantep; research areas/interests: economics. E-mail: ozpolat@gantep.edu.tr.

Higher multiplier effect of housing expenditures leads to increase in demand for housing related goods such as furniture and textiles. The housing market has been a target of government fiscal and monetary policy aimed to achieve balanced growth, low inflation and lower rate of unemployment.

The economic literature have broadly analyzed housing market and its interaction between the effect of shocks on house prices, economic growth, welfare and the financial position of households (ECBC, 2011). From macroeconomic and microeconomic points of view, the housing market is an important aspect of the whole economy for many countries. In other words, the performance of the housing market has a major impact on the overall performance of the economy (Baffoe, 1998, p. 179). The developments in housing markets influence business cycles, play a key role in the transmission of monetary impulses to the real economy and affect the stability of the financial system. These occur due to variety of reasons: Firstly, housing takes a relatively significant share in economic activity and thus, shocks originating in the housing sector can have significant effects on the macroeconomic variables (Brandt et al., 2010). According to this, Baffoe and Bonnie (1998), has found that labor force, growth rate, inflation rate, interest rate and money supply play an important role on housing prices in the U.S. economy. Apergis (2003) has indicated that a positive shock occurred in housing loan rates reduced the real housing prices and this, real house prices decreased in Greece. Also according to the study, the existence of an increase in the rate of inflation and the labor force increased housing prices. In addition, changes in interest rate have an important role to buy houses and durable goods (Baffoe, 1998, p. 182). While Feldstein (1992) has found that inflation has created a positive impact on the housing demand; Kearl (1979) has indicated that inflation reduces the demand for housing.

Secondly, Housing sector has an impact on wealth of people other than economic and financial variables. Non-housing consumption is generated by the changes in house prices. This interaction is related to wealth effect of housing. When increase in housing wealth, Households can raise their consumption in response higher house prices (Rozsavölgyi & Kovacs, 2005, pp. 2-3). Housing and household expenditures are an important part of housing costs. Chetty and Szeidl (2004) has indicated that 20% of household spending occurred from housing expenditures; and housing expenditures did not respond to shocks occurred in the economy in the short term.

The third reason is the possibility to raise loans against housing collateral. An increase in property prices raise the value of the collateral available to households, which enables them to borrow more from the credit system, which in turn can be used for financing consumption or investment. The last reason is the effect of house price fluctuations on residential construction. The market value of property may increase its reproduction cost arising from higher house prices. Thus, these increases can be impulsion for the construction of new dwellings (Rozsavölgyi & Kovacs, 2005, p. 2).

For the economists believing government interventions, the housing market is an important impact on this process. Their argument is if monetary policy is to be useful as a stabilization policy, housing sector is sensitive to monetary conditions and important to the whole economy (Baffoe, 1998, p. 181). Therefore, taxes or subsidies and other government policy tools affecting the process of the housing sector can produce independent shocks and influence the response of housing markets to economic shocks (ECBC, 2011).

There are strong empirical evidences of relationship between economy and the housing sector. Mullbauer and Murphy (2008) have surveyed the multiple interactions between housing markets and economy in UK. According to Mullbauer and Murphy (2008) rise in house prices would lead to a decrease of potential customers and reduce the demand for housing. However, the rent or home ownership will become more restricted than in the past. Therefore, private consumption reduces and ultimately, this causes a reduction in the total growth. Prices in the

housing market do not occur in the short term. For this reason, the demand for housing in any one period is equal to the existing housing stock. Thus, the housing market is not usually an efficient market and bring into equilibrium very slowly (Riddel, 2004, p. 121). However, the efficient market hypothesis has been tested on housing markets and is concluded that housing prices have positive serial correlation in the short-term and have a negative serial correlation in the long term (Hamilton & Schwab, 1985). So, the housing markets are not efficient markets in the long-term. Also in the literature because of the residential markets have higher transaction costs, normal and higher yields are not be obtained continuously (Cho, 1996, p. 146).

In this study, the dynamic relationship between the housing demand and the variables determining the housing demand for 11 regions of Turkey will be analyzed. Regions will be selected as SRE1 based on Turkish Statistical Institute classification. The model will be using quarterly data from January 1992 to April 2012. Building Permits has been considered as housing demand indicator. The other variables used are GDP, Monetary Aggregate, Interest Rate and Inflation. The data used in this study were obtained from Turkish Statistical Institute (TUIK) and OECD. By using the variables mentioned, short term relationship between the series has been analyzed with Granger Causality Test in the first stage of the study. In the second stage of the study, long term relationship will be analyzed with Vector Autoregressive Model (VAR) as impulse response and variance decomposition.

2. The Model

The analysis is estimated by using the VAR Model. The VAR approach makes minimal theorical demands on the structure of the model, and it employs a common lag for all variables in all equations. The method basically involves specifying the set of endogenous and exogenous variables that are believed to interact and hence should be included as part of the economic system that one is trying to model and the largest number of lags needed to capture most of the effects that the variables have on each other (Pindyck & Rubenfeld, 1991, p. 354).

The VAR methodology superficially resembles simultaneous-equation modeling in that consider several endogenous variables together. But each endogenous variable is explained by its lagged, or past, values and the lagged values of all other endogenous variables in the model; usually, there are no exogenous variables in the model (Gujarati, 2004, p. 837).

The Var models have many applications. They are used to determine how each endogenous variable responds over time to shock in that variable and in every other endogenous variable (Baffoe, 1998, p. 183).

For a set of n time series variables $y_t = (y_{1t}, y_{2t,}..., y_{nt})'$, a VAR model of order p (VAR(p)) can be written as (Enders, 2003, p. 301):

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + ... + A_p y_{t-p} + u_t \quad (1)$$

Certain properties of the variables in the model must be checked in order to determine the appropriate specification for estimation purposes. First, it is necessary to determine whether the variables are difference stationary or trend stationary.

A test of stationary (or nonstationary) that has become widely popular over the past several years is the unit root test (Gujarati, 2004, p. 814). This is done by Dickey-Fuller Unit Root test that each variables included in the model contains a unit root.

The unit root test involves testing the coefficient of the least square estimate β_1 in $\Delta y_t = \alpha_0+\alpha_1 t+\beta_1 y_{t-1}+\sum^{n}_{i=2}\beta_i y_{t-i}$, is equal to unity. The unit root test results should be interpreted with caution. Research has shown that the test for unit roots has a low ability to reject the null hypothesis of unit when it is false against

plausible alternatives (Baffoe, 1998, p. 185). The unit roots are tested by using the Augmented Dickey-Fuller (ADF) test, and the results shown in tables. Data in log levels and data in log difference is shown in Table 1.

Before VAR analysis, Granger Causality Test must be estimated because of to analyzed short term interaction between variables and for to make Cholesky rank.

The VAR model assumes that the current innovations n vector of random variables are unanticipated but become part of the information set in the next period. The implication is that the anticipated impact of a variable is captured in the coefficients of lagged polynomials while the residuals capture unforeseen contemporaneous events. A joint F-test on the lagged polynomials provides information regarding the impact of the anticipated portion of the right-hand side variables (Baffoe, 2004, p. 183). The impact of unanticipated policy shocks on housing demand can be analyzed by employing *impulse response functions* and *variance decompositions.* Impulse response functions enable us to analyze the dynamic behavior of the target variables due to a random shock in other variables. The impulse response traces the effect on current and future values of the endogenous variables of one standard deviation shock to the other variables (Baffoe, 2004, p. 188). Variance decompositions tells how much of a change in a variable is due to its own shock and how much due to shocks to other variables. In the SR most of the variation is due to own shock. But as the lagged variables' effect starts kicking in, the percentage of the effect of other shocks increases over time (Enders, 2003, p. 310). Nevertheless, impulse analysis and variance decompositions (together called innovation accounting) can be useful tools to examine the relationships among economic variables. If the correlations among the various innovations are small, the identification problem is not likely to be especially important (Enders, 2003, p. 280).

The model has been estimated using quarterly data from January 1992 to April 2012. Building Permits was considered as housing demand. The other variables used as determining the housing demand are GDP, Monetary Aggregate, interest Rate and inflation. Both variables were obtained from Turkish Statistical Institute and OECD.

According to analysis; the demand for housing at time (t) is given by:

$$Q_t^D = D(MA_{,t}, GDP_{,t}, R_{,t}, INF_{,t})$$

Where:

MA_t = Monetary Aggregate;

GDP_t = Gross Domestic Product;

R_t = Interest Rate;

INF_t = Inflation.

The model is written as follows:

$$BP_t = \beta_1 + \beta_2 GDP_t + \beta_3 R_t + \beta_4 MA_t + \beta_5 INF_t + \varepsilon_t \quad (2)$$

3. Empirical Results

Certain properties of the variables in the model must be checked in order to determine the appropriate specification for estimation purposes. Firstly, it is necessary to determine whether the variables are difference stationary or trend stationary. This is done by testing the null hypothesis that each variable included in the model contains a unit root. If the variables are difference stationary, it is appropriate to estimate the VAR model by using the first difference of the variables. If the variables are trend stationary, the VAR model may be estimated by taking the residuals from the deterministic trend. Secondly, if the variables are difference stationary, it is necessary to establish whether the variables in the model share a common trend. If they do not, estimation of a VAR model

in the first difference is appropriate (Baffoe, 1998, p. s.185). According to this, the unit roots are tested by using the augmented Dickey-Fuller (ADF) test, and the results are shown in Table 1. The results of the test suggest that all variables have different stationary.

Table 1 Unit Root Test Result

	Level Stationary (T- Stat)*					First Stationary (T- Stat)**				
	BP	R	GDP	INF	MA	BP	R	GDP	INF	MA
Regions										
West Marmara	-1.022	-1.046	-2.303	-2.334	1.004	-3.902	-7.380	-7.267	-4.085	-4.153
Aegean	-1.709	-1.046	-2.303	-2.334	1.004	-17.008	-7.380	-7.267	-4.085	-4.153
East Marmara	-1.803	-1.046	-2.303	-2.334	1.004	-12.333	-7.380	-7.267	-4.085	-4.153
West Anatolia	-1.509	-1.046	-2.303	-2.334	1.004	-17.817	-7.380	-7.267	-4.085	-4.153
Mediter.	-2.525	-1.046	-2.303	-2.334	1.004	-14.886	-7.380	-7.267	-4.085	-4.153
Central Anatolia	-1.665	-1.046	-2.303	-2.334	1.004	-21.763	-7.380	-7.267	-4.085	-4.153
West Black Sea	-2.021	-1.046	-2.303	-2.334	1.004	-6.393	-7.380	-7.267	-4.085	-4.153
East Black Sea	-1.603	-1.046	-2.303	-2.334	1.004	-26.205	-7.380	-7.267	-4.085	-4.153
North East Anatolia	-1.991	-1.046	-2.303	-2.334	1.004	-8.070	-7.380	-7.267	-4.085	-4.153
Central East Anatolia	-0.588	-1.046	-2.303	-2.334	1.004	-21.070	-7.380	-7.267	-4.085	-4.153
Southeast Anatolia	-2.056	-1.046	-2.303	-2.334	1.004	-11.752	-7.380	-7.267	-4.085	-4.153

Note: *critical values with constant and trend; -4.20(1%), -3.52 (5%), -3.19 (10%); **critical values with constant and trend; -4.21 (1%), -3.52 (5%), -3.19 (10%).

Granger Causality test is shown relationship between variables in the short term. The significance levels of the granger causality test provide a summary for analyzing the impact of the anticipated variables on the target level, housing demand. The significance levels of the test, which are based on the hypothesis that all the lags of a given variable in a particular equation are zero, are shown in Table 2.

Table 2 Granger Causality Test

Regions	Variables	BP	R	GDP	INF	MA
	BP		0.8762	0.9101	0.8827	0.6746
	R	0.4428		0.3660	0.1760	0.4425
West Marmara	GDP	0.8028	0.0162		0.6345	0.4534
	INF	0.0448	0.0111	0.0029		0.0975
	MA	0.3710	0.3025	0.2724	0.9216	
	BP		0.2542	0.3932	0.0225	0.4126
	R	0.9053		0.2081	0.2322	0.6823
Aegean	GDP	0.6091	0.0026		0.8546	0.4101
	INF	0.7416	0.0132	0.0217		0.4389
	MA	0.4546	0.4287	0.2234	0.9296	
	BP		0.7958	0.8901	0.0748	0.5358
	R	0.0866		0.1483	0.0755	0.5408
East Marmara	GDP	0.8916	0.0043		0.7763	0.2675
	INF	0.2341	0.0580	0.0354		0.6632
	MA	0.7453	0.3387	0.3376	0.9026	
	BP		0.4210	0.8056	0.5854	0.2015
West Anatolia	R	0.5385		0.1290	0.0764	0.4571
	GDP	0.4512	0.0011		0.6966	0.1713

(Table 2 to be continued)

(Table 2 continued)

	INF	0.5850	0.0268	0.1005		0.3673
	MA	0.5084	0.3242	0.2219	0.7797	
	BP		0.5495	0.7548	0.1457	0.1621
	R	0.2578		0.2201	0.1444	0.7455
Mediterranean	GDP	0.5234	0.0010		0.8211	0.1915
	INF	0.8053	0.0648	0.1217		0.5888
	MA	0.7088	0.2435	0.2577	0.9620	
	BP		0.0010	0.2970	0.2518	0.0008
	R	0.0482		0.2415	0.0633	0.3577
Central Anatolia	GDP	0.8497	0.0048		0.7226	0.2551
	INF	0.1776	0.0652	0.0611		0.4138
	MA	0.2862	0.1694	0.1360	0.8413	
	BP		0.7700	0.8013	0.7436	0.5657
	R	0.0656		0.2940	0.0336	0.2874
West Black Sea	GDP	0.4043	0.0045		0.8733	0.1692
	INF	0.2692	0.1711		0.0980	0.5592
	MA	0.6331	0.3428	0.3249	0.9711	
	BP		0.0815	0.7075	0.7185	0.1145
	R	0.0231		0.2483	0.0854	0.6051
East Black Sea	GDP	0.9632	0.0063		0.8632	0.6041
	INF	0.4394	0.0479	0.0171		0.4385
	MA	0.1576	0.6996	0.1004	0.9830	
	BP		0.4610	0.1529	0.8816	0.4589
	R	0.2577		0.4398	0.1532	0.2029
Central East Anatolia	GDP	0.8230	0.0023		0.7879	0.6158
	INF	0.3614	0.0247	0.0192		0.4452
	MA	0.1680	0.1402	0.1529	0.9686	
	BP		0.5255	0.0879	0.2159	0.2363
	R	0.7939		0.1397	0.8520	0.0018
Southeast Anatolia	GDP	0.2045	0.0004		0.8502	0.0628
	INF	0.4565	0.0032	0.0545		0.1876
	MA	0.4455	0.2026	0.5229	0.9702	
	BP		0.8468	0.6088	0.9402	0.9411
	R	0.7670		0.1091	0.9120	0.0005
North East Anatolia	GDP	0.7039	0.0011		0.9465	0.0985
	INF	0.6740	0.0015	0.0537		0.1591
	MA	0.5284	0.3798	0.3698	0.9721	

The direct and indirect effects can be examined with the help of the table rows and columns. For instance, row 6 and column 6 shows that the impact of change in the inflation rate on the housing demand for Aegean. Accordingly, in the interest rate equation being equal to zero is accepted 98 times out of 100.

In the short term, the effects of variables on the housing demand vary according to regions and Cholesky rank is as follow for regions:

For West Marmara; Inflation, Monetary Aggregate, Interest Rate, GDP

For Aegean; Inflation, Interest Rate, GDP, Monetary Aggregate

For East Marmara; Interest Rate, Interest Rate, Interest Rate, GDP

For West Anatolia; GDP, Inflation, Monetary Aggregate, Interest Rate

For Mediterranean; Inflation, Monetary Aggregate, Interest Rate, GDP

For Central Anatolia; Interest Rate, Monetary Aggregate, Inflation, GDP

For West Black Sea; Interest Rate, Inflation, GDP, Monetary Aggregate

For East Black Sea; Interest Rate, Monetary Aggregate, Inflation, GDP

For North East Anatolia; Interest Rate, Inflation, GDP, Monetary Aggregate

For Central East Anatolia; GDP, Interest Rate, Monetary Aggregate, Inflation

For South East Anatolia; GDP, Inflation, Monetary Aggregate, Interest Rate

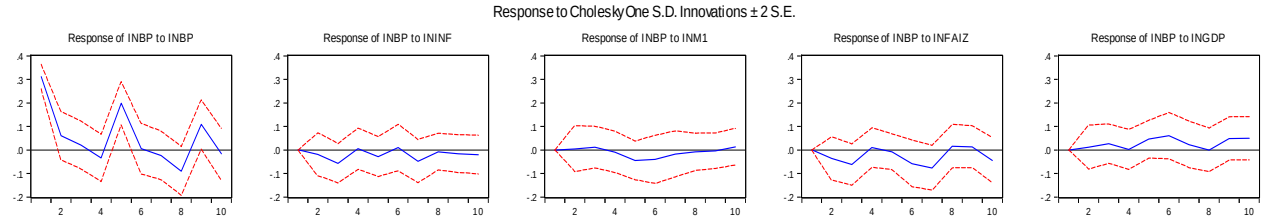
3.1 VAR Analysis

As specified before, VAR Analysis have two parts as the impulse response and variance decomposition.

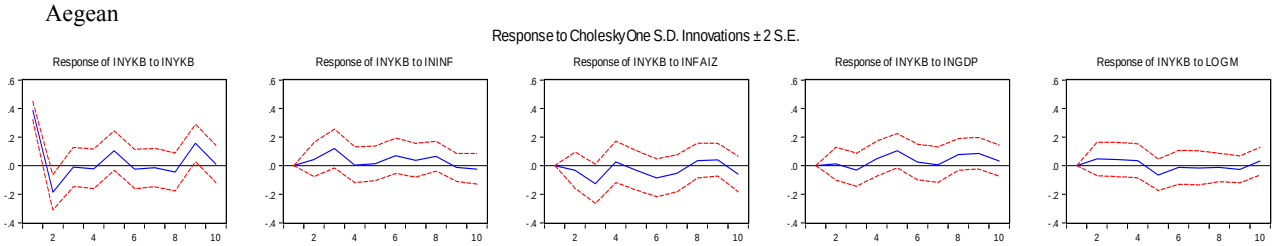
(1) Impulse response

As a result of the Granger Causality Test is not possible to determine the dynamic structure of the model. The impulse response coefficients provide information to analyze the dynamic behavior of a variable due to a random shock in other variables (Baffoe, 1998, p. 188). Sims (1980) has suggested that the graphs of the impulse response coefficients provide a better device to analyze the shocks. The reactions to shocks of variables in the model to both own and the other variables are important. Cholesky ranking used in the impulse response were taken separately for each regions according to Granger Causality Test. The results for impulse response are shown in Figure 1.

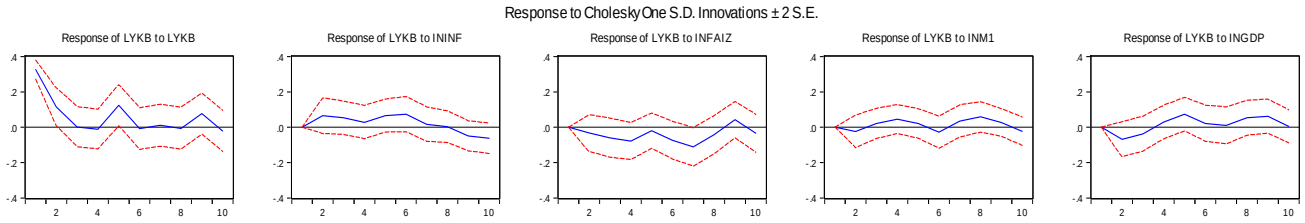
West Marmara



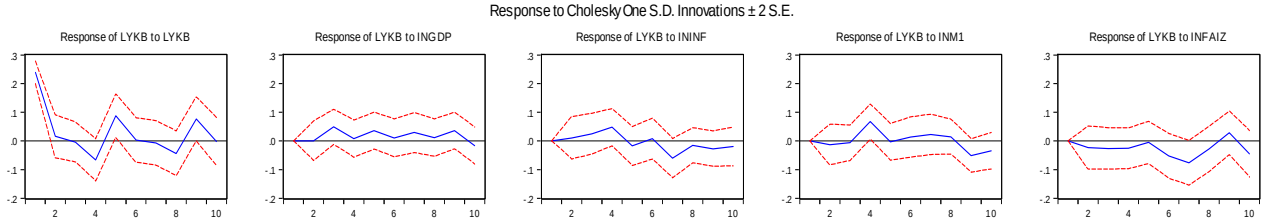
Aegean



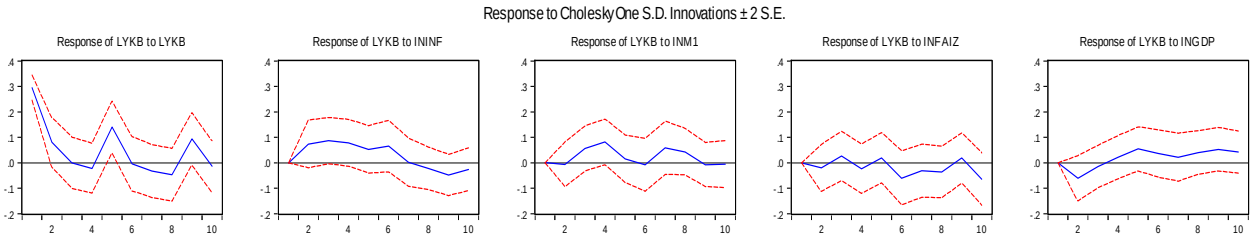
East Marmara



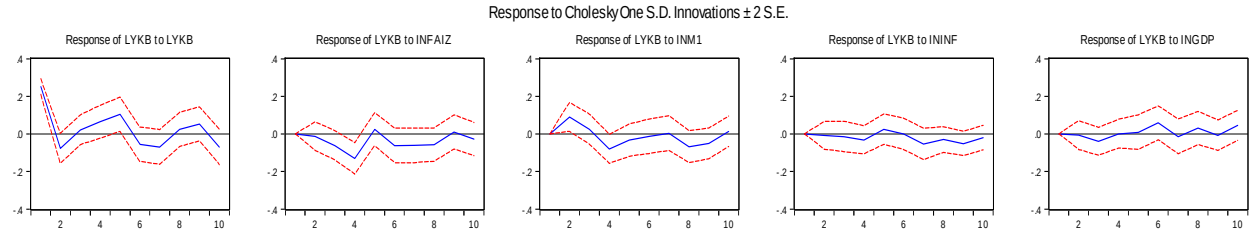
West Anatolia



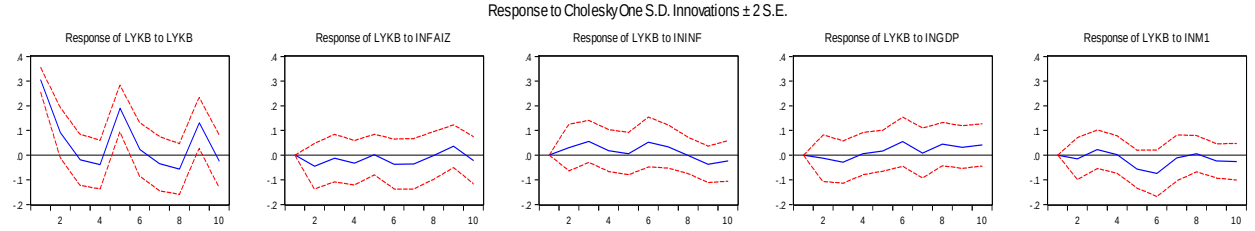
Mediterranean



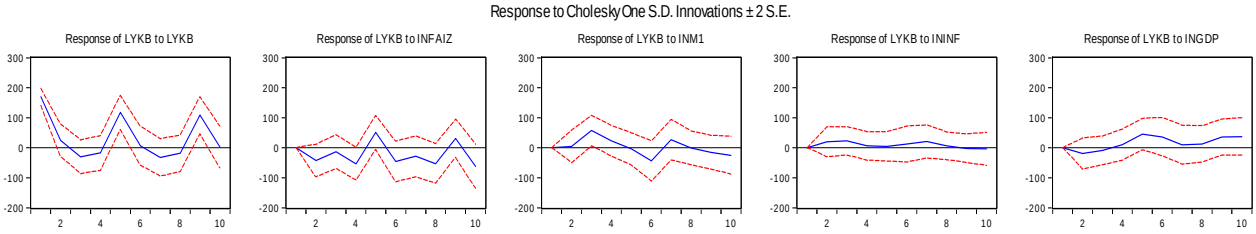
Center Anatolia



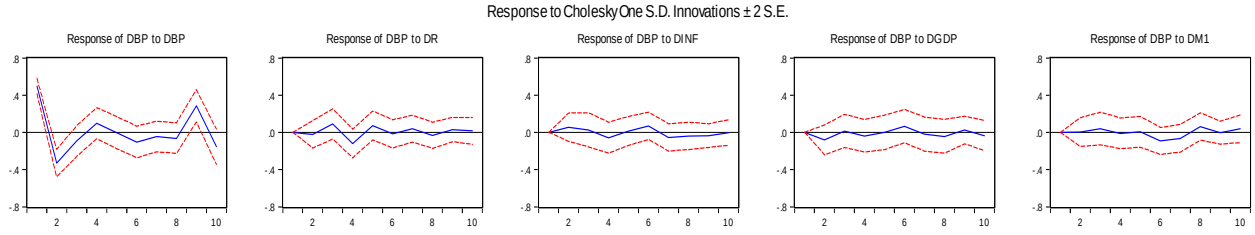
West Black sea



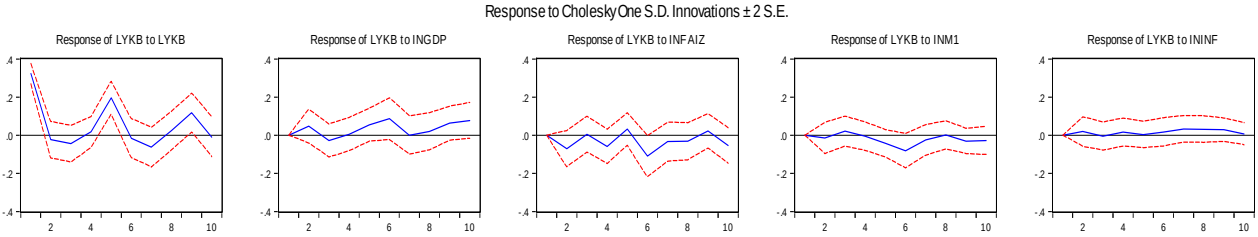
East Black Sea



Northeast Anatolia



Center East Anatolia



South East Anatolia

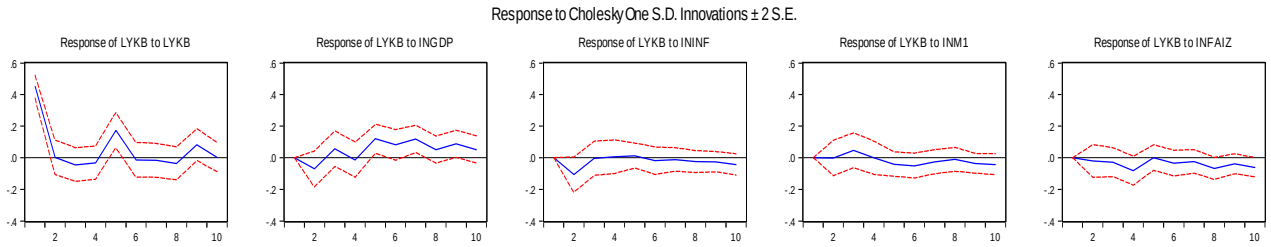


Figure 1 Impulse Response Results

For all regions, first columns of Figure show that the response to housing demand shocks occurring by itself. In West Marmara, For example the second column of Figure shows that the effect of one standard deviation of interest rate on housing demand. The third column of figure shows that the effect of one standard deviation of Monetary Aggregate on housing demand.

According to results, the most important impacts are respectively occurred by inflation, monetary base, GDP and interest rate. GDP have significantly affected to housing demand in West Marmara, Aegean and south East Anatolia. Housing demand response negative impact to inflation in, but some regions have positive for examples Mediterranean, west black sea and center east Anatolia. Housing demand doesn't reacts immediately to changes in monetary base in. But, West Black Sea, Center Anatolia and East Black Sea react immediately and interest rate is fluctuating for all regions.

(2) Variance Decomposition

The variance decompositions show the portion of variance in the prediction for each variable in the model that is attributable to its one shocks to other variables in the model.

Variance decomposition divides one of the internal variables change as separate shocks affecting all the internal variables. In this sense, the variance decomposition provides information about the dynamic nature of the system.

The results of variance decompositions are reported for each reason in Table 3. The results indicate that impacts of variables are changeable. For examples, in West Marmara GDP has the most important effect on housing demand according to the other variables. But in Center and North East Anatolia GDP has the less effect on housing demand. These differentiations can arise from housing market equilibrium, consumer choices and the other macroeconomic reasons. If the results are evaluated as a general, it can be seen that GDP, interest rate and inflation have important impacts on housing demand.

Table 3 Results for Variance Decomposition

West Marmara

Period	S.E.	LYKB	ININF	INMA	INR	INGDP
1	0.442517	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.465253	90.49625	1.705057	0.811111	1.418897	5.568684
3	0.477360	86.32171	3.097195	2.932572	2.101140	5.547385
4	0.504376	79.23289	3.370729	3.864067	7.314174	6.218142
5	0.545327	75.84805	2.938110	5.458676	6.446655	9.308511
6	0.557199	72.66515	3.390785	5.523120	8.862218	9.558731
7	0.573852	68.70974	4.255334	6.229938	11.73717	9.067816
8	0.589523	66.16838	7.169053	6.522756	11.20224	8.937576
9	0.627716	63.01706	6.605060	6.913940	9.882671	13.58127
10	0.642832	60.34957	8.546119	7.434340	10.71808	12.95189

Aegean

Period	S.E.	INYKB	ININF	INR	INGDP	LOGM
1	0.387456	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.436261	97.28287	0.945300	0.587065	0.080570	1.104199
3	0.473016	82.80662	7.217586	7.764627	0.478890	1.732274
4	0.477951	81.33749	7.078071	7.903460	1.486454	2.194521
5	0.506058	76.86212	6.391967	7.497997	5.586874	3.661042
6	0.519192	73.24668	7.815190	9.870632	5.530960	3.536540
7	0.523824	72.03974	8.163917	10.77468	5.447667	3.574000
8	0.536715	69.32596	9.251160	10.66139	7.299937	3.461551
9	0.568252	69.56884	8.307408	10.04123	8.784939	3.297582
10	0.573833	68.25326	8.322717	10.92264	8.956188	3.545196

East Marmara

Period	S.E.	LYKB	ININF	INR	INMA	INGDP
1	0.325032	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.359712	91.90029	3.228054	0.863656	0.436521	3.571478
3	0.371067	86.36472	5.096026	3.438122	0.735862	4.365268
4	0.384422	80.54554	5.286011	7.415641	2.101979	4.650834
5	0.416777	77.40863	6.932035	6.527790	2.051629	7.079918
6	0.431167	72.36151	9.393443	9.024659	2.347874	6.872516
7	0.447375	67.26993	8.869615	14.65109	2.777538	6.431834
8	0.456420	64.64624	8.524859	14.95102	4.311969	7.565907
9	0.472277	63.01788	9.069227	14.78416	4.334510	8.794218
10	0.478780	61.51852	10.55102	14.92225	4.440822	8.567375

West Anatolia

Period	S.E.	LYKB	INGDP	ININF	INMA	INR
1	0.239514	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.241763	98.59727	0.000141	0.190829	0.291341	0.920415
3	0.249411	92.67126	3.840273	1.154253	0.341346	1.992872
4	0.272339	83.69026	3.298398	4.055197	6.377915	2.578234
5	0.289062	83.53570	4.488215	3.974217	5.677342	2.324527
6	0.294408	80.54162	4.447288	3.906764	5.674378	5.429950
7	0.312324	71.62558	4.829023	7.184166	5.543991	10.81724
8	0.317502	71.20689	4.792741	7.178358	5.578282	11.24373
9	0.334907	69.26212	5.447792	7.124942	7.359454	10.80569
10	0.340702	66.93014	5.498996	7.204717	8.144053	12.22210

Mediterranean

Period	S.E.	LYKB	ININF	INMA	INR	INGDP
1	0.295165	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.321098	90.67172	5.245381	0.041238	0.396370	3.645293
3	0.338569	81.55594	11.23381	2.757352	0.974525	3.478370
4	0.359015	72.91022	14.67647	7.631186	1.316902	3.465225
5	0.393590	73.41825	13.97447	6.503702	1.337374	4.766197
6	0.405207	69.28068	15.77905	6.180500	3.476911	5.282853
7	0.412514	67.48318	15.22639	7.962568	3.946922	5.380942
8	0.421565	65.89592	14.87385	8.659395	4.538128	6.032702
9	0.438313	65.57739	14.99550	8.042321	4.379053	7.005732
10	0.446077	63.42165	14.81617	7.781518	6.330363	7.650300

Center Anatolia

Period	S.E.	LYKB	INR	INMA	ININF	INGDP
1	0.252749	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.279688	89.17769	0.194898	10.47582	0.087248	0.064337
3	0.291325	82.77038	4.643840	10.35777	0.309559	1.918456
4	0.337219	65.49773	18.55574	13.38362	1.131104	1.431811
5	0.356734	67.24703	17.05957	12.83659	1.515174	1.341641
6	0.371280	64.34731	18.55513	11.97333	1.399110	3.725130
7	0.386749	62.54950	19.58955	11.04492	3.251150	3.564873
8	0.399929	58.84825	20.39850	13.23062	3.602040	3.920597
9	0.410088	57.64748	19.46421	14.11512	5.009082	3.764105
10	0.420312	57.69801	18.98066	13.54054	4.987244	4.793553

West Black Sea

Period	S.E.	LYKB	INR	ININF	INGDP	INMA
1	0.305054	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.323645	96.82916	1.958208	0.849125	0.152033	0.211476
3	0.331235	92.78538	2.012180	3.614946	0.895570	0.691927
4	0.335593	91.75404	2.871971	3.799196	0.898334	0.676461
5	0.389906	91.49908	2.129961	2.835797	0.856076	2.679088
6	0.406429	84.51810	2.782214	4.291280	2.558661	5.849749
7	0.411198	83.30143	3.486098	4.884713	2.533709	5.794048
8	0.417605	82.65406	3.381915	4.737666	3.589768	5.636587
9	0.442476	82.35196	3.661572	4.951192	3.707019	5.328259
10	0.446976	80.98708	3.820388	5.138473	4.471895	5.582160

East Black Sea

Period	S.E.	LYKB	INR	INMA	ININF	INGDP
1	170.1166	100.0000	0.000000	0.000000	0.000000	0.000000
2	179.3682	91.86295	5.692477	0.063855	1.226918	1.153801
3	192.8125	82.05373	5.382803	8.854145	2.504952	1.204365
4	202.5562	75.08889	11.87825	9.319413	2.368553	1.344898
5	244.1255	74.96196	12.57546	6.442294	1.665952	4.354331
6	255.3007	68.61618	14.75670	8.871282	1.750812	6.005028
7	261.3557	66.98392	15.29680	9.556477	2.288626	5.874175
8	267.5918	64.36375	18.45792	9.117686	2.241989	5.818663
9	293.0738	67.38913	16.53878	7.861010	1.875845	6.335236
10	302.9510	63.07090	19.65895	8.030891	1.769514	7.469745

Northeast Anatolia

Period	S.E.	DBP	DR	DINF	DGDP	DMA
1	0.498146	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.606850	97.24134	0.146318	0.791524	1.819682	0.001136
3	0.622354	94.65562	2.231041	0.930147	1.780637	0.402554
4	0.645489	90.31477	5.563703	1.703113	2.009522	0.408888
5	0.649821	89.11930	6.756105	1.731734	1.983397	0.409467
6	0.671720	85.83011	6.389305	2.671773	2.842804	2.266010
7	0.680068	84.20517	6.575005	3.271045	2.851461	3.097323
8	0.689390	82.80981	6.631204	3.509725	3.203198	3.846068
9	0.748031	84.90352	5.783955	3.205778	2.836548	3.270197
10	0.765326	85.08392	5.562546	3.063601	2.923856	3.366075

Center East Anatolia

Period	S.E.	LYKB	INGDP	INR	INMA	ININF
1	0.323758	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.336323	93.15582	2.008498	4.319770	0.184293	0.331623
3	0.341215	92.23045	2.623713	4.224484	0.575133	0.346224
4	0.347291	89.27785	2.558958	7.016467	0.581773	0.564956
5	0.406048	88.55997	3.674217	5.788663	1.556187	0.420960
6	0.437780	76.31877	7.049124	11.28786	4.836706	0.507539
7	0.445355	75.70259	6.811421	11.46214	4.977492	1.046351
8	0.448722	74.86587	6.916986	11.79410	4.903781	1.519255
9	0.470837	74.33970	8.083183	10.94664	4.874083	1.756395
10	0.481175	71.21545	10.34645	11.74285	4.990616	1.704625

Southeast Anatolia

Period	S.E.	LYKB	INGDP	ININF	INMA	INR
1	0.450989	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.469506	92.26945	2.270912	5.248605	0.004093	0.206936
3	0.478220	89.79292	3.616112	5.066788	0.962493	0.561683
4	0.486669	87.14241	3.568877	4.911280	0.929769	3.447662
5	0.532503	83.52905	8.034694	4.157989	1.398427	2.879841
6	0.542642	80.50062	9.975753	4.129466	2.216884	3.177273
7	0.556954	76.51627	13.99696	3.967471	2.318850	3.200448
8	0.565313	74.69179	14.41025	4.035018	2.284822	4.578122
9	0.581120	72.69925	15.92618	4.019917	2.557578	4.797074
10	0.589531	70.64029	16.20180	4.426050	2.995978	5.735887

4. Summary and Conclusion

The main point of the study is to use non-structural dynamic model to determine the effects of macro variables and by making country comparisons, to determine the differences on the determinants of the demand for housing. The determinant of housing demand generated temporary and permanent shocks in the economy and government policy such as income tax rates, land use regulations, monetary and fiscal policy, and cost of residential.

The evidence presented in this paper overall suggests that the component of consumer choice and regional GDP can play a significant role in housing demand fluctuations.

Difference between regions and deviations from general housing market equilibrium can be also occurring from these reasons. Income distributions, immigrations, dwelling for foreign and their demand change between according to regions, and the last one is support to building company in emerging regions.

References:

Apergis N. and Rezitis A. (2003). "Housing prices and macroeconomic factors in Greece: Prospects within the EMU", *Applied Economics Letters*, Vol. 10, pp. 561-565.

Baffoe-Bonnie J. (1998). "The dynamic impact of macroeconomic aggregate on housing prices and stock of houses: A national and regional analysis", *Journal of Real Estate Finance and Economics*, Vol. 17, pp. 179-197.

Brandt O., Knetsch T., Penalosa J. and Zollino F. (2010). *Housing Markets in Europe: A Macroeconomic Perspective*, Spring Publisher.

Chetty and Szeidl (2004). "Consumption commitments and asset prices", *The Quarterly Journal of Economics*, MIT Pres., Vol. 122,

No. 2, pp. 831-877.

Cho M. (1996). "House price dynamics: A survey of theoretical and empirical issues", *Journal of Housing Research*, Vol. 7, No. 2.

ECBC (2011). *European Covered Bond Fact Book*, European Mortgage Federation.

Enders W. (2003). *Applied Econometric Time Series* (2nd ed.), Haboken NJ: J Wiley.

Feldstein M. S. (1992). "Comment on James M. Poterba's paper, tax reform and the housing market in the late 1980s: Who knew what, and when did they know it?", *Federal Reserve Bank of Boston Conference Series*, Vol. 36, pp. 252-257.

Gujarati D. N. (2004). *Basic Econometrics*, New York: McGraw Hill, Inc.

Kearl J. H. (1979). "Inflation, mortgages and housing", *Journal of Political Economy*, Vol. 87, pp. 1-29.

Hamilton B. and Schwab R. (1985). "Espected appreciation in urban housing markets", *Journal of Urban Economics*, Vol. 18, No. 1, pp. 103-118.

Iacoviello M. (2000). "House prices and the macroeconomy in Europe: Results from a structural VAR analysis", European Central Bank, Working Paper No.18.

Iacoviello M. (2010). "Housing in DSGE models: Finding and new directions", in: Brandt O. & Knetsch T. (Eds.), *Housing Markets in Europe: A Macroeconomic Perspective*, Spring Publisher.

Muellbauer J. (2008). "Housing, credit and consumer expenditure", *CEPR Disccussion Papers 6782.*

Renauld B. (1996). "Housing finance in transition economics", The World Bank, Policy Research Working Paper, No.1565.

Riddel M. (2004). "Housing-market disequilibrium: An examination of housing-market price and stock dynamics", *Journal of Housing Economics*, Vol. 13, pp. 120-135.

Pindyck R. and Rubinfeld D. (1991). *Econometric Models and Economic Forecasts* (3nd ed.), New York: McGraw-Hill, Inc..

Rozsavölgyi B. andKovacs V. (2005). "Housing subsidies in Hungary: Curse or blessing?", *ECFIN Country Focus*, Vol. 2, No. 18, pp. 1-5.