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Construction and Real Estate in Thai Regional Development

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Abstract: This paper analyzes structural relationships among growth of construction and real estate sectors with various macroeconomic and regional economic variables in Thailand. A Pooled Vector Autoregressive Model was estimated using quarterly data in six regions of Thailand for the period 2010-2014. The results of the econometric estimation indicate that the structure of construction and real estate sectors of Thailand and regional economic growth depend on business confidence. Moreover, it was revealed that the lag of regional real estate adjustment was eight quarters, and economic adjustment was slow and highly volatile. The results suggest that consideration of the real estate loans of commercial bank as a policy variable to stimulate regional development would not be an effective strategy for the government. Direct productivity improvement to boost growth in real gross regional product will be necessary.

Keywords: *Construction, Real Estate, Vector Autoregressive Model, Thailand*

INTRODUCTION

Thailand has faced a number of internal and external shocks created by political and economic instabilities in achieving its targets toward sustainable development. The country became slowly immune to such disturbances due to the collaborative activities performed with private sector and public organizations. From 1999, average real Gross Domestic Product (GDP) growth in Thailand has been 4.15 percent, average unemployment rate 1.89 percent, and average core inflation 2.47 percent per annum. The global economic downturn, the gigantic 2011 flood and protests against the government were the vital problems and challenges faced by the Thai economy.

The construction and real estate sector in Thailand contributes about 6 percent of GDP. The real estate sector has a complex structure in term of business activities due to its vertical and horizontal linkages to other industries. The average growth rate for construction and real estate during 1999 – 2014 was 1.16 percent per annum with a standard deviation of 5.51 implying that this sector has low average growth rate and high volatility. As in the case of other countries, whenever the sector experiences rapid growth, it creates a bubble causing fragility in economic structure. Thus, a better understanding of the structure of the regional construction and real estate sector in Thailand will benefit policy makers, domestic and global investors, entrepreneurs, and the general public.

THEORETICAL AND EMPIRICAL MODELS

This study modifies the dynamic demand-supply model by incorporating the characteristics of construction and real estate development in Thailand. The Dynamic Stochastic General Equilibrium with search and matching mechanism (DSGE Model with Search and Matching) for the Regional Construction and Real Estate Sector explains the economic

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behaviors of the representative agents in terms of their inter-temporal rational decision-making based on information among current and future alternatives. The underlying model considers that expected future outcomes can play important roles in the behavioral model of sectoral development. Without disturbances, the construction and real estate sector in various regions the economy can simultaneously adjust in order to maintain the overall steady state growth.

The three-sector model developed in this study consists of a representative household, business, and the government. The real estate sector behaves as a near competitive model because there are many buyers and sellers. Households may act as small entrepreneurs who either sell or rent their real estate to maximize profits. It is assumed that all buyers and sellers have nearly perfect information about these assets. Rational decisions are made considering search costs. Head, Lloyd-Ellis, and Hongfei (2014) suggested that time for search and matching can be reduced, but it is unavoidable. They further explain that time-consuming search and matching can create autocorrelation in real estate price causing the model to differ from the standard asset-pricing approach. Glaeser *et al*., (2011, p. 29) consider short-run dynamics when the real estate variables are endogenously determined in the model and they find that the income and the willingness to pay can cause an adjustment to the steady state. Krainer (2001, 2008), Wheaton (1990), and Albrecht *et al*. (2007) assume a steady-state equilibrium under constant aggregate housing stock and they conclude that the search and matching behavior is a significant factor affecting the price and the value of the real estate. Moreover, their evidence supports one way causal relation between real estate price and its value. The evidence also indicates a negative relationship between the real estate value and the time to either buy or sell the real estate. Caplin and Leahy (2011), and Diaz and Jerez (2013) point out that concentration of the market can have a negative effect on the real estate price.

This article analyses the DSGE model with search and matching similar to those of Davis and Heathcote (2005), Glaeser *et al*. (2011), Diaz and Jerez (2013), and Head, Lloyd-Ellis, and Hongfei (2014) because the model allows dynamic transmission to impact new construction via the total market value of real estate instead of price suggested by previous articles. Nevertheless, our model differs from Wheaton (1990), Krainer (2001 and 2008), Albrecht *et al*. (2007), and Caplin and Leahy (2011) because the regional real estate market in Thailand is expanding, so the model does not assume constant aggregate housing stock.

Data

Six regions in Thailand, viz. Bangkok metropolis and vicinity area, the Northern region, the Central region, the Eastern region, the Northeastern region, and the Southern region were examined in the study. The data were collected from the Ministry of Finance, the National Economics and Social Development Broad (NESDB), the Real Estate Information Center (REIC), and the Bank of Thailand (BOT) from 2010 to 2014. Data were obtained on economic variables, viz. growth rate of real gross regional product in Thailand ($GGRP_{it}$) measured in percent, value of land and construction in each region ($VLCR_{it}$) measured in million Baht, regional real estate loans from commercial banks ($RELOANR_{it}$) measured in million Bahts, regional construction license ($LICR_{it}$) measured in thousands of square meters, business confidence index ($CONF_{it}$), and the population in each region ($POPR_{it}$) measured in millions of people.

Empirical Model and Estimation Technique

The Dynamic Stochastic General Equilibrium model with search and matching mechanism was estimated using a Pooled Vector Autoregressive model (Pooled VAR) specified below.

$$BX_{ct} = \sum_{t=1}^{T} A_t X_{c\ t-i} + F_c + \varepsilon_{ct}$$

where $\varepsilon_{ct} = \left[\varepsilon_{ct}^{Y}, \varepsilon_{ct}^{v}, \varepsilon_{ct}^{l}, \varepsilon_{ct}^{H}, \varepsilon_{ct}^{c}, \varepsilon_{ct}^{N} \right]$

The vector X_{ct} consists of six macroeconomics variables, i.e., growth rate of GRP (Y_c), value of land and construction to represent the real estate value (V_{ct}), commercial bank real estate loans to represent the financial resources used to stimulate regional growth (l_{ct}), construction license to represent the growth rate of housing stock (g^H_{ct}), population (g^N_{ct}) to represent regional real estate demand, and the business confidence index (F_c). B and A are matrices of parameters in the structural model. The Cholesky decomposition was used and ordered consistent with the theoretical concepts to measure the structural adjustment. Stationary properties were tested using Granger's Causality tests and the model was estimated with Pooled VAR. The impulse response function (IRF) was used to capture the dynamic effects of structural shocks where ε_{ct} is the vector of various shocks. Let ε^y_{ct} be the real GRP shock; ε^v_{ct} is the value of the land and construction shock; ε^l_{ct} is the real estate loan shock; ε^H_{ct} is the construction license shock; ε^c_{ct} is the business confidence shock, and ε^N_{ct} is the population shock, respectively.

RESULTS

Results of the Stationary Tests

Results of the stationary test at 90 percent confidence interval are presented in Table1.

Table 1. Levin, Lin & Chu Unit Root Test

Variables	Form	Lags	t-test	P-value	Result
GGRP	None	0	-2.1390	0.0162	I(0)
POPR	Drift and Trend	3	-5.3868	0.0000	I(0)
LICR	None	1	-2.9529	0.0016	I(0)
CONF	None	0	-5.7504	0.0000	I(1)
RELOANR	None	1	-2.1271	0.0167	I(0)
VLCR	None	1	-4.2824	0.0000	I(0)

Remark: Maximum lags = 4 and Optimum lag based on AIC

Results of Granger's Causality Tests

The null hypothesis of the Granger causality tests is no causal relation between the variables (Table 2). The results indicate that the value of land and construction, commercial bank real estate loans, change in business confidence, and the population Granger causes the growth rate of GRP. (VLCR → GGRP, RELOANR → GGRP, LICR → GGRP, DCONF → GGRP, and POPR → GGRP). Moreover, the change in business confidence is two-way causes the value of land and construction.

Table 2. Granger Causality Tests

variable	Excluded	Chi-sq	Prob	variable	excluded	Chi-sq	prob
GGRP	VLCR*	28.0205	0.0005	**LICR**	GGRP	1.8746	0.9846
	RELOANR*	20.5702	0.0084		VLCR	8.2831	0.4063
	LICR*	22.7746	0.0037		RELOANR	10.9980	0.2018
	DCONF*	30.1990	0.0002		DCONF	4.5984	0.7995
	POPR*	115.0307	0.0000		POPR	9.7381	0.2839
VLCR	GGRP	6.9001	0.5475	**DCONF**	GGRP	2.7805	0.9474
	RELOANR	11.0224	0.2004		VLCR*	14.8323	0.0625
	LICR	7.0764	0.5284		RELOANR	3.2797	0.9156
	DCONF*	13.8117	0.0868		LICR	1.1440	0.9972
	POPR	9.6115	0.2934		POPR	1.1662	0.9970
RELOANR	GGRP	0.9886	0.9983	**POPR**	GGRP	9.2809	0.3192
	VLCR	11.2789	0.1864		VLCR	4.8877	0.7695
	LICR	4.5478	0.8046		RELOANR	7.4054	0.4936
	DCONF	2.8615	0.9427		LICR	7.2096	0.5142
	POPR	1.9207	0.9833		DCONF	6.2167	0.6230

The VAR Estimate

The optimum lag structure in the VAR model equal to 8 quarters, and the estimates are shown in Appendix 1. If the historical growth rate of gross regional product increases by 1 percent, the current growth rate of gross regional product will increase by 0.93 percent. Every 1 million Baht increase in the past value of land and construction in the region will raise the growth rate of gross regional product by approximately 0.00007 percent, and every 1 million Baht increase in the past commercial bank real estate loans in the region will have a little effect on the growth rate of gross regional product by 0.00006 percent. The one thousand square meters of regional construction license can have a positive effect on the growth rate of gross regional product by 0.0008 percent. Moreover, one unit increase in the business confidence index will increase the growth rate of gross regional product by 3.43 percent.

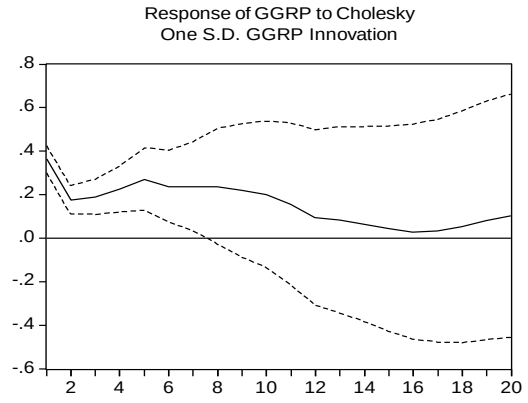
Table 3. VAR Lag Order Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
2	-1979.701	226.4703	5.00e+19	62.35458	64.94235*	63.37713
8	-1579.720	57.7098*	2.38e+18*	56.77938*	66.53330	60.63362*

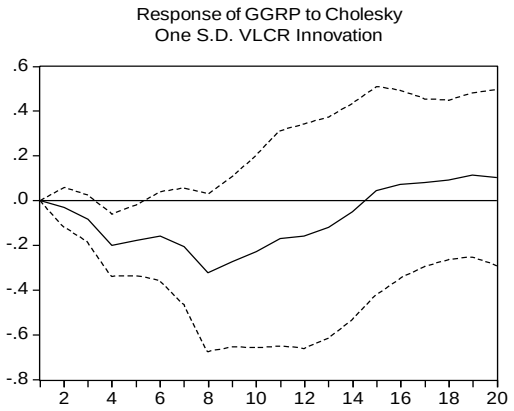
Remark: * indicates lag order selected by the criterion and LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, and HQ: Hannan-Quinn information criterion.

The Results of the Pooled Vector Autoregressive model and Impulse Response Function

The response of the growth rate of gross regional product and the structure of the regional construction and real estate sector in Thailand to various shocks are shown in Figures 1 and 2.



(a)



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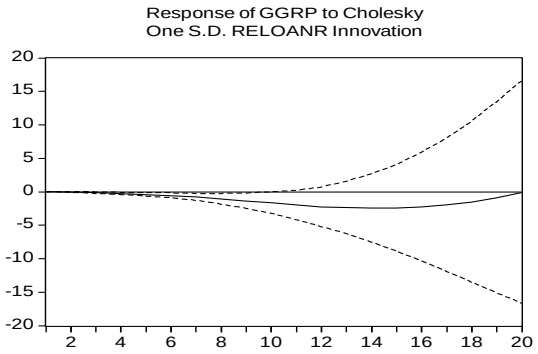
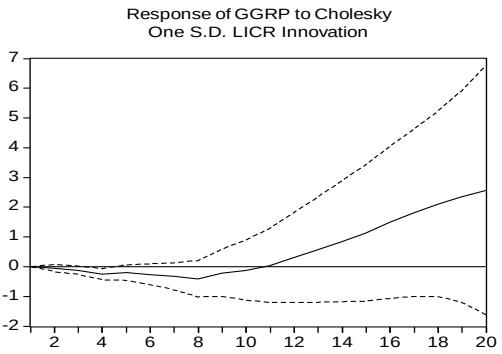


(c)



(d)

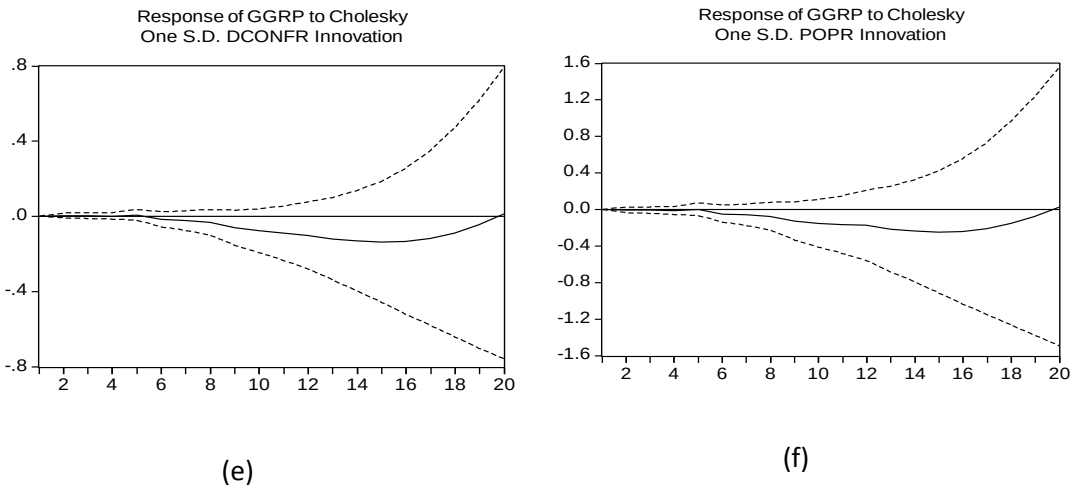


Figure 1. Response of GGRP to the shocks in GGRP, VLCR, RELOANR, LICR, DCONF, and POPR

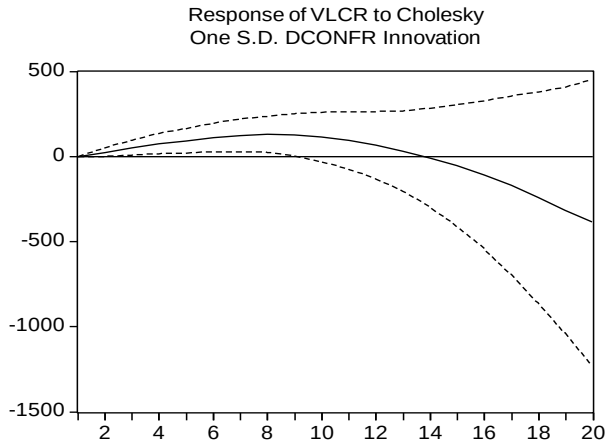


Figure 2. Response of VLCR to the shock in DCONF

Figure 1 (a) indicates that the growth rate of real GRP to its own shock is slow and negative. The one time stimulus on the growth rate of gross regional product declines approximately 0.2 percent in the first quarter and approaches zero in 16 quarters. Figure 1 (b) shows the response of the growth rate of real GRP to the value of land and construction in various regions of Thailand. The one time increase in the value of land and construction would create a short term decline in the growth rate of gross regional product for 8 quarters and then it shows signs of recovery. There are four quarter lags before the growth rate of real GRP responds to the shock in commercial banks' real estate loans as shown in Figure 1 (c) and the shock causes a persistence effect. Figure 1 (d) shows the long term positive impact on the growth rate of real GRP from the shock in regional construction licenses. There are similar response patterns of real GRP growth to the shock in change in business confidence and in regional population shown in Figure 1 (e and f). The response of the growth rate of real GRP to the shocks in real estate loan, business confidence, and change in population are

similar where it occurs with time lags for 6 quarters and their impacts are quite small except for the real estate loan. The response of the growth rate of real GRP to shocks in construction license are also limited but it occurs without a time lag. Figure 2 (a) represent the positive response of the value of land and construction to change in business confidence. It shows a positive momentum for 8 quarters before its decline.

CONCLUSIONS

The regional construction and real estate sector in Thailand was specified using the structural DSGE model with search and matching and estimated with the pooled vector autoregressive model. The empirical evidence suggests five important factors that can be used to stimulate regional development through increased growth of real gross regional product. These factors include the value of land and construction in each region, regional real estate loans, the amount of construction licenses issued in various regions, the business confidence index, and population in each region. Some of these factors such as real estate loans, licenses issued, and business confidence can be used as policy instruments to stimulate regional growth. The structural real estate model indicates the overall structural lag adjustment to be 8 quarters; however, the actual adjustment process for each variable may differ. Comparing the alternatives available to stimulate growth in the region, the evidence supports the use of license control; however, it also has limitations due to the size of its impact but it creates a quicker response of regional growth. An increase in the value of land and construction which is the necessary cost of living would create a short term decline in the growth rate of gross regional product and such increase can be triggered by the change in business confidence. In contrast to the common belief, the results from this research show that stimulating regional real estate sectors in Thailand during the last 5 years can be a threat to the regional development. Since the commercial banks' real estate loans do not influence the other variables, we can conclude that there is no strong evidence to support the chance to have a crisis due to real estate credit. The authors suggest that commercial bank real estate loans not be used as a policy variable to stimulate regional development. Direct productivity improvement causing the growth in real gross regional product is necessary because the effect of indirect stimulus such as creating business confidence to the growth in real gross regional product is minimal.

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Appendix 1. Pooled VAR Estimates

	GGRP	VLCR	RELOANR	LICR	DCONFR	POPR
GGRP(-1)	0.460684	26.01730	-25.68991	-15.75570	0.001629	-3.984797
	(0.07264)	(130.796)	(149.670)	(35.3621)	(0.00215)	(39.5869)
	[6.34229]	[0.19892]	[-0.17164]	[-0.44555]	[0.75614]	[-0.10066]
GGRP(-2)	0.251173	-0.804299	4.656820	-10.55535	0.000290	3.473833
	(0.06745)	(121.453)	(138.979)	(32.8361)	(0.00200)	(36.7591)
	[3.72393]	[-0.00662]	[0.03351]	[-0.32146]	[0.14517]	[0.09450]
GGRP(-3)	0.153685	-29.24861	27.56973	-9.588027	-0.000833	8.530911
	(0.06512)	(117.263)	(134.184)	(31.7033)	(0.00193)	(35.4910)
	[2.35998]	[-0.24943]	[0.20546]	[-0.30243]	[-0.43155]	[0.24037]
GGRP(-4)	0.271850	145.1981	-48.80917	-4.720253	-0.000522	133.1553
	(0.06217)	(111.953)	(128.109)	(30.2678)	(0.00184)	(33.8840)
	[4.37249]	[1.29696]	[-0.38100]	[-0.15595]	[-0.28321]	[3.92974]
GGRP(-5)	0.023364	-132.5332	41.51970	-5.358692	0.000933	-0.491281
	(0.06782)	(122.119)	(139.741)	(33.0162)	(0.00201)	(36.9607)
	[0.34451]	[-1.08528]	[0.29712]	[-0.16231]	[0.46398]	[-0.01329]
GGRP(-6)	0.029745	-63.57534	16.24187	-3.848310	-7.13E-05	2.966018
	(0.06593)	(118.710)	(135.841)	(32.0946)	(0.00196)	(35.9291)
	[0.45119]	[-0.53555]	[0.11957]	[-0.11991]	[-0.03647]	[0.08255]
GGRP(-7)	0.047908	-28.38641	-6.125895	-4.674044	-0.001048	7.993773
	(0.06842)	(123.206)	(140.985)	(33.3100)	(0.00203)	(37.2897)
	[0.70018]	[-0.23040]	[-0.04345]	[-0.14032]	[-0.51667]	[0.21437]
GGRP(-8)	-0.033591	-59.67008	59.61457	5.615075	0.001367	-14.56570
	(0.06355)	(114.430)	(130.943)	(30.9374)	(0.00188)	(34.6336)
	[-0.52859]	[-0.52146]	[0.45527]	[0.18150]	[0.72542]	[-0.42057]
VLCR(-1)	-0.000181	1.382189	0.175990	0.027235	5.42E-06	-0.055076
	(0.00013)	(0.23286)	(0.26646)	(0.06296)	(3.8E-06)	(0.07048)
	[-1.39692]	[5.93573]	[0.66047]	[0.43260]	[1.41372]	[-0.78147]

	GGRP	VLCR	RELOANR	LICR	DCONFR	POPR
VLCR(-2)	-4.38E-05	-0.242223	-0.041309	-0.019324	-5.01E-06	0.007112
	(0.00024)	(0.42345)	(0.48455)	(0.11448)	(7.0E-06)	(0.12816)
	[-0.18639]	[-0.57203]	[-0.08525]	[-0.16879]	[-0.71872]	[0.05549]
VLCR(-3)	-0.000182	-0.126090	0.020344	-0.011951	-4.64E-06	-0.015179
	(0.00024)	(0.43148)	(0.49374)	(0.11666)	(7.1E-06)	(0.13059)
	[-0.75753]	[-0.29223]	[0.04120]	[-0.10245]	[-0.65286]	[-0.11623]
VLCR(-4)	0.000552	0.229116	-0.835469	0.117710	2.60E-06	0.255608
	(0.00024)	(0.43412)	(0.49677)	(0.11737)	(7.1E-06)	(0.13139)
	[2.29068]	[0.52777]	[-1.68181]	[1.00290]	[0.36352]	[1.94538]
VLCR(-5)	-0.000119	-0.540492	1.017388	-0.109221	8.37E-06	-0.181657
	(0.00020)	(0.36415)	(0.41670)	(0.09845)	(6.0E-06)	(0.11022)
	[-0.59054]	[-1.48424]	[2.44152]	[-1.10937]	[1.39586]	[-1.64820]
VLCR(-6)	-0.000196	0.066993	-0.134004	0.040899	-6.44E-06	-0.015978
	(0.00019)	(0.34616)	(0.39611)	(0.09359)	(5.7E-06)	(0.10477)
	[-1.01918]	[0.19353]	[-0.33830]	[0.43701]	[-1.12947]	[-0.15250]
VLCR(-7)	-0.000278	-0.042294	-0.041710	0.059601	-6.69E-06	-0.021875
	(0.00019)	(0.34272)	(0.39218)	(0.09266)	(5.6E-06)	(0.10373)
	[-1.45843]	[-0.12341]	[-0.10635]	[0.64323]	[-1.18495]	[-0.21088]
VLCR(-8)	0.000515	0.224763	-0.136304	-0.117085	6.23E-06	0.050911
	(0.00014)	(0.24452)	(0.27981)	(0.06611)	(4.0E-06)	(0.07401)
	[3.78907]	[0.91920]	[-0.48714]	[-1.77110]	[1.54709]	[0.68792]
RELOANR(-1)	-0.000197	0.250631	1.285053	0.065432	5.29E-06	-0.097399
	(0.00012)	(0.20977)	(0.24004)	(0.05671)	(3.5E-06)	(0.06349)
	[-1.68998]	[1.19478]	[5.35344]	[1.15373]	[1.53004]	[-1.53408]
RELOANR(-2)	-2.69E-05	-0.014823	-0.243640	-0.020044	-4.62E-06	0.007312
	(0.00021)	(0.37684)	(0.43122)	(0.10188)	(6.2E-06)	(0.11405)
	[-0.12873]	[-0.03934]	[-0.56500]	[-0.19674]	[-0.74443]	[0.06411]
RELOANR(-3)	-0.000146	0.073281	-0.181783	0.004550	-4.21E-06	-0.019886
	(0.00021)	(0.38500)	(0.44056)	(0.10409)	(6.3E-06)	(0.11653)
	[-0.68337]	[0.19034]	[-0.41262]	[0.04372]	[-0.66473]	[-0.17066]
RELOANR(-4)	0.000484	0.161350	-0.514595	0.003021	3.13E-06	0.199666
	(0.00020)	(0.35832)	(0.41003)	(0.09688)	(5.9E-06)	(0.10845)
	[2.43477]	[0.45030]	[-1.25503]	[0.03119]	[0.53090]	[1.84110]
RELOANR(-5)	-0.000279	-0.420662	0.716719	-0.030906	3.61E-06	-0.197594
	(0.00018)	(0.32308)	(0.36971)	(0.08735)	(5.3E-06)	(0.09779)
	[-1.55258]	[-1.30202]	[1.93861]	[-0.35382]	[0.67893]	[-2.02069]
RELOANR(-6)	-7.91E-05	0.192096	-0.218056	0.013606	-2.40E-06	-0.024879
	(0.00019)	(0.34020)	(0.38930)	(0.09198)	(5.6E-06)	(0.10297)

	GGRP	VLCR	RELOANR	LICR	DCONFR	POPR
	[-0.41869]	[0.56465]	[-0.56013]	[0.14792]	[-0.42861]	[-0.24162]
RELOANR(-7)	-0.000147	0.222248	-0.240047	0.025275	-2.29E-06	-0.058569
	(0.00019)	(0.34040)	(0.38952)	(0.09203)	(5.6E-06)	(0.10303)
	[-0.77763]	[0.65290]	[-0.61626]	[0.27464]	[-0.40773]	[-0.56849]
RELOANR(-8)	0.000327	-0.352208	0.338776	-0.053484	1.76E-06	0.145977
	(0.00013)	(0.22599)	(0.25860)	(0.06110)	(3.7E-06)	(0.06840)
	[2.60665]	[-1.55854]	[1.31005]	[-0.87538]	[0.47253]	[2.13424]
LICR(-1)	-0.000414	0.015470	-0.001620	1.346970	1.07E-05	-0.016215
	(0.00042)	(0.75605)	(0.86515)	(0.20441)	(1.2E-05)	(0.22883)
	[-0.98512]	[0.02046]	[-0.00187]	[6.58966]	[0.85932]	[-0.07086]
LICR(-2)	-7.69E-05	0.052578	-0.116575	-0.194693	-7.51E-06	-0.037430
	(0.00073)	(1.32123)	(1.51190)	(0.35721)	(2.2E-05)	(0.39989)
	[-0.10482]	[0.03979]	[-0.07710]	[-0.54504]	[-0.34528]	[-0.09360]
LICR(-3)	-0.000437	0.259245	-0.184405	-0.080071	-4.65E-06	-0.107794
	(0.00074)	(1.33930)	(1.53257)	(0.36209)	(2.2E-05)	(0.40535)
	[-0.58811]	[0.19357]	[-0.12032]	[-0.22113]	[-0.21086]	[-0.26592]
LICR(-4)	0.001172	-1.340599	1.812318	-0.487754	5.99E-07	0.520420
	(0.00070)	(1.25328)	(1.43413)	(0.33884)	(2.1E-05)	(0.37932)
	[1.68362]	[-1.06967]	[1.26370]	[-1.43949]	[0.02901]	[1.37198]
LICR(-5)	-0.000328	0.381265	-1.543216	0.402029	-1.31E-06	-0.207595
	(0.00062)	(1.11050)	(1.27075)	(0.30024)	(1.8E-05)	(0.33611)
	[-0.53218]	[0.34333]	[-1.21441]	[1.33904]	[-0.07170]	[-0.61765]
LICR(-6)	-0.000258	0.125165	0.126896	-0.079368	3.96E-06	-0.112071
	(0.00063)	(1.14230)	(1.30714)	(0.30883)	(1.9E-05)	(0.34573)
	[-0.40700]	[0.10957]	[0.09708]	[-0.25699]	[0.21043]	[-0.32416]
LICR(-7)	-0.000499	0.225180	0.000918	-0.092275	5.98E-06	-0.238884
	(0.00064)	(1.14919)	(1.31503)	(0.31070)	(1.9E-05)	(0.34782)
	[-0.78117]	[0.19595]	[0.00070]	[-0.29699]	[0.31609]	[-0.68681]
LICR(-8)	0.001672	-1.347821	0.819145	0.049822	-1.13E-05	0.891521
	(0.00057)	(1.02091)	(1.16824)	(0.27602)	(1.7E-05)	(0.30899)
	[2.94957]	[-1.32021]	[0.70118]	[0.18050]	[-0.67028]	[2.88526]
DCONFR(-1)	0.738406	-472.1140	642.5005	-38.54931	0.046165	54.77587
	(0.29846)	(537.428)	(614.982)	(145.300)	(0.00885)	(162.659)
	[2.47406]	[-0.87847]	[1.04475]	[-0.26531]	[5.21580]	[0.33675]
DCONFR(-2)	0.443552	-305.7242	381.5166	-25.90569	0.027044	44.65675
	(0.19695)	(354.650)	(405.829)	(95.8838)	(0.00584)	(107.339)
	[2.25206]	[-0.86204]	[0.94009]	[-0.27018]	[4.63028]	[0.41603]

	GGRP	VLCR	RELOANR	LICR	DCONFR	POPR
DCONFR(-3)	0.313987	-229.3017	257.7451	-22.92452	0.018541	44.16706
	(0.15728)	(283.208)	(324.076)	(76.5684)	(0.00466)	(85.7163)
	[1.99638]	[-0.80966]	[0.79532]	[-0.29940]	[3.97521]	[0.51527]
DCONFR(-4)	0.091775	863.1059	-153.9705	112.6354	-0.609853	-245.9211
	(0.15060)	(271.188)	(310.322)	(73.3186)	(0.00447)	(82.0782)
	[0.60938]	[3.18269]	[-0.49616]	[1.53625]	[-136.548]	[-2.99618]
DCONFR(-5)	0.647815	-586.0183	367.8748	-70.36172	0.021929	133.7095
	(0.21699)	(390.733)	(447.118)	(105.639)	(0.00644)	(118.260)
	[2.98542]	[-1.49979]	[0.82277]	[-0.66606]	[3.40771]	[1.13064]
DCONFR(-6)	0.561965	-375.1527	238.2404	-28.32162	0.017023	129.3445
	(0.21245)	(382.553)	(437.757)	(103.427)	(0.00630)	(115.784)
	[2.64517]	[-0.98066]	[0.54423]	[-0.27383]	[2.70202]	[1.11712]
DCONFR(-7)	0.727869	-344.6629	195.7384	-2.223262	0.018238	160.6309
	(0.22826)	(411.016)	(470.328)	(111.123)	(0.00677)	(124.399)
	[3.18882]	[-0.83856]	[0.41617]	[-0.02001]	[2.69428]	[1.29126]
DCONFR(-8)	-0.086994	434.5076	196.9867	-30.03276	-0.378992	-393.4737
	(0.17543)	(315.889)	(361.473)	(85.4041)	(0.00520)	(95.6076)
	[-0.49589]	[1.37551]	[0.54496]	[-0.35165]	[-72.8496]	[-4.11551]
POPR(-1)	-5.42E-05	0.539227	-0.320252	0.039257	4.52E-07	1.226477
	(0.00014)	(0.26011)	(0.29765)	(0.07032)	(4.3E-06)	(0.07873)
	[-0.37487]	[2.07307]	[-1.07595]	[0.55823]	[0.10549]	[15.5791]
POPR(-2)	5.35E-05	-0.243716	0.154191	-0.016320	-1.51E-07	-0.101575
	(0.00015)	(0.26983)	(0.30877)	(0.07295)	(4.4E-06)	(0.08167)
	[0.35720]	[-0.90322]	[0.49937]	[-0.22371]	[-0.03405]	[-1.24376]
POPR(-3)	7.07E-05	-0.145020	0.084424	-0.010238	-7.06E-08	-0.045216
	(0.00014)	(0.25725)	(0.29437)	(0.06955)	(4.2E-06)	(0.07786)
	[0.49492]	[-0.56374]	[0.28680]	[-0.14720]	[-0.01666]	[-0.58074]
POPR(-4)	0.000303	-0.289653	0.014569	-0.116908	-2.38E-07	-0.225698
	(0.00013)	(0.23960)	(0.27417)	(0.06478)	(3.9E-06)	(0.07252)
	[2.27970]	[-1.20892]	[0.05314]	[-1.80477]	[-0.06027]	[-3.11236]
POPR(-5)	-0.000666	0.434303	0.011964	0.170839	2.80E-06	0.171416
	(0.00014)	(0.25877)	(0.29612)	(0.06996)	(4.3E-06)	(0.07832)
	[-4.63099]	[1.67832]	[0.04040]	[2.44187]	[0.65621]	[2.18864]
POPR(-6)	0.000110	-0.099454	-0.006423	-0.036078	-2.15E-06	-0.021976
	(0.00017)	(0.31385)	(0.35915)	(0.08485)	(5.2E-06)	(0.09499)
	[0.63045]	[-0.31688]	[-0.01789]	[-0.42518]	[-0.41635]	[-0.23134]
POPR(-7)	-5.67E-07	0.006222	-0.027095	-0.016294	-1.54E-06	-0.010399
	(0.00017)	(0.31130)	(0.35622)	(0.08416)	(5.1E-06)	(0.09422)

	GGRP	**VLCR**	**RELOANR**	**LICR**	**DCONFR**	**POPR**
	[-0.00328]	[0.01999]	[-0.07606]	[-0.19360]	[-0.30035]	[-0.11037]
POPR(-8)	0.000181	-0.201125	0.088197	-0.014168	9.06E-07	0.006436
	(0.00010)	(0.18573)	(0.21253)	(0.05021)	(3.1E-06)	(0.05621)
	[1.75850]	[-1.08290]	[0.41499]	[-0.28216]	[0.29605]	[0.11449]
C	-2.177954	5736.331	-3117.124	426.4416	-0.364408	-1859.986
	(1.22551)	(2206.74)	(2525.19)	(596.618)	(0.03634)	(667.898)
	[-1.77718]	[2.59946]	[-1.23441]	[0.71476]	[-10.0269]	[-2.78484]
R-squared	0.991378	0.999812	0.999930	0.999339	0.999817	1.000000
Adj. R-squared	0.967032	0.999282	0.999733	0.997471	0.999301	1.000000
Meandependent	-0.266362	39866.60	31316.31	9322.157	-0.330682	2701316.
S.D. dependent	2.180412	26607.65	49956.40	3832.659	0.444075	1427680.

Remark: Standard errors in ( ) & t-statistics in [ ]