

## The Role of Public and Private Investment to Ensure Sustainable Macroeconomic Stability in Turkey

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**Abstract:** Private investment plays a vital role to promote sustainable economic growth and to reduce poverty in developing countries. The idea of using private sector investments intensively to boost growth in Turkey has started to emerge after 1980s. Despite a sizeable empirical literature, the impact of public investment in the developing countries gives inconsistent results on whether it complements or crowds out private investment. This paper makes use of Blejer and Khan Model (1984) for Turkey over the 1980-2009 periods estimating the effect of public investment on private sector. We employed time series analysis in this study. Our findings support the hypothesis that GDP growth stimulates private investment while public investment and private investment are complementary. The other finding of the study is that credit constraint is an important determinant of private investments in Turkey.

**Keywords:** Private investment, Blejer and Khan Model, Crowding out/in, ARDL model.

### Introduction

Private investment plays a vital role on the process of growth in developing countries. Even though private investment represents a small component of aggregate demand compared to consumption expenditures, it determines the rate of physical capital accumulation. Therefore private investment is a significant determinant for the expansion of production capacity and long run economic growth (Chibber et al., 1992).

Blejer and Khan (1984) emphasize that public investment crowds out private investment because the public sector uses the limited physical or financial resources which are necessary for the production of private sector and it produces good and services which can also be produced by the private sector. Besides, they emphasize that the way of borrowing, taxing and inflation to finance the public investments crowd out private investment. Instead, supplying the infrastructural public investment and public goods can complete the private investments. This kind of public investment can develop the private investment opportunities and increase capital productivity. The investment behaviour is analyzed by using formal models in developed economies such as 'Accelerator model', 'Tobin's q theory of investment', 'Neoclassical flexible accelerator theory'. Because of the institutional problems and data constraints in Turkey and also in other developing countries, application of these models on these countries is very difficult if not impossible. Sundararajan and Thakur (1980), Wai and Wong (1982) and Blejer and Khan (1984) tried to develop applicable investment models for developing countries.

The empirical literature is developed on two approaches which depend on the relationship between private investment and public investment. The first approach is based on the crowding out effect in which public investment expenditure decreases private investment. The second approach is that private investment and public investment are complements (crowding in) rather than rival to each other. Grene and Villanueva (1984) and Seven and Solimano (1991) find out a complementary relationship between public and private investment in developing countries. For African Countries Oshikayo (1994) and for developing countries Blejer and Khan (1984) give empirical evidence for the complementary relationship only between infrastructural public investment and infrastructural private investment. Nazmi and Ramirez (1997) shows that public investment crowds out private investment in Mexico. For the period of 1963-1993, Ghali (1998) finds that public investment has a negative effect on private investment in the short run while it has both negative and positive effect on economic growth and private investment in the long run for the Tunisian economy. The study of Ahmed and Miller (1999) for the OECD countries shows there is a negative relationship between public and private investment however there is a positive relationship between private

investment and government expenditures on transportation and communication. Ghura and Godwin (2000) shows that public investment crowds in private investment in Sub-Saharan African countries and there is a negative relationship between public and private investment in Asian and Latin American countries. Narayan (2004) tests whether public investment crowds out private investment for Fijian Economy for the period of 1950-2001. He focuses on two different periods as a complementary relation between public and private investment for the period of 1950-1975 and a weak relationship between public and private investment for the period of 1976-2001.

The empirical findings show that the results differ across countries. The studies on the same countries have different results. The empirical studies on Turkey have different findings for the crowding in and crowding out hypothesis. Ismihan et al. (2002) emphasize that after the 1970s the relationship between public and private investment has started to show no clear relationship. After 1980s, the crowding in effect of the investments has reversed by the macroeconomic inconsistency and the growth of financial deficit. Taban and Kara (2006) finds out there is not any complementary relationship between public and private investment for the period of 1989:1 and 2004:4. Moreover, they focus on the effect of domestic public borrowing which crowds out private investment. Simsek (2003) studies the effect of different kinds of government expenditure on private investment. His empirical findings for the period of 1970-2001 show that government expenditure has crowding out effect on private expenditure. Bilgili (2003) analyzes the short run and the long run effects of financial policy for the period of 1988-2003 and he reaches the supporting results for both the crowding in and crowding out hypothesis. Kustepeli (2005) tests both direct and indirect effects of the government expenditures between 1963 and 2000. The results indicate that the real government expenditures crowd in real private investment while the real budget deficit crowds out private investment. Yavuz (2005) found evidence that public investment crowds in private investment for the period of 1980-2003 in Turkey.

In this study, based on the Blejer and Khan Model (1984), the effects of the infrastructural and non-infrastructural public investment on private investment for the period of 1980-2009 are investigated by employing the time series techniques. This study will fill an important gap in the literature because there has not been any study that takes into account the effects of the infrastructural and non-infrastructural public investment on private investment.

## Economic Model

Blejer and Khan (1984) investigate the relationship between public and private investment in developing countries and also they focus on the determinants of these investment categories. The model has two important policy variables. The public investment and the banking credits for the private sector are considered in the model which is associated with private investments. The model enables us to see the effects of government expenditure on inflation, rise of wages and crowding out effect. One of the contributions of the model is that it categorizes the public investments by two types as infrastructural and non-infrastructural investments. Moreover, Blejer and Khan (1984) assume the private investment is affected by the public investment categories in different ways. The starting point of Blejer and Khan model for the partial adjustment gross investment model is,

$$\Delta PI = \beta(PI^*_t - PI_{t-1}) \quad (1)$$

or

$$PI_t = \beta PI^*_t + (1 - \beta)PI_{t-1} \quad (2)$$

$PI$  shows the level of domestic private investment,  $PI^*$  shows the required level of domestic private investment,  $t$  is the time period and  $\beta$  is adjusting coefficient ( $0 \leq \beta \leq 1$ ). The actual capital stock, which affects  $\beta$ , adjusts required level and the actual level in  $t-1$  period. When there is a nonstationary process, the required level of private investment will be,

$$PI^*_t = [1 - (1 - \delta)L]CS^*_t \quad (3)$$

$CP^*$  represents the required capital stock which is associated with output level in the next periods.

$$CS^*_t = aY_t \quad (4)$$

Combining equations (1) and (4), we get,

$$PI_t = \beta a [1 - (1 - \delta)L]Y_t + (1 - \delta)PI_{t-1} \quad (5)$$

For the estimation of such a functional structure, domestic private investment is the only data to be need. Blejer and Khan (1984) denote there are three important factors affecting private investment such as business cycle, the available credits for private sector and the level of public investment. The net effect of public investment on the private investment depends on the size of the crowding out effect and the complementary effect between public and private investment. Crowding out effect is measured by unexpected change in banking credits for the private sector

( $\Delta UPC$ ) which is counted as the difference between the real value and the one-year lagged value of private investments. Adjusting coefficient,  $\beta$ , depends on public investment (GI) and the unexpected change in the banking credits for the private sector:

$$\beta = b_0 + \frac{(b_1 \Delta UPC_t + b_2 GI_t)}{(PI_t^* - PI_{t-1})} \quad (6)$$

Substituting (6) into equation (2) we get:

$$PI = b_0 (PI_t^* - PI_{t-1}) + b_1 \Delta UPC + b_2 GI_t \quad (7) \quad \text{Following}$$

Blejer and Khan, it can be shown that:

$$PI_t = b_0 a [Y_{t-1} - (1 - \delta) Y_{t-2}] + b_1 \Delta UPC + b_2 GI_t + b_3 \Delta GI_t + (1 - b_0) PI_{t-1} \quad (8)$$

The effects of public policies on private investment are found by estimating the coefficient of the credit to the private sector ( $b_1$ ) and public investment ( $b_2$  ve  $b_3$ ). Blejer and Khan (1984) suggest a method to estimate the component of infrastructural and non infrastructural public investment. Infrastructural investment is assumed as a long-run concept and it becomes a proper representative variable by modelling the expected public investment.

$$GI_t = p_0 + p_1 GI_{t-1} \quad (9)$$

Expected values represent the component of infrastructural long run investment and the residual values represent the component of non-infrastructural short run public investment. Therefore the equation is written by,

$$PI_t = b_0 a [Y_{t-1} - (1 - \delta) Y_{t-2}] + b_1 \Delta UPC_t + b_2 EGI_t + b_3 \Delta UGI_t + (1 - b_0) PI_{t-1} \quad (10)$$

Based on the equation 10, the equation 11 is used to estimate the short run and long run coefficients:

$$PI_t = b_0 Y_{t-1} + b_1 UPC_t + b_2 EGI_t + b_3 UGI_t + b_4 PI_{t-1} + u_t \quad (11)$$

ECI and UGI is the expected and unexpected public investment respectively. The negative sign of  $b_3$  shows the crowding out effect of UGI. This equation is estimated for Turkey using annual data for the period 1980-2009. The infrastructural investment data is gathered from SPO and the others such as GDP, GDP price deflator (1987=100) and the credits to the private sector are gathered from annual statistical reports of TurkStat.

## Method and Empirical Findings

The time series method investigates the non-stationary characteristics of data. It is expected to have a stationary process to have a statistically significant relationship between the variables. If the mean and the variance of the series change in over time, these series are called as non-stationary or unit root series. In order to test the unit root in time series, Augmented Dickey Fuller (ADF) Test is the most common method in literature. The equation which has lagged values in the dependent variable can be formulated with an intercept and time trend as follows:

$$\Delta y_t = \mu + \beta t + \delta y_{t-1} + \sum_{j=1}^k \alpha_j \Delta y_{t-j} + \varepsilon_t \quad (12)$$

$\Delta$  is the difference operator,  $t$  is the time trend,  $\varepsilon$  is the error term,  $y_t$  is the series investigated and  $k$  is the lag number. ADF assumes that the error term are statistically independently distributed and it has a constant variance. Besides, it is important to select the lag numbers correctly for the power of the test and significance level of the parameters (Said and Dicky, 1984). ADF test depends on the estimation of the parameter  $\delta$ . If  $\delta$  is different from zero and statistically significant, then the hypothesis which shows the series has a non stationary process is rejected. Philips-Perron test (1988) has been developed to control the high frequency correlation and it does not give way to the limitation of the assumptions. Therefore Philips-Perron test (1984) is a complementary unit root test for the ADF test. PP test does not include enough lag values of the dependent variable in the model, so Newey-West estimator is performed to remove the autocorrelation problem in the model. As the absolute value of  $\tau$  in ADF test is greater than the absolute value of Mac-Kinnon critical values, the series has a non-stationary process (Altunc, 2008: 118). Table 1 presents the ADF and PP test results for each series:

Variables	ADF Test		Phillips-Perron Test	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
LPRI	-1.31(0)	-1.67(0)	-1.56(3)	-1.98(3)
LGDP	-1.15(0)	-3.09(0)	-1.17(3)	-3.11(1)
LPI	-2.17(1)	-3.05(1)	-1.61(5)	-1.97(5)
UPI	-3.34(2)**	-3.66(3)**	-3.23(5)**	-3.68(5)**
LPC	-2.71(4)	-2.48(4)	-1.37(4)	-1.07(7)
DLPRI	-5.02(0)*	-4.91(0)*	-5.02(2)*	-4.91(2)*
DLGDP	-4.66(0)*	-4.44(0)*	-4.16(4)**	-3.87(4)**
DLPI	-4.05(1)*	-3.96(1)*	-3.11(13)**	-3.66(14)**
DLPC	-3.73(0)*	-3.89(0)*	-3.60(27)**	-5.11(27)*
McKinnon (1996) Critical Values				
Significant				
Level	Intercept	Intercept and Trend		
1%	-3.68	-4.32		
5%	-2.97	-3.58		
10%	-2.62	-3.22		

**Table 1:** Unit Root Test Results

L denotes the logarithm of the variables and D shows the first-difference operator. Figures in the parentheses from the ADF test results are the lag values which show there is not an autocorrelation according to SIC. But for the PP test, the numbers in the parenthesis are the optimal Newey-West lag values. ADF test results confirm that all variables excluding UPI are integrated of I(1). The results of ADF and PP test which are related to the non-infrastructure public expenditures (UPI) shows that non-infrastructure public expenditures are stationary and statistically significant in 5% confidence level is I(0).

When some of the series are stationary at level and some of them are stationary at first difference level I(1), we can not apply on the traditional cointegration test. This problem can be removed by the autoregressive distributed lag model and the bound test approach which is developed by Paseran, Shin and Smith (2001) to observe the long run relationship between the variables. The cointegration method used here, the Autoregressive Distributed Lag (ARDL) method allows testing for a long-run relationship between variables of mixed order of integration (Paseran et al., 2001). There are many advantages of using ARDL model for testing the private investment model on Turkey. The main advantage of this method is that ARDL avoid the pre-testing problems in data. Bound test approach can be applied to studies that have a small size while Engle and Granger (1987) and Johansen (1988, 1995) methods of cointegration are not reliable for small sample sizes. Finally, the ECM, which is derived from ARDL by a linearly simple transformation way, integrates the short run and long run dynamics without losing long run information (Banerjee vd., 1993).

As the error correction term in the ARDL model does not have restricted error corrections, the ARDL model is an unrestricted error correction model (UECM). In the UECM, these statistics are used for testing if the lagged values of the variables are statistically significant (Faras and Ghali, 2009; Paseran et al. 2001). The form of the model can be written in our adapted model as:

$$\begin{aligned} \Delta LPRI = & \alpha_0 + \sum_{i=1}^m \alpha_{1i} \Delta LPRI_{t-i} + \sum_{i=0}^m \alpha_{2i} \Delta LGDP_{t-i} + \sum_{i=0}^m \alpha_{3i} \Delta LPI_{t-i} + \sum_{i=0}^m \alpha_{4i} \Delta UPI_{t-i} \\ & + \sum_{i=0}^m \alpha_{5i} \Delta LPC_{t-i} + \alpha_6 LPRI_{t-1} + \alpha_7 LGDP_{t-1} + \alpha_8 LPI_{t-1} + \alpha_9 UPI_{t-1} + \alpha_{10} LPC_{t-1} \quad (12) \\ & + u_t \end{aligned}$$

The cointegration relationship in equation 12 is performed by testing the hypothesis of  $H_0 : \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = 0$ . The null hypothesis of no cointegration will be rejected if the calculated F-statistic is greater than the upper bound critical value. If the computed F-statistics is less than the lower bound critical value, then we cannot reject the null of cointegration. Finally, the result is inconclusive if the computed F-statistic falls within the lower and upper bound critical values (Gurgur ve Karaca, 2007: 19). In ARDL model, firstly the lag orders of the dependent and independent variables in equation (12) that is represented by “m” must be determined by AIC and SIC criteria. The lag order which gives the smallest critical values is selected as the lag order of the model. If the selected model has autocorrelation, then the second smallest value is selected. If the autocorrelation problem still exists, the same process is applied until autocorrelation is removed (Karagol et al., 2007: 76). In this study, the maximum lag length of two is chosen in ARDL model because of the annual data and limited observations.

m	AIC	SBC	$\chi^2_{BG}$
1	-7.503501	-5.809910	5.877**
2	-8.407829	-5.504529	4.518***
3	-9.937074*	-5.824066*	1.120

**Table 2:** Determining the Lag Order for ARDL

Notes: m denotes the lag order.  $\chi^2_{BG}$  is Breusch-Godfrey autocorrelation test statistic. The superscript \*\*, \*\*\* indicate that there is an autocorrelation among residuals at the 5% ve 10% levels, respectively.

Table 2 shows that the smallest value is obtained when the lag order of 3 by considering both AIC and SBC. The problem of autocorrelation has been also removed in the same lag order. Therefore the private investment model is estimated at lag 3. The ARDL approach is applied to test whether there is a long run relationship between private investment and other variables which affects private investment. The F statistics which is counted for testing the fundamental hypothesis of the long run relationship between variables in the model has higher values than Paseran et al (2001) critical values. According to Narayan (2005), the existing critical values reported in Paseran et al. (2001) cannot be used for small sample sizes because they are based on large sample sizes. Narayan (2005) provides a set of critical values for sample sizes ranging from 30 to 80 observations. Given the relatively small sample size in this study, we also compare the calculated F-statistics with the critical values from Narayan (2005). Both of them give the same result.

k	F-statistic	Critical Bound's Value (%1)		Critical Bound's Value (%5)	
		Lower I(0)	Upper I(1)	Lower I(0)	Upper I(1)
3	6.45	4.29	5.61	3.23	4.35

**Table 3:** ARDL Bound Testing for Cointegration Analysis

Note: k indicate the number of regressors in the model. The appropriate lag lengths are selected by SBC. Breusch-Godfrey autocorrelation test statistic ( $\chi^2_{BG}$ ) is 2.327(0.17) when the lag order of three (m=3). So we cannot reject the null hypothesis and conclude that there is not autocorrelation in the model. Source of critical values: Paseran et al., 2001 and Narayan, 2005.

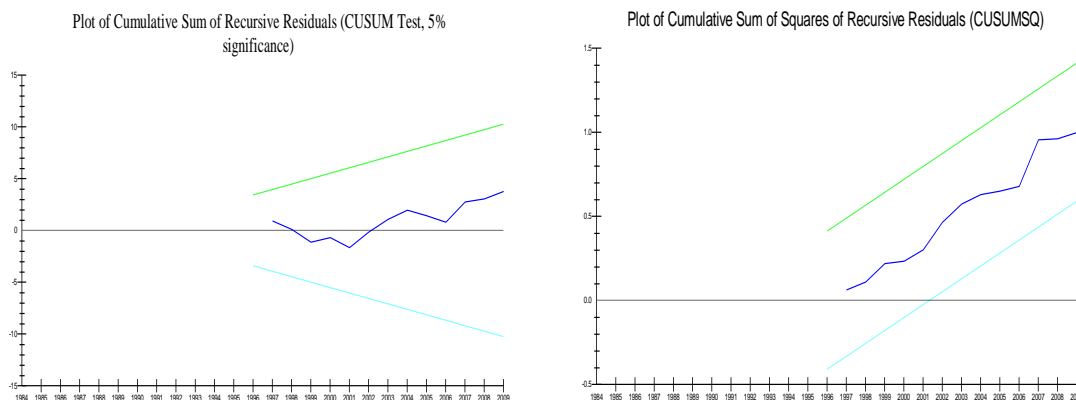
By using the SBC criteria, the optimal lag length is selected to estimate the long run parameters of the relationship between private investment, GDP, total infrastructural public investment and credit to private investment. We select 2 lags for the private investment (PRI), 3 lags for the credit to private investment (PC), 0 lag for the public investment, 2 lags for the GDP and unexpected public investment (UPI). The estimation results of ARDL model (2, 3, 0, 2, 2) and the results of the descriptive tests are given in Table 4:

Regressor	Coefficients	Stand. Error	t-Stat	Prob.
LPRI(-1)	1.586	0.240	6.611	0.000
LPRI(-2)	0.902	0.283	3.181	0.008
LPC	0.487	0.135	3.609	0.004
LPC(-1)	0.387	0.181	2.136	0.054
LPC(-2)	-0.034	0.182	-0.187	0.855
LPC(-3)	-0.588	0.176	-3.338	0.006
LPI	1.031	0.523	1.972	0.072
LGDP	6.120	1.958	3.126	0.009
LGDP(-1)	13.578	3.938	3.445	0.005
LGDP(-2)	13.163	4.091	3.218	0.007
UPI	0.146	0.138	1.055	0.312
UPI(-1)	-0.117	0.109	-1.064	0.308
UPI(-2)	0.194	0.061	3.208	0.008
C	12.832	3.124	4.108	0.001

$R^2=0.887$      $R_d^2=0.764$      $F\text{-stat}=7.220(0.001)$   
 Breusch Godfrey LM Test (1)= 0.935(0.333)  
 Ramsey Reset Test(1)=1.013(0.314)  
 Jarque Bera Test(2)=1.473(0.479)  
 White Test(1)=1.158(0.362)

**Table 4:** Estimation Results of ARDL (2,3,0,2,2) Model

The test statistics indicate that there is not any problem in the ARDL model. To complement this study it is important to investigate whether the long run relationship among variables are stable for the entire period of study. In other words, we have to test for parameter stability. The test results of CUSUM and CUSUMQ in which the stability of the parameters is observed indicate that the residuals are stays within the 5 percent critical bound and there is not a structural change in the model (Figure 1).



**Figure 1:** Plot of Cumulative Sum of Squares of Recursive Residuals (CUSUM, CUSUMSQ)

The long run coefficients in ARDL model (2, 3, 0, 2, 2) and diagnostic tests are given in Table 5. Due to some of the variables in the model are non-stationary, the assumption of normal distribution is invalidated or we can not attain normal distributed standard errors. The inference based on t statistics, therefore, will not be valid anymore. This problem can be removed by calculating the asymptotic standard errors of the long run coefficients by delta method (Paseran and Paseran, 1997; Caglayan, 2006; Erden and Saglam, 2009).

Regressor	Long Run Coefficient	Standard Error	t-Stat
LPI	0.295	0.143	2.056***
LPC	0.072	0.032	2.238**
LGDP	9.420	1.852	5.085*
UPI	0.064	0.021	3.054*
C	2.789	0.336	8.301*

**Table 5:** Estimated Long Run Coefficients using the ARDL (2,3,0,2,2)

Note: \*, \*\*, and \*\*\* denote significant at 1, 5, and 10% levels, respectively.

Table 5 shows that all variables are statistically significant and their long run coefficients are positive. The long run results show that GDP growth has a strong and statistically significant positive effect on private investment. Also there is a complementary relationship between private investment and both total infrastructural and non-infrastructural investment. Likewise there is a positive and significant relationship between bank credit to private sector and private investment. The short run relationship between variables is analyzed by error correction model based on ARDL. The model,

$$\begin{aligned} \Delta LPRI_t = & \alpha_0 + \sum_{i=1}^m \alpha_{1i} \Delta LPRI_{t-i} + \sum_{i=0}^m \alpha_{2i} \Delta LGDP_{t-i} + \sum_{i=0}^m \Delta LPI_{t-i} + \sum_{i=0}^m \Delta UPI_{t-i} \\ & + \sum_{i=0}^m \Delta LPC_{t-i} + \lambda ECT_{t-1} + u_t \end{aligned} \quad (13)$$

ECT represents the error-correction term. The coefficient of ECT, ( $\lambda$ ), shows that the disequilibrium is corrected in the current year. The functionality of the error correction model depends on its negative and significant coefficient. The short run relationship based on Model (13) is shown in Table 6.

Regressor	Coefficient	Standard Error	t-Stat	Prob.
$\Delta LPRI_{t-1}$	0.902	0.283	3.181*	0.006
$\Delta LPC$	0.486	0.135	3.609*	0.003
$\Delta LPC_{t-1}$	0.622	0.121	5.140*	0.000
$\Delta LPC_{t-2}$	0.588	0.176	3.338*	0.004
$\Delta LPI$	1.031	0.523	1.972**	0.067
$\Delta LGDP$	6.119	1.958	3.126*	0.007
$\Delta LGDP_{t-1}$	-13.163	4.090	-3.218*	0.006
$\Delta UPI$	0.146	0.138	1.055	0.308
$\Delta UPI_{t-1}$	-0.194	0.061	-3.207*	0.006
$ECM_{t-1}$	-1.488	0.471	-3.157*	0.006
$\Delta C$	12.832	3.024	4.243*	0.001
$R^2=0.939$	$R_d^2=0.873$	F-stat(10,15)=18.438(0.000)		

**Table 6:** ARDL (2,3,0,2,2) Error Correction Model Presentation

The coefficient of error correction term ( $ECT_{t-1}$ ) is determined as -1,488. The sign of the error correction term is negative and statistically significant as expected. The coefficient of the error correction variable is greater than 1 and this shows the system tends to equilibrium path by diminishing and fluctuating at every turn (Erden ve Saglam, 2009: 29; Karagol vd., 2007: 78; Paseran ve Paseran, 1997: 404). When the short run coefficients are analyzed, we see that all variables are statistically significant excluding non-infrastructural public investment ( $\Delta UPI$ ). Short run estimating results indicate that there is a complementary relationship between private investment and infrastructural public investment.

## Conclusions

In this study, total private investment, total infrastructural and non-infrastructural public investment, real GDP growth and the relationship among all these variables are estimated for the short and the long run, based on the Blejer and Khan Model (1984). The long run coefficients of all variables are positive in the ARDL model. The long run results show that the private investment is stimulated by the total infrastructural and non-infrastructural public investment. The empirical findings support that both of two descriptions of investment do not crowd out private investment, on the contrary they both crowd in (complement) private investment. Besides, we reach that the growth in private sector credits and the growth in GDP affect the private investment positively in the long run. These empirical findings are contrary to the studies for Turkey (Taban ve Kara, 2001; Yavuz, 2001; Ismihan vd., 2002; Simsek, 2003; Bilgili, 2003) but support the results of the studies of Yavuz (2005) and Kustepeli (2005) on the relationship between public and private investment.

Many of the variables excluding total non-infrastructural public investment in the short run ARDL model are statistically significant. The error correction term is negative and statistically significant and it shows there is an error correction mechanism. The lagged values of the private investment are positive and statistically significant and this finding supports the estimation results of Blejer and Khan Model (1984). The capital stock adjustment model implies that private investment adjusts the actual level of the capital investments to the optimal level. The other finding shows that in the short run there is a complementary relationship between private investment and current value of the total non-infrastructural public investment. The short run coefficient of total non-infrastructural public investment has a negative sign that means the non-infrastructural public investments crowd out the private investments in the short run.

The sustainability of the private sector investment and contributions of the private sector investment on GDP are possible with selective government policies. Creating a suitable investment environment, increasing the availability of credits and giving priority to the productive investments depend significantly on the coordination between private sector investments and government policies.

## References

- Ahmed H. and Miller S. (1999), "Crowding Out and Crowding-In Effects of the Components of Government Expenditure", Working Papers 1999-02, University of Connecticut, Department of Economics.
- Altunc, Ö.F., (2008), "Türkiye'de Finansal Gelişme ve İktisadi Büyüme Arasındaki Nedenselliğin Ampirik Bir Analizi", Eskişehir Osmangazi Üniversitesi İ.İ.B.F. Dergisi, 3(2), 113-127.
- Banerjee, A., Galbraith J. and Hendry D. (1993), *Cointegration, Error Correction and Econometric Analysis of Non-stationary Data*. Oxford Univ. Press, Oxford.
- Bilgili, F. (2003), "Dynamic Implications of Fiscal Policy: Crowding Out or Crowding In", Middle East Technical University-ERC, International Conference in Economics VII, "F5 Fiscal Policy, Public and Private Expenditures", METU, September 8.
- Blejer, M.I. and Khan M.S. (1984), "Government Policy and Private Investment in Developing Countries", IMF Staff Papers, Vol.31.
- Chhibber, A. and Wijnbergen S. (1988), "Public Policy and Private Investment in Turkey", Policy, Planning, and Research Working Papers, 1-26.
- Çağlayan, E. (2006), "Enflasyon, Faiz Oranı ve Büyümenin Yurtiçi Tasarruflar Üzerindeki Etkileri", Marmara Üniversitesi İ.İ.B.F. Dergisi, 21(1), 423-438.
- Erden, L. ve Sağlam G. (2009), "Türkiye'de Döviz Kuru Oynaklığının Sektörel İthalata Etkileri: Bir ARDL İthalat Modeli Analizi", Hacettepe Üniversitesi İ.İ.B.F. Dergisi, 27(2), 19-45.
- Faras, R.Y. and Ghali K.H. (2009), "Foreign Direct Investment and Economic Growth: The Case of the GCC Countries", International Research Journal of Finance and Economics, 29, 134-145.
- Ghali, K.H. (1998), "Public Investment and Private Capital Formation in a Vector Error Correction Model of Growth, Applied Economics, 30, 837-844.



- Ghura, D. ve Godwin B. (2000), "Determinants of Private Investment: A Cross Regional Empirical Investigation", *Applied Economics*, Vol.32, 1819-1829.
- Greene, J. and Villanueva D. (1991), *Private Investment in Developing Countries: An Emperical Analysis*, IMF Staff Papers, Vol.38.
- Gürgür, T. ve Karaca O. (2007), "Türkiye'de Reel Faiz Oranlarını Belirleyen Faktörler", *Uluslararası Ekonomi ve Dış Ticaret Politikaları*, 2(3), 1-32.
- Ismihan, M., Metin-Özcan K. ve Tansel A. (2002), "Macroeconomic Instability, Capital Accumulation and Growth: The case of Turkey 1963-1999", *Middle East Technical University- ERC, International Conference in Economics VII , Working Papers in Economics 02/04*.
- Karagöl, E., Erbaykal E. ve Ertuğrul H.M. (2007), "Türkiye'de Ekonomik Büyüme ile Elektrik Tüketimi İlişkisi: Sınır Testi Yaklaşımı", *Doğuş Üniversitesi Dergisi*, 8(1), 72-80.
- Karluk, R. (2001), *Türkiye'de Yabancı Sermaye Yatırımlarının Ekonomik Büyüme Katkısı (2001)*, *Ekonomik İstikrar, Büyüme ve Yabancı Sermaye*, TCMB İnsan Kaynakları Genel Müdürlüğü, Eğitim Müdürlüğü, 97-115.
- Kılıçbay, A. (1991), *Türk Ekonomisinin Son 10 Yılı*, Milliyet Yayınları, İstanbul.
- Kuştepli, Y. (2005), "Effectiveness of Fiscal Spending: Crowding out and/or crowding in?", *Celal Bayar University, Yönetim ve Ekonomi Dergisi*, 12(1), 182-192.
- Narayan, P.K. and Smyth R. (2006), "What Determines Migration Flows from Low-income to High-income Countries? An Empirical Investigation of Fiji-US Migration 1972-2001", *Contemporary Economic Policy*, 24(2), 332-342.
- Narayan, P.K. (2004), "Do Public Investment Crowd Out Private Investments? Fresh Evidence from Fiji", *International Economic Journal*, 12, 93-104.
- Narayan, P.K. (2005), "The Saving and Investment nexus for China: Evidence from Cointegration Tests", *Applied Economics*, 37, 1979-1990.
- Nazmi, N. and Ramirez M. (1997), "Public and Private Investment and Economic Growth in Mexico", *Contemporary Economic Policy*, 15, 65-75.
- Oshikoya, T.W. (1994), "Macroeconomic Determinants of Domestic Private Investment in Africa: An Emperical Analysis", *Economic Development and Cultural Change*, 42(3), 327-596.
- Pesaran, M.H., Shin, Y. and Smith R. J. (2001), "Bound Testing Approaches to the Analysis of Long Run Relationships", *Journal of Applied Econometrics*, Special Issue, Vol.16, 289-326.
- Pesaran, M.H. and Pesaran, B. (1997), *Working with Microfit 4.0, Interactive Econometric Analysis*, Oxford University Press, Oxford.
- Said, E.S. and Dickey D.A. (1989), "Testing for Unit Roots in ARMA(p,q) Models with Unknown p and q", *Biometrika*, No.71, 599-607.
- Serven L. and Solimano A. (1991), "Adjustment Policies and Investments Performance in Developing Countries; Theory, Country Experiences, and Policy Implications", Paper 606, World Bank Country Economics Department.
- Şimşek, M. (2003), "Kamu Harcamalarının Özel Yatırımlara Etkileri, 1970-2001", *C.Ü. İ.İ.B.F. Dergisi*, 4(2).
- Taban, S. ve Kara A. (2006), "Türkiye'de Kamu Kesimi İç Borçlanmasının Özel Yatırım Harcamaları Üzerindeki Etkisi", *Eskişehir Osmangazi Üniversitesi İ.İ.B.F. Dergisi*, 1(2), 11-26.
- Yavuz, N.Ç. (2005), "Türkiye'de Kamu Harcamalarının Özel Sektör Yatırım Harcamalarını Dışlama Etkisinin Testi (1980-2003)", *Marmara Üniversitesi İ.İ.B.F. Dergisi*, 20(1), 269-284.