Effectiveness of Fiscal Spending: Crowding out and/or crowding in?

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ABSTRACT

While the neoclassical school advocates that private investment is dampened by an increase in fiscal spending, an increase in the government spending stimulates private investment in the Keynesian model. The Ricardian Equivalence theorem argues that increases in deficit financed by fiscal spending leave private spending unchanged (Bahmani-Oskooee, 1999: 634). This study analyses the effectiveness of fiscal policy in the context of crowding out hypothesis for Turkey. Johansen cointegration test results verify both the Keynesian and neoclassical views for Turkey. While increases in government spending are found to crowd in private investment, government deficits are found to crowd it out.

Keywords: crowding out, fiscal spending, government deficits, private investment, cointegration.

Kamu Harcamalarının Etkinliği: Dışlama (crowding out) etkisi ve/veya crowding in etkisi?

ÖZET

Neoklasik görüş, hükümet harcamalarındaki bir artışın özel sektör yatırımlarını azaltacağını savunurken, Keynesyen modele göre kamu harcamalarındaki bir artış özel sektör yatırımlarını teşvik eder. Ricardo'nun Denklik Hipotezi ise hükümet harcamalarındaki artışla finanse edilen bütçe açıklarındaki artışın özel sektör yatırımlarını etkilemediğini savunmaktadır. Bu çalışma, dışlama etkisi çerçevesinde Türkiye'de maliye politikasının etkinliğini analiz etmektedir. Johansen koentegrasyon test sonuçları, Türkiye için hem Keynesyen hem de neoklasik görüşü doğrulamaktadır. Kamu harcamalarındaki artışların, özel sektör yatırımlarını artırdığını, hükümet açıklarındaki artışların ise özel sektör yatırımlarını azalttığı bulunmuştur.

Anahtar sözcükler: dışlama etkisi, kamu harcamaları, hükümet bütçe açıkları, özel sektör yatırımları, koentegrasyon.

I.   Introduction

Private investment is an important channel for the effectiveness of the fiscal policy in terms of increasing growth in the economy. Expansionary fiscal policy, by positively affecting private investment (crowding in) can lead to growth in total income of the country. However, it can also crowd out; i.e. decrease private investment by leading to an increase in interest rates.

The effect of fiscal policy on private investment, therefore, becomes crucial due to its relevance to sustained economic growth. The literature on this topic shows that the views on the validity of the crowding out or crowding in hypothesis are not unique.

While the neoclassical school advocates *crowding out*, the Keynesian model argues that an increase in the government spending stimulates the domestic economic activity and *crowds in* private investment. According to the Ricardian

Equivalence theorem, increases in deficit financed by fiscal spending will be matched with a future increase in taxes and so they leave interest rates and private investment unchanged (Bahmani-Oskooee, 1999: 633-634).

The Neoclassical view assumes full employment and advocates competitive markets against government intervention. The neoclassical loanable funds theory explains that the balancing of savings and investment will be solved by the "interest rate mechanism". The malfunctioning or slow operations of this mechanism are attributed to the short-term variations in employment and output (Grieve, 2004: 4). In case of an increase in government spending, interest rates have to increase to bring the capital market into equilibrium, dampening private investment (Beck, 1993: 167; Heijdra and Ligthard, 1997: 804; Voss, 2002: 642-643; Amirkhakhali vd., 2003: 1138-1139; Ganelli, 2003: 88).

The Keynesian view, on the other hand, assumes that there is unemployment in the economy and that the interest rate sensitivity of investment is low. In that case, expansionary fiscal policy will lead to little or no increases in the interest rate and increase output and income. In addition, this view assumes that government spending increases private investment due to the positive effect of government spending on the expectations of the investors. Therefore, there is crowding in rather than crowding out (Aschauer, 1989: 178-179; Baldacci, Hillman and Kojo, 2004).

The third view on the effect of government spending on private investment is the Ricardian Equivalence Theorem, which assumes that as asset holders completely discount future tax liabilities implied in the deficits, government debt is not considered wealth. This implies that budget deficits are irrelevant for financial decisions (Barro, 1974: 1096). In other words, according to this approach an increase in the budget deficits is expected to be accompanied by an increase in taxes in the future, if not today. Therefore, individuals considering their future income do not change their consumption and/or savings leaving interest rates and private investment also unchanged, which translates into no crowding out or crowding in effect of fiscal spending (Barro, 1978: 569-581; 1989: 37-54; Darrat and Suliman, 1991: 76; Ghatak and Ghatak, 1996: 278-279).

The aim of this study is to search the effectiveness of fiscal policy in the context of the validity of the crowding out hypothesis in Turkey in the long run. For this end, Johansen cointegration technique is applied to see whether real private investment decreases with an increase in fiscal spending.

The paper proceeds as follows: the second section describes the data and the empirical model; the third section reports the results of the empirical analysis. Conclusion and comments are provided in the fourth section.

II. The model and data

Cointegration tests provide valuable information about the relationships between variables, however they require that the variables are nonstationary and integrated of the same order. Therefore, augmented Dickey-Fuller test for unit roots is employed on all the variables with and without a trend term to determine

the time series properties of the variables for which appropriate test statistics and critical values provided by Dickey and Fuller (1979, 1981) are used.

If two or more non-stationary variables have the same number of unit roots, there might be a linear relationship between them that is stationary. If this is correct, these variables are said to be cointegrated and the linear combination is called the cointegrating vector. The Johansen likelihood procedure for the test of cointegration consists of the trace test and the maximum eigenvalue test. The trace statistics λ_{trace} tests the null hypothesis that the number of cointegrating vectors are less than or equal to r against a general alternative and the maximum eigenvalue statistics λ_{max} tests the null that the number of cointegrating vectors is r against an alternative of $r+1$ cointegrating vectors. With n variables, the number of cointegrating vectors r can at maximum be n-1.

The variables used in this study are fixed private investment, gross domestic product, government budget deficit, government spending and interest rate. The nominal interest rate used here is the savings deposit interest rate. All variables except the interest rate are deflated by the GNP deflator to get the real values. The real interest rate is set as 1 + nominal interest rate divided by 1 + inflation rate. The inflation rate is computed by taking the percentage change in the GNP deflator. All of our variables are annual and obtained from the State Planning Organization of Turkey. All calculations are done using the computer package program MFIT4.0 by Pesaran and Pesaran (1997).

In order to test the effectiveness of fiscal spending in the crowding out context, we use two fiscal variables: government spending and government budget deficit. The latter is multiplied by –1 and measured as positive numbers in this paper. So, two models are estimated; one using the government spending, the other using government budget deficit in the equation among real income and real interest rate:

Model (1):   RPINV = f (RINTRATE, RINC, RGOVSPN)
Model (2):   RPINV = f (RINTRATE, RINC, RGDEF)

where RPINV represents real private investment, RINTRATE real interest rate, RINC real income (gross domestic product), RGOVSPN real government spending and RGDEF real government deficit. The time period is 1967-2003 for model (1) and it is 1963-2003 for model (2).

As the theory suggests, we expect real private investment to decline with increases in real interest rate and increase with increases in real income. As for real government deficit and real government spending, a negative effect on real private investment indicates crowding out and a positive effect indicates crowding in.

187

III. Empirical Results

The results of the Augmented Dickey Fuller (ADF) test are shown in Table 1. It can be seen that all of the variables are integrated of order, I(1) and this means that all variables can be included in the Johansen cointegration tests.

Before starting the Johansen cointegration technique, the number of lags to be used in this analysis must also be determined. The Log-Likelihood ratio and Akaike's Information Criteria are used to select the order of the VAR model. For model (1) including government spending, both Log-Likelihood ratio and Akaike's Information Criteria choose two lags whereas for model (2) including government deficit, they indicate only one lag. Having few lags is actually an expected result, as our data is annual. We use the Johansen cointegration specification that includes a time trend in the cointegrating vector. The results of Johansen cointegration analysis for both models are shown in Tables 2 and 3.

Table 1. ADF test for the (non) stationarity of the variables

	Calculated ADF statistics			
	Level		*First differences*	
Variable	*No trend*	*Trend*	*No trend*	*Trend*
real private investment (RPINV)	-1,01 (6)[1]	-2,05 (6)	-6,53*(6)	-6,46*(6)
real interest rate (RINTRATE)	-2,81 (4)	-2,73 (4)	-7,03*(2)	-7,01*(2)
real gross domestic product (RINC)	0,77 (6)	-2,26 (6)	-8,77*(6)	-9,06*(6)
real budget deficit (RGDEF)	-0,65 (6)	-2,14 (6)	-7,85*(6)	-7,97*(6)
real government spending (RGOVSPN)	-2,06 (6)	-2,33 (6)	-7,45*(6)	-7,46*(6)

[1]The numbers in the parentheses are the number of lags in the ADF test.
*Indicates %1 significance.

188

Table 2. Johansen Cointegration Analysis for model (1)

Variables: RPINV, RINTRATE, RINC, RGOVSPN				
H_0	*H_1*	*λ-max*	*95 % critical value*	*90 % critical value*
r = 0	*r = 1*		31,79	29,13
		44,60[**]		
r <= 1	*r = 2*	14,54	25,42	23,10
r <= 2	*r = 3*	9,41	19,22	17,18
H_0	*H_1*	*λ-trace*	*95 % critical value*	*90 % critical value*
r = 0	*r >= 1*	74,31[**]	63,00	59,16
r <= 1	*r >= 2*	29,71	42,34	39,34
r <= 2	*r >= 3*	15,16	25,77	23,08

[**]indicates %5 significance

Table 3. Johansen Cointegration Analysis for model (2)

Variables: RPINV, RINTRATE, RINC, RDEFICIT				
H_0	*H_1*	*λ-max*	*95 % critical value*	*90 % critical value*
r = 0	*r = 1*	41,73[**]	31,79	29,13
r <= 1	*r = 2*	17,08	25,42	23,10
r <= 2	*r = 3*	8,05	19,22	17,18
H_0	*H_1*	*λ-trace*	*95 % critical value*	*90 % critical value*
r = 0	*r >= 1*	71,38[**]	63,00	59,16
r <= 1	*r >= 2*	29,66	42,34	39,34
r <= 2	*r >= 3*	12,57	25,77	23,08

[**]indicates %5 significance.

Both maximum eigenvalue and trace tests find one cointegrating vector between the variables in both of the models. The long run cointegrating relationships are given below. The numbers in the parentheses are the χ^2 values of the likelihood ratio test based on the eigenvalues of unrestricted and restricted cointegrating vectors. They indicate whether the coefficient of each variable in the cointegrating vectors could be restricted to zero. The critical χ^2 values with one degrees of freedom (the number of cointegrating vectors) at 1 % and 5 % respectively are 6.63 and 3.84.

Model (1):
RPINV=
-25.75(RINTRATE) + 0.23(RINC) + 0.0012(RGOVSPN) - 2.79 (TREND)
(-19.19)   (10.33)   (20.53)   (-4.98)

Model (2):
RPINV=
 -8.96 (RINTRATE) + 0.57 (RINC) - 0.0075 (RGDEF) - 7.67 (TREND)
(-2.12)   (32.32)   (24.12)   (26.92)

It can be seen that in both models, all of the variables are statistically significant except for the real interest rate in the second model. The coefficient of the real interest rate is negative as expected in both models. However, in addition to being only statistically significant at 1 % in the model with real government spending, this effect in the second model is lessened by two-thirds of the first model. This finding for real interest rate for model (2) with real government deficit in the equation is probably due to the fact that real government deficit includes already the effect of interest rate on private investment.

Real income is found to affect private investment positively as expected, being statistically significant at 1 % in both models. In a similar way as the effect of real interest rate, the effect of the real income on real private investment is 2.5 times greater for model (2) with real government deficit compared to the first model. This also can be explained as the real government spending entailing most of the effect of real income on real private investment.

Regarding the crowding out hypothesis, the effects of government spending and government budget deficit are found to be different. While real government spending <u>crowds in</u> real private investment approving the Keynesian model, real government deficit <u>crowds out</u> real private investment asserting the neoclassical argument. Both of the effects are significant at 1%. It can be seen that the crowding out effect of real government deficit (0.0075) is six times greater on private investment than the crowding in effect of real government spending (0.0012).

According to the findings, real government spending in Turkey is a stimulator for private investment. This positive effect can be further enhanced if government budget deficit is reduced and if government spending is directed to fields where it acts as a complement to private investment.

IV. Conclusion

This study analyses the effectiveness of fiscal policy in the context of crowding out hypothesis in Turkey in the long run. Augmented Dickey Fuller unit root test and Johansen cointegration technique are applied to two models; one using government spending, the other using government deficit in addition to interest rate and income.

The results show that there is a negative relationship between real private investment and real interest rate and that there is a positive relationship between real private investment and real income.

As for the crowding out/crowding in debate, our results verify both the Keynesian and the neoclassical view for Turkey. While increases in government

spending are found to crowd in private investment, increases in government deficit crowd out private investment in the long run. Taken together, the crowding out effect overweighs the crowding in effect.

Despite its record of high inflation, Turkey has experienced usually positive and high growth rates in real income, except a couple of years of financial crises. Therefore, the positive effect of fiscal spending on private investment is expected on the following grounds.

Investment, especially that for infrastructure is mostly undertaken by public sector in Turkey which finances investment either through loans from international agencies or through borrowing from the domestic market. While the former implies insensitiveness to market incentives (for example, interest rate), the latter leads to price instability. However, Turkish economy has a developing but fragile and imperfect financial market and the availability of credit is insufficient for private investment facing liquidity constraints and differential borrowing rates. In this sense, public and private investments probably act as complements in Turkey; fiscal spending having a stimulating effect on private investment.

On the other hand, government deficits have always been an issue of debate due to their proven positive effects on inflation. This study provides an additional finding on the adverse effects of high government deficits. Obviously, expansionary fiscal policy would be more effective on economic growth if government deficits were reduced.

It can be concluded that fiscal *spending* (unless it leads to deficits) is effective in Turkey in terms of increasing private investment and therefore increasing real income in the country. Expansionary fiscal policy would be at most effective if aimed at increasing government spending in the sectors where private sector does not find profitable and where public and private investment are complements to each other.

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