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ÖZGÜN ARAŞTIRMA

Investigating Crowding-Out Effect Of Government Expenditures: Evidence From Turkey

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Abstract

The purpose of this article is to investigate the effect of government consumption and investment expenditures on private sector investment in the Turkish economy. In this study, the Cointegration Vector Autoregressive Model based on 1980-2018 data has been used. The results of the cointegration vector obtained from the Johansen Cointegration Test show that during the period under review, government investment expenditures are complementary and incentive and government consumption expenditures are competitive with private investment expenditures. Based on the results, it is suggested that to economic prosperity and development in various economic sectors, the government should undertake infrastructure expenditures.

Keywords: *Private Sector Investment, Public Sector Consumption Expenditures, Public Sector Investment Expenditures, Cointegration*
JEL Codes: *C32, E22, H54*

Kamu Harcamalarının Dışlama Etkisinin İncelenmesi: Türkiye Örneği

Özet

Bu makalenin amacı, kamu tüketim ve yatırım harcamalarının Türkiye ekonomisindeki özel sektör yatırımları üzerindeki etkisini incelemektir. Bu çalışmada 1980-2018 verilerine dayalı Eşbütünleşme Vektörü Otoregresif Model kullanılmıştır. Johansen Eşbütünleşme Testi'nden elde edilen eşbütünleşme vektörünün sonuçları, incelenen dönemde kamu yatırım harcamalarının birbirini tamamlayıcı ve teşvik edici olduğunu ve kamu tüketim harcamalarının özel yatırım harcamaları ile rekabet halinde olduğunu göstermektedir. Sonuçlara göre, çeşitli ekonomik sektörlerde ekonomik refah ve kalkınma için hükümetin altyapı harcamalarını üstlenmesi önerilmektedir.

Anahtar Kelimeler: *Özel Sektör Yatırımları, Kamu Sektörü Tüketim Harcamaları, Kamu Sektörü Yatırım Harcamaları, Eşbütünleşme*
Jel Kodu*: C32, E22, H54*

1. INTRODUCTION

One of the most important components of aggregate demand in macroeconomics is private invest whose fluctuations cause instability of the whole economy. Private sector economic activity is a topic that has been at the center of the economic debate in developing countries in recent decades and the impact of government expenditures on private sector investment has been one aspect of researchers. Given the importance of private investment in the economy, it is not surprising that economic policymakers are very interested in explaining private investment behavior. This argument has come to the attention of economists in recent years for two reasons. On the one hand, almost from the 1980s, there was a global consensus on adopting a growth strategy with an emphasis on private sector leadership. On the other hand, in academia, the introduction of the role of private sector investment in macroeconomics by economists gained support.

To determine the effect of public expenditures on private sector expenditures, it is necessary to classify different types of expenditures. Expenditures made by the public sector in areas such as education, infrastructure,

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research, and development can increase the productivity of the private sector. The effect of public expenditure on increasing the marginal productivity of the private sector is complementary to private sector investment expenditures and has the effect of attracting the private sector (crowding-in). If public expenditures are realized in sectors such as food, housing, and health services, it will cause the private sector investments to shrink with the effect of crowding out due to its substitution feature for the private sector in these areas (Monadjemi and Nuh, 1998: 93-94).

Normally, in most economies government expenditures are divided into two distinct categories that one of them has a consumption character and the other has an investment character. These expenditures are called current expenditures and construction costs in the calculation of the government budget and called consumption expenditures and investment expenditures in the calculation of national income from the method of expenditures. Accordingly, the focus of the present study is the impact of government consumption and investment expenditures on private sector investment. For this purpose, after presenting theoretical foundations and empirical studies, a model for Turkish private sector investment has been designed and tested.

This article aims to examine the effects of public consumption and public investment expenditures on private sector investments in the Turkish economy. Cointegration Vector Autoregressive Model based in 1980-2018 data is used in the study. The results of the cointegration vector obtained from the Johansen Cointegration Test will show that public investment and consumption expenditures are complementary or competitive with each other in the period under review. The results will suggest what expenditures should be undertaken by the government for economic welfare and development in various economic sectors.

2. LITERATURE

From the Monetarist point of view, if government expenditures increase, they will replace private sector expenditures after a relatively short period of time, and the overall effect is that corporate investment in machinery and equipment will decrease. Increasing government expenditures without changing the money supply increases demand for the product and increases revenue, thereby increasing the trading demand for money. If the money supply is stable, an increase in the trading demand for money and an increase in the amount of debt market will raise interest rates. Rising interest rates reduce companies' costs in machinery and equipment, construction, and durable goods. Accordingly, an increase in public sector expenditures inevitably affects private sector expenditures; unless the money supply increases in the equivalent.

According to Keynes, assuming that there is unemployment in the economy and low investment sensitivity to interest rates, expansionary fiscal policy, despite the effect of crowding out, leads to a slight increase in interest rates and increases production and income. In addition, Keynes assumes that government expenditures increase private investment because of the positive effect it has on investor expectations. Therefore, according to this view, not only is there no substitution relationship, but a complementary relationship is established. The Keynesians only agree with the Monetarist theory of substitution if the economy is at the full employment level (Mishkin, 2011).

Various researches have been done in the field of private investment theories and models, most of which are related to advanced economies. Advanced economies rely heavily on market economics, and this is one of their salient features. However, the economies of developing countries have features that distinguish them from developed countries. These countries mainly have structural economic problems that make the application

of classical economic theories in these countries difficult. Despite the conditions that make the flexible acceleration inappropriate for developing countries (existence of full investment market assumptions and low government investment, lack of statistics for some variables in this model such as investment stock, real wages, etc.) (Koyck, 1954: 34-37), most research on private sector investment in these countries is a modified version of the flexible acceleration model. Accordingly, research in developing countries has tried to modify the model variables in a way that does not interfere with the model framework. Numerous factors such as monetary, financial, political, and structural variables affect the private investment process of each country, in general in developing countries; private investment is affected by the following variables:

- ✓ In empirical studies related to private sector investment in industrialized and developing countries, the relationship between private investment and GDP, national income, per capita income, etc. has been confirmed which is derived from the theoretical topics of investment. What is most emphasized is the relationship between private investment and aggregate demand, which fits into the theory of the principle of acceleration.

- ✓ An important variable that undoubtedly has an important impact on private sector investment is the credit of the banking system. This variable indicates the private sector's access to financial and credit resources. In developed countries, there are extensive financial markets (money and investment markets) as well as advanced stock markets and many investment companies which finance investment projects and diminish the role of the money market and banks in this regard, so the bank loans and credits can not be considered as an influential variable on private sector investment. However, due to the lack of investment markets and the lack of expansion of the stock market, companies, and economic institutions in developing countries, it is not possible to provide investment resources for economic institutions from the investment market and to issue shares and participation bonds in an acceptably also, unlike the complete replacement of the money and investment markets in developed countries, in developing countries, money and investment are complementary. That is, financing projects from within the firm (internal dividends) and financing from outside sources (stocks and credits) are not perfect substitutes for each other, and resources outside the firm will be a conduit for investment accumulation.

- ✓ The impact of government expenditure on private sector investment includes examining the impact of government expenditure and investment expenditure:

Since productive activities such as the garment industry and small industries can also be done by the private sector, if the government invests in these activities, then the government will act as an alternative to the private sector and as a result, the return on private investment will decrease (Blejer and Khan, 1984: 383). But if the government invests in public goods such as the construction of airports, highways, ports, roads, etc., it will complement private sector investment and reduce the problems associated with private sector activities (Strauss, 1999: 198). If such expenses are not covered by the government, many economic activities of the private sector will not be carried out, and if they are done, it will be very expensive, and doing by the government will reduce the cost of private sector production. Also, government investment expenditures enter the market in various forms in the form of demand for goods and services which if there are no structural bottlenecks in production, will increase production, income and, private sector investment (Blejer and khan, 1984: 384). Government expenditures have a negative impact due to the lack of community resources

such as skilled labor, raw materials, and financial credit.

As regards whenever the government appropriates the factors of production, such as investment and manpower, the pressure on the market of factors of production increases and causes the increase of production costs in the private sector and reduces the incentive to invest (Green and Villanueva, 1997: 318-319).

In the case of variables that indicate the cost of using investment or the cost of investment opportunities, we can refer to interest rates and inflation rates. In studies, despite confirming the significant effect of interest rates on private investment, in some cases, it has been suggested that the main constraint on private sector investment in developing countries is not the cost of investment and interest rates, but it is the number of financial resources and access to credit (Ott and Soreiz, 2006: 15). In the case of Turkey, interest rates do not justify investment behavior. Because in Turkey and other developing countries, the interest rate of the banking system is controlled by the government and the political system and is determined bureaucratically and interest rates have nothing to do with market forces, Therefore, interest rates cannot be used as investment opportunity costs. According to previous studies, the inflation rate is used instead of the interest rate index, which seems to be a good indicator in this regard (Erenburg, 1993: 834).

In the field of the impact of government consumption and investment expenditures on private sector investment, several empirical studies have been conducted in this sector that has been studied in other countries and Turkey.

Preliminary studies on the relationship between government expenditure and private investment go back to Bailey's (1971) and Buiter's (1977) early work. The importance of government expenditures on private investment seems to have been overlooked for a long time and when it was raised, it was met with widespread reaction from economists. While the theory of substitutability between private investment and government expenditures has been endorsed by Barro (1981), Baily (1971), and Monadjemi (1993), the theory of complementarity has been strongly endorsed by Aschauer (1989), Erenburg (1993) and Karras (1994).

Sundarajan and Thankur (1980), Tun Wai and Wong (1982) investigate public and private investment relationships for India, Korea, Greece, Malaysia, Mexico, and Thailand. They believe that coercive replacement can occur both through increased government expenditure which raises interest rates and reduces private sector investment and through some resource allocation and quota mechanisms. The complementary effect of government investment has also been confirmed and the replacement effect as well only existed financially. Blejer and Khan (1984) identified private sector investment as influenced by three factors: trade fluctuations, financing, and government development expenditure. The test results for 24 developing countries confirm the complementary effect of government investment expenditures on private sector investment. Bairam and Ward (1993) examine the increase in government expenditure on private sector investment in OECD countries. They introduce private sector investment as a function of GDP and government expenditure and conclude that increasing government expenditures have an alternative effect on private sector investment. Erenburg (1993) considered private sector investment to be influenced by public sector investment, budget deficit, and production capacity and showed that the effects of government investment expenditures on private sector investment in the United States are statistically positive and significant. Mamatzakis (1996) examines the impact of government expenditure on private investment in Greece. This study considers private investment to be affected by GDP, corporate profits, government investment expenditures, and government consumption expenditures. According to the findings, government

investment expenditures have a positive effect, and government consumption expenditures hurt private investment. Strauss (1999) examines the cost and financing aspects of government for 64 industrialized and developing countries. According to the estimates, government investment expenditures on private investment have a positive effect in developing countries and a negative effect in industrialized countries. Lizal and Svejnar (2002) have investigated the effect of GDP and corporate profits on private investment in the Czech Republic. The results show that the effect of GDP on private investment is consistent with the principle of acceleration. Sun G (2005) examines the impact of government investment expenditure on private sector investment in Korea. According to his estimates, government investment expenditure has a positive effect on private sector investment. Schclarek (2007) conducted a panel study for 40 industrial and developing countries. The results showed the complementarity relationship between public expenditure and private investment. Based on a study conducted by Kollaparambil and Nicolau (2011) in South Africa, they concluded that government expenditure had a positive and significant effect on private investment. Mahmoudzadeh and Sadeghi (2013) with a study for developing and developed countries concluded that the elasticity of private investment is positive for both developing and developed countries. Sineviciene (2015) through the analysis of panel data for Slovenia, Latvia, Bulgaria, Lithuania, and Estonia concluded that the negative impact of government expenditures on private sector investment was greater than its positive impact. Dreger and Reimers (2016) examine the long-term relationship between public sector investment and private sector investment in European countries. The results show that reduced public sector investment reduces private sector investment in European countries. Bahal, Raissi, Tulin (2018) examine the relationship between public and private investment in India. The results show that public sector investment encourages private sector investment in India.

Examining the studies carried out for Turkey will also be useful in terms of giving the right idea to the study. For this purpose, studies examining the relationship between public expenditures and private sector investments for Turkey are summarized in Table 1.

Table 1: Studies For Turkey

Author	Period	Results
Şimşek (2003)	1970-2001	Public investment expenditures have a crowding-out effect on private investment
Erden (2005)	1968-1998	Public investment expenditures have a crowding-out effect on private investment
Başar and Temurlenk (2007)	1980-2005	Public investment expenditures have a very low crowding-out effect on private investment
Altunç and Şentürk (2010)	1980-2009	Public investment expenditures complement private sector investments
Cural et al. (2012)	1970-2009	Public investment expenditures have an attractive effect on private investment
Altunöz (2013)	1989-2004	Public investment expenditures have a crowding-out effect on private investment
Çelik (2016)	1975-2013	Public investment expenditures increase private sector investment
Kaytancı (2017)	1985-2016	Public investment expenditures have a crowding-out effect on private investment

3. INTRODUCING THE RESEARCH MODEL

In the present study using the Mamatzakis model, the standard model of private investment has been modified in such a way that the variables affecting private investment in the Turkish economy are included in the model. The model is as follows:

$$LPI = \beta_0 + \beta_1 LGDP + \beta_2 LBC + \beta_3 LGI + \beta_4 LGC + \beta_5 LP + \varepsilon \quad (1)$$

The discussed variables are considered as follows:

LPI Logarithm of private investment

LGDP Logarithm of GDP

LBC Logarithm of the rate of facilities granted by the banking network to the private sector

LGI Logarithm of public sector investment expenditures

LGC Logarithm of public sector consumption expenditures

LP Logarithm of the inflation rate

ε: Error Term

β_0: Intercept

The time series of the present study is extracted from the statistical series of the Central Bank of the Republic of Turkey for the years 1980-2018. [1]

3.1. Estimation

Johansen Cointegration Test was used to estimate the relationship between variables. Using of traditional methods in econometrics is based on the assumption of the reliability of variables. Studies in this area show that for many macroeconomic time series, this assumption is incorrect and most of these variables are non-stationary. Therefore, according to cointegration theory, it is necessary to ensure their stationary or non-stationary to avoid the problem of fake regression in regression analysis. For this purpose, time series variables are tested by the Dickey-Fuller Unit Root Test (ADF) and their accumulation rank is determined. The final results of this test are reflected in Tables 2 and Table 3 for the data level and their first-order difference.

Table 2: ADF Unit Root Test Results (Level Value)

Model	Non-Trended with Fixed		Trended with Fixed	
Variable	ADF statistic	Critical Value	ADF statistic	Critical Value
LPI	-0.57	-2.97	-2.72	-3.58
LGDP	-0.61	-2.97	-2.56	-3.58
LBC	-0.49	-2.97	-1.65	-3.58
LGI	-0.78	-2.97	-1.87	-3.58
LGC	-0.58	-2.97	-1.92	-3.58
LP	-0.48	-2.97	-1.70	-3.58

Table 3: ADF Unit Root Test Results (First Differences)

Model	Non-Trended with Fixed		Trended with Fixed	
Variable	ADF statistic	Critical Value	ADF statistic	Critical Value
LPI	-4.21	-2.97	-4.55	-3.58
LGDP	-3.22	-2.97	-4.25	-3.58
LBC	-3.70	-2.97	-4.45	-3.58
LGI	-3.62	-2.97	-4.38	-3.58
LGC	-3.59	-2.97	-4.65	-3.58
LP	-3.61	-2.97	-4.74	-3.58

All variables used in the model are non-stationary at the data level (with time trend and without time trend) and the absolute value of the calculated generalized Dickey-Fuller

[1] The data used in this article were collected in 2019.

statistic is smaller than the critical McKinnon values. Therefore, for all variables, the null hypothesis that there is a unit root at the 95% confidence level can not be rejected. By repeating this test for data difference, it becomes clear that all variables are stationary after one time difference, and the null hypothesis that there is a unit root of data difference and non-stationary is rejected so, the opposite hypothesis is accepted at 95% confidence level (with time trend and without time trend). According to this test, all variables included in the model are accumulated from the first degree, I(1).

The next step is to determine the optimal interrupt of the VAR model. This step is one of the main steps in estimating the cointegration model based on the VAR model. The optimal interrupt determination of the VAR model is done to ensure the significance of the determined model. In this research, the Schwartz-Bayesian criterion has been used to determine the optimal number of interruptions. Due to the output related to determining the optimal degree of the VAR model, the highest value of the Schwartz-Bayesian standard is 53.2365, which indicates the first degree.

3.2. Determine The Appropriate Model

In Johansen's method, the necessity of entering definite variables such as width from the origin and trend in vectors is determined by determining the rank of the matrix of long-term coefficients. The maximum eigenvalue statistic was used to determine the appropriate model with which the cointegration test should be performed. The final results of this test are shown in Table 4.

Table 4: Determine The Appropriate Model

H_0	H_1	Model 1	Model 2	Model 3	Model 4	Model 5
r=0	r=1	64.64 (45.37)	64.91 (49.63)	56.55 (48.93)	62.10 (52.71)	57.11 (51.77)
r<=1	r=2	39.16 (38.99)	50.12 (43.14)	36.17 (42.74)	40.47 (46.96)	38.77 (46.17)
r<=2	r=3	31.91 (32.92)	34.91 (37.37)	33.36 (36.52)	33.92 (40.89)	33.90 (40.41)
r<=3	r=4	26.95 (26.78)	31.68 (31.14)	27.87 (30.22)	27.93 (34.52)	*26.35* (*33.45*)
r<=3	r=5	25.49 (21.13)	25.41 (24.97)	17.93 (23.88)	19.87 (28.32)	*15.48* (*27.43*)
r<=5	r=6	13.72 (13.26)	13.99 (18.26)	11.22 (17.17)	15.71 (21.49)	*14.91* (*20.46*)

In the third model, the statistical quantity of the maximum eigenvalue is 36.17, which is less than the critical value at the level of 95% (42.74). Therefore, the null hypothesis is accepted in the third model and the cointegration test is performed with the mentioned model.

3.3. Cointegration Vectors

To find the number of cointegration vectors, two statistics of the maximum eigenvalue (λ max) and effect statistics (λ trace) can be used. The results are presented in Table 5 and Table 6.

Table 5: Maximum Eigenvalue Statistics (λmax) Results

H_0	H_1	λ_{max}	Critical Value %95	Critical Value %90
r=0	r=1	38.3454	31.1900	29.3200
r<=1	r=2	17.3222	20.2500	19.3400
r<=2	r=3	13.3442	17.2300	15.3200
r<=3	r=4	9.2440	11.2100	10.6500
r<=4	r=5	8.3091	10.6700	9.4500
r<=5	r=6	5.5602	7.3400	6.2700

These statistics confirm the existence of one co-accumulated vector (r = 1). Because the quantity of the statistics is λ max = 17.3222 and λ trace = 14.1232 which are smaller than the critical values at the level of 95% and 90%. In other words, there is one linear combination of stationary model variables.

Table 6: Trace Statistic (λtrace) Results

H_0	H_1	λ_{trace}	Critical Value %95	Critical Value %90
r=0	r=1	26.4356	21.1200	18.4500
r<=1	r=2	14.1232	16.4300	15.6800
r<=2	r=3	9.5576	12.7600	11.6500
r<=3	r=4	7.3221	9.1400	8.5500
r<=4	r=5	5.5434	7.3400	6.5400
r<=5	r=6	4.5976	6.5300	5.9100

Because the purpose is to examine the effect of government expenditure on private investment, the normalization of the resulting vector is based on private sector investment. Nonnormalized and normalized integration vectors are presented in Table 7.

Table 7: Non-Normalized and Normalized Vectors

Vectors	Non-Normalized Vector	Normalized Vector
Intercept	2.2731	-3.3121
LPI	0.5232	1
LGDP	1.0823	-2.2723
LBC	0.4721	-0.9732
LGI	0.4321	-0.8920
LGC	-0.8732	0.9721
LP	-0.2531	0.4925

Therefore, the normalized vector is presented as follows:

LPI = 3.3121 + 2.2723 LGDP + 0.9732LBC + 0.8920 LGI - 0.9721 LGC - 0.4925 LP

(1.2530) (0.4965) (0.2432) (0.1290) (0.5723) (0.1450)

The values in parentheses are the standard deviation values. By dividing the coefficients of the variables by the standard deviation, the statistical values of the t-test are obtained which show the significance of the coefficients of the variables at the level of 95%. Therefore, it can be claimed that the vector is unique and concepts related to long-term economic relations can be deduced from that vector.

3.4. Interpretation Of Results

Based on the estimated relationship, the following economic results can be interpreted:

The elasticity of private sector investment expenditures to GDP, in the long run, is 2.2723; in other words, a one percent increase in GDP will cause 2.2723 percent increase in private investment expenditure. The positive relationship between private sector investment and GDP has been confirmed and the improvement of economic conditions will increase private investment (acceleration principle). In other words, as much as the country's economic growth is at a desirable level, investors will make new investments to benefit from the market situation and private sector investment will increase.

The elasticity of private sector investment expenditures to the rate of credit granted to the banking network, in the long run, is 0.9732; in other words, one percent increase in the credit rate of the banking system will cause 0.9732 percent increase in private investment. Since the main framework of the financial market in developing countries is the money market, the rate of banking network facilities has a positive impact on private sector investment. This coefficient indicates the important role of the banking network in financing private sector investment. This ratio encourages private investment authorities to increase lending to banks. Increasing lending to banks will continue the process of private investment in the country, and as a result will lead to economic growth and development, and thus reduce unemployment and increase employment.

The elasticity of private sector investment expenditures to government investment expenditures, in the long run, is 0.8920; in other words, a one percent increase in government investment expenditures in the machinery and construction sector causes 0.8920 percentage increase in the private sector investment. In other words, government investment expenditures can complement private sector investment for the following reasons:

- ✓ The side effects of government investment expenditures on infrastructure increase productivity or reduce production costs or reduce transaction costs and increase private sector investment.
- ✓ Government investment expenditures increase the demand for private sector products and consequently the investment of this sector increases.
- ✓ Government investment expenditures increase gross domestic product and national savings, provide financial resources to the economy and ultimately the private sector thus increases investment in the private sector.

In general in Turkey, government investment expenditures on machinery and construction help to facilitate private sector activities. Also, given the government's financial capacity, these investments are made only by the government and can not be considered a forced alternative to public sector investment instead of private sector investment but it has had a positive and complementary effect on private sector investment and it supports and expands the private sector and it even increases the return on investment of the private sector. Accordingly, the government with its investment expenditures on infrastructure provides the ground for private sector investment and strengthens it.

The elasticity of private sector investment expenditure relative to government consumption expenditure, in the long run, is -0.9721; in other words, a one percent increase in government consumption expenditure will reduce the investment sector expenditure by 0.9721 percent. This shows that government consumption expenditure negatively affects the ability and decision to save and thus the ability to build private sector investment and it limits the investment of this sector. Rising government consumption expenditure has reduced private sector savings and as a result, it reduces the financial resources to use the private sector. Also, government consumption expenditure has a bureaucratic aspect that does not help increase private sector investment. In other words, government consumption expenditure is competitive with private investment expenditure.

The elasticity of private sector investment expenditures to the long-term inflation rate is -0.4925; in other words, a one percent increase in inflation, causing 0.4925 percentage reduction of private sector investment costs.

An increase in the price of investment goods, on the one hand, increases the value of the final output of the investment and encourages investors to increase investment and on the other hand, reduces the nominal interest rate whether the negative or positive effect of inflation on private sector investment depends on the outcome of these two effects. Given that

the effect of inflation on private sector investment in this study is negative, it can be said that the decrease in nominal interest rates was greater than the increase in the value of the final output of the investment. Also, the inflation rate is one of the most important factors determining the bank interest rate and whenever inflation has an upward trend, the nominal interest rate has also increased and it leads to higher production costs and reduced incentives for private sector investment. Considering that the cost of using investment goods for each period of its life consists of three components: the interest, rate of investment goods, their depreciation rate, and the change in the price of these goods therefore inflation will increase production costs by increasing interest rates, investment opportunity costs, and investment depreciation costs and will hurt private sector investment. Also, the increase in the price of investment goods has a direct effect on the cost of using investment because price increase is considered a return on investment which is a negative cost and will affect private sector investment.

3.5. Error Correction Model Estimation

To investigate the short-term deviation of the variables from their equilibrium values, an error correction model is set and estimated for the long-run relationship. In other words, the error correction model has been used to estimate short-term and long-term relationships. The error correction mechanism is an adjustment process that combines the dynamic motion of variables with their equilibrium relationship. That is, changes in the dependent variable are explained by changes in the explanatory variables as well as the imbalance of the previous period. Pesaran and Shin (1999) showed that estimates using this method for smaller sample sizes are less biased and more efficient.

In this model, short-term fluctuations of variables are related to their long-term values. The error correction parameter is expected to be statistically significant and negative. The results are presented in Table 8.

Table 8: ECM for Variable LPI Estimated By OLS Based on Cointegrating VAR(1)
Dependent variable is dLPI 39 observations used for estimation from 1980 to 2018

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.9721	.98604	-2.0000[.055]
ecm1(-1)	-.49330	.11362	-2.1772[.038]
List of additional temporary variables created: dLPI = LPI-LPI(-1) ecm1 = 1.0000LPI -2.2723LGDP -.9732LBC -.8920LGI +.9721LGC +. 4925LP			
Diagnostic Tests			
Test Statistics	LM Version		F Version
A:Serial Correlation CHSQ(1) = 2.1907[.139]	F(1, 13) = 1.9910[.169]		
B:Functional Form CHSQ(1) = 1.5370[.215]	F(1, 13) = .88949[.363]		
C:Normality CHSQ(2) = .87892[.644]	Not applicable		
D:Heteroscedasticity CHSQ(1) = .0019200[.965]	F(1, 22) = .0017602[.967]		

A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values

According to the test results of the error correction model, since the error correction coefficient is -0.49, the error correction mechanism works and the imbalance that occurs in one period will be corrected in the next period. The result of the error correction model for the private sector investment function shows that in each period, 49% of the

short-term equilibrium of private sector investment is adjusted to achieve long-term equilibrium. Therefore, the long-term relationship is consistent with the model established for the relevant period, and this indicates that when there is a deviation from the balance, it will return to equilibrium in the long run. The effect of a shock entering the system will disappear after 1/0.49 = 2.04 periods. When we look at the diagnostic tests, the correlation is insignificant compared to both the F version (1%) and the LM version (5%). So there is no autocorrelation. Similarly, the functional form is insignificant (no issue); normality is insignificant (no issue) and heteroscedasticity is insignificant (no issue)

too. Hence, there is no apparent issue with this model.

4. CONCLUSIONS AND POLICY SUGGESTIONS

As regards, in developing countries the government has a decisive role in the formation of fixed investment, and government consumption and investment expenditures do not have the same impact on private investment, therefore, in this study, to investigate the effect of government consumption and investment expenditures on private sector investment in the Turkish economy, a long-term relationship between private sector investment, and government expenditures has been obtained. In this regard, private investment as a dependent variable and GDP, banking network facilities to the private sector, government consumption and investment expenditures, and inflation rates are independent variables. The results show that government investment expenditures have a positive and complementary effect on private sector investment and are a powerful tool for economic policy while government expenditure is competitive with private investment expenditure.

Because the research model is logarithmic, the estimated coefficients show the attractiveness of private investment relative to the independent variables. Accordingly, the highest elasticity of private investment is concerning to GDP and the least elasticity is with inflation.

The results of Johansen cointegration method estimation showed that public investment had a positive and significant effect on private investment. This means that an increase in public investment leads to an increase in private investment, which indicates a complementary relationship. This result is consistent with Keynesian theory. Assuming that there is unemployment in the economy and low investment sensitivity to interest rates, Keynes believes that expansionary fiscal policy leads to a slight increase in interest rates and ultimately increases productivity. Considering the positive effect of public investment on private investment, it can be concluded that public investment has acted as a complement to private investment and has expanded the infrastructure and thus facilitated the activities of this sector. Of course, this is to be expected in developing countries due to the weakness of existing infrastructure. However, it is observed that government consumption expenditures have a negative and significant effect on private investment. On the one hand, government consumption expenditures have increased demand and inflation, and on the other hand, it has expanded the monetary base by increasing government borrowing from the central bank and finally restricts private sector investment. Therefore, reducing government consumption expenditures is expected to improve private sector investment.

According to the findings of this study, the following policy proposals can be justified:

- ✓ The government can expand the possibilities for private sector investment by increasing its investment expenditures in infrastructure (highways, airports, water supply systems, etc.) and increase demand for private production through production expectations and private investment. For example, government investment expenditure, which creates infrastructure facilities, such as improved transportation and cheap electricity in the community,

strengthens the private sector in investing by creating foreign savings. Also, government investment expenditures by creating and concentrating investment in the public sector in the fields of machinery and construction can provide the necessary opportunity to create rapid economic growth.

✓ According to the findings of this study, government consumption expenditures have the most negative impact on private investment, it is suggested that the government increase private investment by reducing its expenditures.

✓ Considering the high and positive impact of the banking network lending rate on private sector investment, it is suggested that this issue be given more importance in the country's macro policies and plans.

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