

ÖZ

Hükümet Harcamaları ve Ekonomik Büyüme

Ekonomik durgunluk dönemlerinde, hükümetler GSYİH'daki büyümeyi artırabilmek ve ekonomide fazladan iş yaratabilmek amacıyla harcamalarını artırmaya yönelirler. Bu çalışmada, hükümet harcamalarıyla GSYİH büyümesi arasındaki ilişki ele alınmaktadır. Bu minvalde, 1997-2011 yılları arası 15 yıllık dönemi ve 36 ülkeyi kapsayan veri setine dayalı bir modeli içeren panel veri analizi gerçekleştirilmiştir. Model, hükümet harcamaları değişkenine odaklanmakta; ayrıca beş farklı kontrol değişkeni içermektedir. Sonuçlar hükümet harcamalarının yükseltilmesiyle büyümenin artırılabilirliğini varsaymanın mümkün olmadığını göstermektedir. Çalışma kapsamında, istatistiki olarak negatif ancak nicel olarak oldukça düşük bir korelasyon tespit edilmiştir.

JEL Sınıflandırma: E1, H5, N1

Anahtar Kelimeler: Hükümet Harcamaları, Ekonomi, GSYİH, Büyüme

ABSTRACT

Government Spending and Economic Growth

In times of economic slowdown, governments tend to boost spending in order to increase GDP growth and create extra jobs in the economy. In this paper, the relationship between government spending and GDP growth is examined. In doing so, panel data analysis conducting a model with a data set for 36 countries for 15 years for the period of 1997-2011 were used. The model focuses on the government spending variable also including five other control variables. Results show that it is not possible to assume that GDP growth can be increased by raising government expenditure. A negative correlation that is statistically significant but quantitatively very low were determined in the context of study.

JEL Classification: E1, H5, N1

Keywords: Government Spending, Economy, GDP, Growth

Government Spending and Economic Growth



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INTRODUCTION

Understanding why some countries grow at different levels from others has been a question for many economists. GDP growth levels tend to vary widely across regions and often result in large gaps in development rates and level and income after only a few years. Some countries in Southern Asia, for example, have managed to increase the level of GDP growth to that of developed nations, while on the other hand many nations seem unable to ever apply policies conducive for healthy economic growth. The reasons behind these growth differences and lack of effective policy implementation are highly relevant to current macroeconomic discussions.

The neoclassical view of why countries having different growth performances points to the fact that high growth rates can be achieved with exports and low levels of government intervention. This view blames protectionist trade measures and overly high levels of government control as the main culprits behind economic failure.

2. LITERATURE REVIEW

These discussions originate with *Wealth of Nations* author Adam Smith. Smith claims that the free market is the main factor behind high growth rates and economic wealth. The classic view highlights the necessity of a government to allow the markets to function freely and productively. This belief has been debated throughout economic history, but the 1929 recession put doubts into the totally free market *laissez faire* viewpoint. Economists began to discuss the need for government intervention within the economy. While they did not agree on how the government should or could impact the real

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economy, after World War II all economists realized that the role of the government in the economy has been substantially increased.

Neo Classical Growth Theory;

Solow's work on growth theory was the base for the neoclassical view in the middle of the 20th century. In this model the economy comes to a steady state and the main factor defining growth is technological development and increase in population. In the model a country that increases its savings will have accumulated more capital at steady state causing it to have a higher level of wealth. In the long term the model tells us that countries will come closer in terms of GDP per capita in relation with the fact that growth is explain with exogenous growth. In other words, this convergence hypothesis tells us that in the long term the gap between developed and under developed countries will diminish.

In reality, the hypothesis of the neo classical growth model didn't work perfectly. To the contrary, as years pass, the gap of wealth between developed and under developed nations has only widened. According to Barro (1990) convergence is conditional and will only take place if countries have similar institutional structures. The partial failure of the neo classical model in explaining growth differences has forced economists to develop new models in order to explain the growth process endogenously.

Endogenous Growth Theories

The different step taken forward by endogenous growth models has been to try and explain economic growth with a model that puts the technology factor in as well. On the

other hand the developers of these models have also taken into account factors such as government policies in explaining growth dynamics. Another important difference between the old and new models is that, the new models have distanced themselves from diminishing returns and have underlined the possibility of increasing returns from capital with the human capital factor.

We can summarize endogenous growth models in three different areas. First group of models have taken into consideration the effects of information, technology and have defined concepts such as learning by doing (Romer 1986).

The second group has focused on the importance of human capital and its effects of increasing productivity in the economy. The third party has expanded endogenous growth models by including government policies as a factor in explaining economic growth. Some of these economists have argued that government policies have a major importance in economic functioning and efficient use of government funds will enable an economy to grow at a higher level (Barro 1990, Kelly 1997, Webber 2002). In Barro's model government spending on efficient areas results in higher growth rates but the opposite happens if the size of the government increases too much. Further, Barro continues and says that the efficient use of government funds and generating effective government policies is the main determinant of growth differences between countries.

Devarajan (1996) derives conditions under which a change in the composition of expenditure leads to a higher growth rate of the economy. The condition he examines depends not just on the physical productivity

of the different components of government spending but also on the initial shares. He uses data from 43 developing countries over 20 years and shows that an increase in the share of current expenditure has positive and statistically significant growth effects.

On the other hand not all study results have been positive. For example, Gwartney, Halcombe and Lawson (1998) have found that the larger amount of spending had no relation with economic growth. Their reasoning was that when the government spending increases and goes beyond a certain limit, the funds start to go to sectors and areas which are less efficient causing the economy to lose pace. Landau (1983) has studied the relationship between per capita GDP and government spending/GDP ratio and also found a negative relationship between the two.

Ram (1986) has developed a model using data from 115 different countries and tested the relationship government spending and economic growth. The study results showed that in 100 of these countries the relationship was positive and in the other 15 they found a negative relationship. With these results Ram came to the conclusion that government expenditures had a positive external effect on the economy. Besides he underlined the fact that during the 1960s the factor efficiency was higher in the public sector compared to the private sector and in the 1970s the efficiency of government spending had declined. One last point was that the effect of government spending on the economy was greater in the under developed countries.

Butkiewicz (2011) studies the impact of government expenditures on economic growth, emphasizing how government ef-

fectiveness influences the efficiency of government spending. In his model, effects of sub-categories of government spending on growth are also examined. According to his findings total expenditures are estimated to have negative growth effects for some groupings of developed nations. Also consumption expenditures are found to have a negative growth effect in developing nations with ineffective governments. He comes to the conclusion that developing nations with ineffective governments benefit from capital expenditures, therefore in order to increase growth, developing nations should limit their governments consumption spending and invest in infrastructure.

Bosi (2007) considers a discrete-time version of the endogenous growth model which envisages a public participation in the production of private goods where public dividends are invested in order to provide a public good; in turn, the public good plays a role of indispensable production externality and, eventually, of growth engine.

In the production of private goods, Bosi (2007) finds that an optimal policy is always based on a positive participation of the government as shareholder; also, when growth is slow, a public intervention or large substitution effects stabilize the economy. In conclusion he argues that a right mix of short-run services and long-run infrastructures is good to slow economies. Also he adds that infrastructures are mainly recommended in presence of moderate income effects, while services are recommended in presence of strong income effects.

Heitger (2001) who studied the effects of government spending on economic growth in 21 OECD countries found a positive rela-

tionship between the two factors. However, once government spending exceeds a certain point and begins to intervene with the private market the relationship takes a opposite direction and even comes to effects of negativity.

Conte and Darrat (1988) also studied the relationship between growth and government spending looking for correlations between the two. In some countries the relationship they found was positive on the other hand other results came as negative. In conclusion their study showed no significant correlation between the two factors.

3. THE MODEL

The main goal of our model is to examine the effects of government spending on GDP growth. In line with the related literature above, it is very difficult to have a sharp expectation regarding the direction of the relationship between government spending and GDP growth. The results of various working papers have been different, all working on models which include variety of countries for separate time periods. If we are to declare our expectations in a less direct manner, we will lean towards a positive relationship because the data set of the model will include mostly countries with strong institutions, increasing the possibility of having more efficient public investment structure resulting in GDP growth.

Our dependent variable GDP growth is by nature determined by many different factors. This fact and the literature findings (Ram (1986), Heitger (2001)) , quantitatively speaking we don't expect independent variable (X1) government spending to have a high level effect. But statistically the effect is expected to be significant as most of

the related papers results (Barro 1990, Kelly 1997, Webber 2002, Ram (1986), Heitger (2001)).

a) Data and Variables

In our model we use annual data that contains one dependent and six independent variables for 36 countries¹ each including observations for a period of 15 years between 1997-2011. Countries are selected with regards to availability in data sets suitable with the model. Each variable has 540 observations. Three years in this period have been chosen as crisis years; 2009, 2010 and 2011 and are represented with a dummy variable.

The data are gathered from the World Bank internet database.

The dependent variable is **GDP growth** which will be defined as annual percentage growth rate of GDP at market prices based on constant local currency.

Definition of independent variables

Government spending will be defined as cash payments for operating activities of the government in providing goods and services. It includes compensation of employees (such as wages and salaries), interest and subsidies, grants, social benefits, and other expenses such as rent and dividends

Regarding education, we will take into account of the ratio of total enrollment, regardless of age, to the population of the age

¹ Australia, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea Rep., Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, Ukraine.

group that officially corresponds to tertiary education.

Inflation is measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

Research and Development Expenditures are for current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development.

Patent applications are filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention--a product or process that provides a new way of doing something or offers a new technical solution to a problem. A patent provides protection for the invention to the owner of the patent for a limited period, generally 20 years.

b) Model Structure and Methodology

In order to regress the data we built a panel data model to examine fixed and/or random effects of individuals or time. The core difference between fixed and random effect models lies in the role of dummy variables. A parameter estimate of a dummy variable is a part of the intercept in a fixed effect model and an error component in a random effect model. Slopes remain the same across group or time period in either fixed or random effect model (Kennedy 2008). Both fixed and random effect is an issue of unmeasured va-

riables or omitted relevant variables. This heterogeneity is handled by either putting in dummy variables to estimate individual intercepts of groups (fixed) or viewing the different intercepts as having been drawn from possible intercepts, so they may be interpreted as random and treated as though they were a part of the error term (random).

We conducted Hausman Test to choose between fixed and random effects, according to this test if the null hypothesis of no correlation is rejected, it can be concluded that individual effects are significantly correlated with at least one regressor in the model and thus the random effect model is problematic. If this is the result a fixed effect model rather than the random effect counterpart is chosen. The Hausman Test we conducted with the data also resulted with the null hypothesis been rejected²; showing correlation between individual effects and regressors. So the fixed effect method was chosen.

Model:

$$\text{GDP growth} = B_0 + B_1(\text{government spending}) + B_2(\text{education}) + B_3(\text{inflation}) + B_4(\text{research \& development}) + B_5(\text{patent}) + B_6(\text{crisis years})$$

c) Results and Interpretation

Table 1 summarizes the basic results of the regression. The first column shows the estimate results for the coefficients. The second column shows the standard error for these coefficients and the third column gives the t-values. The final column is the p-values which will present the significance of the coefficients.

² Hausman test's result is of this model is 23.08, when evaluated with the critical value, null hypothesis is rejected

The R-Square result indicates that approximately 34 percent of the variation in GDP growth is explained by the model. This is in accordance with our expectations, the GDP has many components and it will be very difficult to build a model that explains the variation in GDP at a high level.

According to the results, the level effect of the independent variable *government*

spending on GDP growth is statistically significant at the 0.01 level. The coefficient estimate -0.076 implies a negative relationship between government spending and GDP growth. More specifically; at the 0.01 significance level, one percent increase in government spending/GDP ratio is expected to decrease GDP growth rate by 0.076 percent, holding all other variables constant.

Table 1: Regression Results

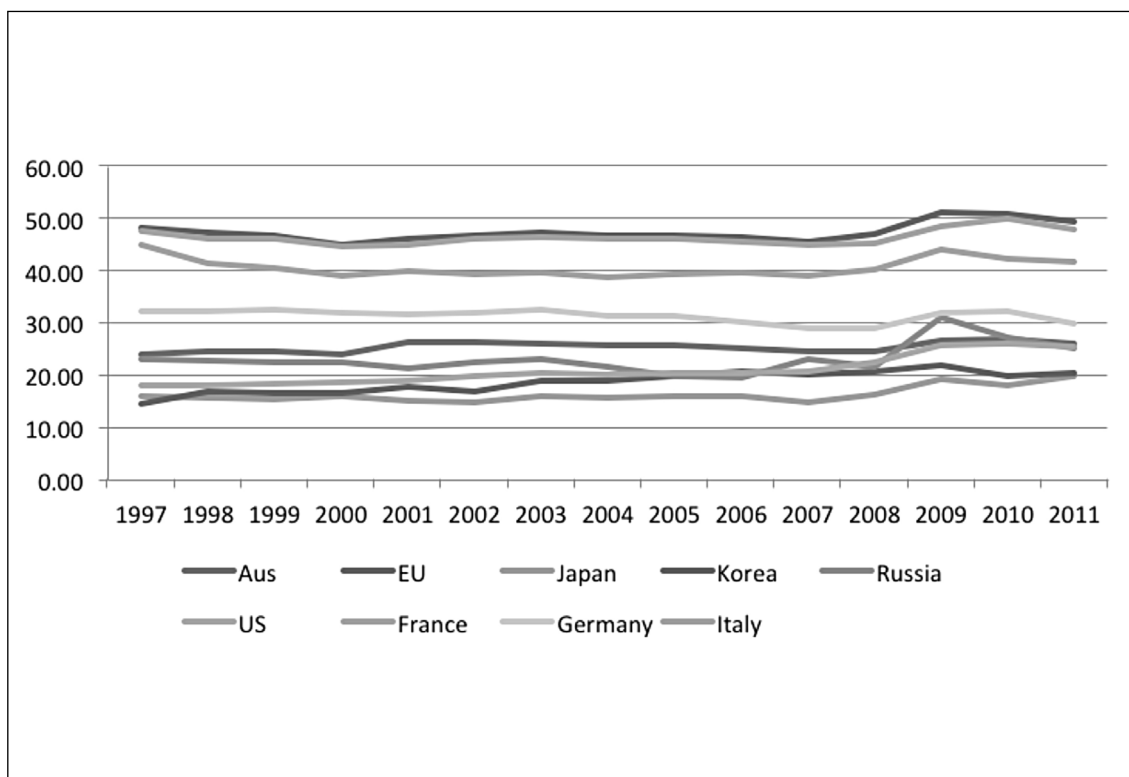
Parameter Estimates				
Variable	Estimate	Standard Error	t Value	Pr > t
Intercept	6.186393	1.3498	4.58	<.0001
Government Spending	-0.07624	0.0215	-3.54	0.0004
Education	0.028657	0.015	1.9	0.0574
Inflation	-0.00824	0.00286	-2.88	0.0041
Research & Development	-1.26781	0.643	-1.97	0.0492
Patents	1.271769	0.6509	1.95	0.0513
dummy	-3.98857	0.3628	-10.99	<.0001
Fit Statistics				
SSE	4340.8801	DFE	498	
MSE	8.7166	Root MSE	2.9524	
R-Square	0.3395			

This result is in line with our expectations in the model hypothesis we put forward. First of all the quantity of the effect is not very large, because GDP growth is by nature determined by many different factors. Similarly the literature findings of Ram (1986) and Heitger (2001) also find small quantitative effects in their regression.

The other important factor is the direction of the relationship. It is very difficult to have a sharp expectation regarding the direction of the relationship between government spending and GDP growth. The

results of various working papers that we examined have been different. But taking into account the development level and institutional quality of the countries selected in our regression a positive relationship was expected. The regression results have shown an opposite direction with a negative relationship which is also statistically significant. One explanation regarding this difference is the tendencies of governments to increase their spending during years where growth is slow, thus, causing the government spending numbers to have an opposite course with the growth data.

Figure 1: Government Spending (%GDP) Between Years 1997-2011



Source : World Bank Database

The coefficient of the *crisis year variable* of the model is also significant at the 0.01 level. This shows that the crisis years 2009-2001 has a robust negative effect on the GDP growth rate.

Control variable *education*'s coefficient is statistically significant at the 0.01 level. The coefficient estimate 0.028 implies a positive relationship between education level and GDP growth. In other words; holding all other variables constant, at the 0.01 significance level, one percent increase in tertiary education enrollment is expected to increase GDP growth rate by 0.028 percent. This positive relationship is expected, according to the related literature as the amount of people attending tertiary level increases, this will result in the rise of skills and productivity in the labor force resulting in economic growth. Similar to government spending, the quantitative effect is not at a high level due to the large amount of different components that determine GDP.

The coefficient estimate of the third independent variable *inflation* is -0.008 and it is statistically significant at the 0.05 level. This implies that holding all other variables constant, one percent increase in the inflation level is expected to decrease GDP growth rate by 0.008 percent at the 0.05 significance level. This is expected, as research results have a relatively wide consensus about this relationship. In particular, it is generally accepted that inflation has a negative effect on medium and long-term growth. Inflation impedes efficient resource allocation by damaging the signaling role of relative price changes, an important guide to efficient economic decision making (Fischer; 1993).

The coefficient estimate of *research and*

development is also significant at 0.05 level and has the value of -1.26. To put it in a different way, holding all other variables constant, one percent increase in the research and development expenditure level is expected to decrease GDP growth rate by 1.26 percent at the 0.05 significance level. The related literature suggests that technology of innovation based on R&D-expenditure will encourage innovation activity and increase physical capital production effecting growth positively. This contradicts with our estimate possibly in relation with the uncertain time effect. Unlike other components of economic growth it is very difficult to make certain estimates about the timing of the results of research and development investments. In some cases the beneficial outcomes of these investments are obtained at early stages, but in other cases a no gain is also possible.

The last control variable *patent applications* coefficient is statistically significant at the 0.01 level. The coefficient estimate 1.27 shows a positive relationship between patent application level and GDP growth. To put it another way; holding all other variables constant, at the 0.01 significance level, one percent increase in patent applications is expected to increase GDP growth rate by 1.27 percent. The literature also supports this finding that increases in patenting activity lead to increases in both labor productivity and economic growth.

When compared with the research and development coefficient results, why does patent application imply a different outcome? An explanation to this is that, research and development data is more open to difficulties when used for the level of innovation. Research and development is an input to innovation outputs, rather than a measure

of innovation occurring in an economy. The relationship between research and development and innovation outputs is likely to be time varying as we mentioned above, causing uncertain lags. Patents have the benefit that patents are more likely to be related to innovation outputs than research and development data (Crosby; 2000).

4. CONCLUSION

Policy makers have the tendency to perceive government spending as a tool which can be applied in order to increase GDP growth. Whenever an extra boost is needed for the economy or when the time of elections near, the amount of government spending is increased in hope of additional economic activity. However, academic literature regarding this subject indicates no clear results. Some studies have found a positive relationship between these parameters, while others have concluded with a negative correlation.

This paper examines the relationship between government spending and GDP growth by focusing on developed countries. Using panel data analysis we conducted a model with a data set for 36 countries for 15 years for the period of 1997-2011. The model focuses on the government spending variable also including five other control variables.

The policy implications arising from this paper show that it is not possible to assume that GDP growth can be increased by raising

government expenditure. We have found a negative correlation that is significant but quantitatively very low. This result is parallel with the findings of Conte and Darrat (1988), Butkiewicz (2011), and Gwartney (1998). One aspect of this result is that our definition of government spending includes all operating activities and doesn't differentiate between them. Further studies may be conducted that analyses specific sub-groups of government spending that will include difference of efficiencies between them.

Another result of this paper is the positive relationship found between tertiary education attendance and growth. This result supports the view that tertiary level education increases the skills and productivity of the labor force. Also, results regarding inflation is also in line with the literature, showing a negative correlation with GDP growth. Research and development expenditure and patent application had contradicting results mainly due to the high level of time variation of the prior.

In conclusion, public policy makers shouldn't put effort in increasing GDP growth by raising the amount of government spending. The outcomes of increased spending will not be positive in all cases, furthermore, causing additional problems such as inflation and budget deficits. Instead, governments' main focus should be on increasing the productivity of the economy with structural changes in the mid and long term.



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