The Master Research Paper

Long Run and Short Run Effects
of Government Expenditures on Economic Growth:
Are there Lessons for Ukraine?

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Abstract.\footnote{I would like to thank my advisor on research paper James Feehan for valuable comments and guidance, and Jack Strauss for discussing the original idea. I bear sole responsibility for all errors.}

The early stages of transition are more tolerable to radical changes than the mature period of economic development. It is reasonable for Ukraine on the early stages of market reforms to design fiscal policy in such a way that it is conducive for long-term economic growth and does not require substantial changes in the nearest future. This paper gives some current observations of fiscal policy in Ukraine and other transition economies and, drawing on existing theoretical and empirical studies, suggests some recommendations for designing new fiscal policy.

First, a reduction in current expenditures on economy and an increase in capital expenditures (or at least fixing them on the same level as they were in CEE) are beneficial for growth. This proposition is supported by findings in the empirical section. Second, government should reorient capital expenditures from commercial projects to public infrastructure, where basic infrastructure such as transportation, communication and utilities should be a priority. Third, based on the observation that efficient recipients of capital government expenditures are crucial for successful fiscal policy, government should foster the development of the new private sector and clearly define the fate of all state-owned enterprises.
I. Introduction.

The reforms in the Soviet/Socialist system started at the end of 1980s when dysfunctions of the centrally planned economy brought the system to the brink of collapse. Despite the fact that strategies of market reforms in the former Socialist bloc differ from country to country, they all have common features: reforms on the macro- and microeconomic level in terms of redesigning the role of the government and giving more freedom and opportunities to the private sector.

The first stage in the course of reforms undertaken is macroeconomic stabilization, the key instruments for which are monetary and fiscal policies. On this stage it was enough to reduce the scope of budget expenditures and bring them down to meet the requirements of balancing the budget. However, the seemingly successful reduction of expenditure to balance the budget on the first stage may be a misleading indicator of reforms. Usually such reduction is accompanied with increased budget arrears. Thus, the second stage is restructuring of the economy. For this stage of reforms, radical restructuring of fiscal policy is on the agenda. The main challenge is to reduce governmental obligations and reorient government policy towards the needs of a market economy. There are a great many changes required to achieve that reorientation. Among the many key issues are redirection of public investment into investment in infrastructure and human capital and improvement in procedures for budgeting and project analysis.

These types of expenditures, which include physical infrastructure such as roads, harbors and water systems, as well as investment in human capital formation such as education and man power training and primary health care, generate returns which are fully realized over the long-run. Yet in the short-run they may entail large sacrifice in terms of reduced expenditures on consumption and social
policy. In transition economies, devoting scarce resources to such long-term projects is especially
difficult due to high obligations of government toward the social sector, some of which are inherited from
the old system and some of which are necessitated by the transition itself. Another complicating factor in
the transition period is the existence of stagnating state-owned enterprises (SOE), which effectively
lobby government for new subsidies and privileges (protectionism, tax exemptions, etc.)

Thus, the governments of most transition economies face a short-run versus long-run dilemma. On the one hand, transition economies are characterized by a very unstable political and economic situation. The “wrong step” in economic policy can cost the destiny of economic reforms. On the other hand, if government cares only about the short term impact, it can easily hurt long-run development. In short, to design and implement prudent fiscal policy, there should be clear understanding of the outside lag of the fiscal policy and difference of short-run and long-run impacts of fiscal policy on economic development.

The objectives of this thesis are (1) by utilizing separately world data, to test various hypotheses about the short-run and long-run relationship between government expenditures and growth rate of real GDP, and to estimate the speed of adjustment of short-run disequilibrium to the long-run, (2) to examine the problem of productive and unproductive government expenditures on the economy in Ukraine and some other transition economies during 1989-1996, and (3) from the perspective of obtained results, to analyze how the existing composition of the government budget of Ukraine corresponds to the targets of current government policy to promote long-run growth. The analysis of Ukrainian fiscal policy will be carried out to prove that the Ukrainian economic situation is not unique in

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1 One of the examples of “wrong step” is cut by government of budget expenditures on social sector without structural adjustments in it. Such a policy can escalate social unrest in the short-run and will not bring any positive results in the long-run.
the sense that “fundamental economic laws” are applicable for Ukraine as much as they are applicable for other world economies.

This paper applies mainstream economic theory and draws on existing empirical studies in order to achieve its objectives. It is organized as follows. Section II gives the theoretical framework. It presents the theoretical background for testable hypotheses. Section III starts with an overview of results of some empirical studies, then validates the functional form of the model and presents results of estimations. Section IV follows with an analysis of current fiscal policy in some transition economies and Ukraine. That section also provides rationales for recommended changes in fiscal policy, with particular emphasis on public investment. Section V concludes.
II. Theoretical Framework.

Fiscal policy is one of the most important instruments of government economic policy. Traditionally, the normative theory of public finance starting with Musgrave,\(^1\) identifies three main functions of fiscal policy. They are defined as allocation, distribution and stabilization. By means of fiscal policy any government attempts to ensure effective utilization of available resources, equitable distribution of income and stability of economic development (counter-cyclical policy). Following the logic of fiscal policy it also influences the growth of the economy.

The fundamental causes of economic growth, disregarding unexpected and non-manageable exogenous shocks, can be classified as follows: (1) efficiency of resource allocation; (2) accumulation of productive resources; (3) technological progress.\(^2\)

To establish the relationship between fiscal policy and economic growth, the mechanisms through which fiscal policy affects the above mentioned factors of economic growth should be investigated in the short-run as well as in the long-run. The significance in distinguishing these two effects arises for the two reasons. First, they can have opposite impacts on the economy. Second, there is an outside lag inherent in fiscal policy. That is to say, there is “time between a policy action and its influence in the economy.”\(^3\) So, the distinction between short-run and long-run impacts of fiscal policy is not only an interesting intellectual and theoretical exercise but it also has important implications for policy making.

Government expenditures can influence the dynamics of Gross Domestic Product (GDP) through its consequences for the effectiveness of resource allocation and accumulation of productive resources. Both of these conditions assume the influence on the productivity of private sector. For example, an increase in government expenditures on a public intermediate good (e.g. building road,
bridge or financing of secondary education) firstly, via taxes or borrowing, withdraws financial resources from the private sector. Secondly, at the time this public intermediate good becomes freely available and fully effective, it affects the productivity of the companies and labor force which use this good. This can lead to decreased costs (especially transaction costs) of production, and frees up funds for new investments in physical and human capital, and may enhance the productivity of existing factors of production. On the contrary, underdeveloped infrastructure may distort the industry structure making it less efficient. Lack of a dense road network can cause unproductive centralization and vertical integration of the production process.  

In most of papers on this issue of public investment, economic growth is viewed as a long-run phenomenon, so the analysis is concentrated on the effects of government expenditures on the long-run equilibrium, leaving aside the short-run effects. However, investigation of the short-run effects is also an important issue. Firstly, it is important to explain why short-time-horizon fiscal policy often has an opposite effect from the expected long-run one. Secondly, distinguishing the time lag between short-run and long-run effects allows one to assess the outside lag inherent in fiscal policy.

Government expenditure is divided by type into current (mostly consumption of goods and services, interest payments, subsidies and current transfers) and capital (purchasing of fixed assets, land and other assets, capital transfers) expenditures. For instance, government provision of food stamps for the poor is current expenditure, while government spending on building an irrigation system in a rural area is capital expenditure.

As for the impact of different fiscal policy variables on economic growth, theory suggests several possibilities. The ones that this paper investigates, are summarized here.

a) The impact of current expenditures on economic growth in the short-run is either zero or positive. A positive impact is provided by two conditions: (1) inflexibility of prices in the short and/or (2) overall underemployment in the economy. Both these conditions are associated with a flat aggregate supply curve. This situation corresponds to the Keynesian type of economy. Under either of these conditions, higher current expenditures of the government stimulate demand for products, which in turn allows producers to increase use of their productive capacities by hiring new capital, labor and thus to expand production. The effect of the current expenditures will be long-lasting if the economy suffers from persistent underemployment. The expansionary fiscal policy, as argued, can stimulate growth of the output until resources are fully employed. Afterwards, such fiscal policy is inflationary and does not affect real output. However, if there is no underemployment in the economy, the effect of higher government expenditures on consumption services may persist only for a very short period because such an increase in demand is artificial by the nature (has nothing common with permanent changes in consumers tastes and does not affect productivity). It may have further contractionary influences in the long-run.

b) The impact of current expenditures on economic growth in the long-run is either negative or insignificant. At the time when artificially stimulated demand dies out, producers no longer meet with any stimulus to preserve expansion of production, so in the long-run the growth rate of production declines. This situation corresponds to the Classical type of economy. The nature of this decline is explained by counterproductive impact of current expenditures. On the one hand, current spending itself is likely to have no impact on productivity of private sector. On the other hand, current

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\[\text{In a) the rationale is for countercyclical policy. Therefore if the economy is at potential GDP or if supply is} \]
expenditures may be financed by distortionary taxes, which lower the return on investment and affect productive incentives of producers and labor.iii The two effects reinforce each other and in the long-run they reduce growth of output.8

2. Capital Expenditures.

a) The impact of capital expenditures on the growth of economy in the short-run is negative. This proposition can be illustrated by the model of public capital goods provision developed by Feehan.9 The main idea is illustrated on Figure 1. Assume that initially economy is characterized with production possibility frontier (PPF) TT1 which corresponds to some amount of government expenditures. Given the initial terms of trade, denoted by P in the figure, the equilibrium is at Q. To finance capital expenditures the government should withdraw a certain amount of capital and labor from the private sector. The new equilibrium is at J. As far as a certain time should pass before public investment becomes productive, in the short-run public capital expenditures reduce private investment and thus hamper growth. In the model this dynamics of production can be represented by shifts of PPF inward to TT2. In the short-run the prevailing effect of such a fiscal policy is mainly a reduction in output of final goods. The withdrawal of resources from private sector usually occurs on the prolonged basis in the sense that to complete the investment project it is necessary to make expenditures on a permanent basis for at least several years. If new government expenditures meet the cost-benefit analysis criteria, an increase in government spending shifts PPF of private sector to TT3. The degree to which PPF is moved outward depends on the complementarity of new government expenditures to private inputs into production.

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iii More technical analysis of this result is discussed in the next part of this section.
b) The impact of the public capital expenditures in the long-run is positive. The latter proposition follows from the nature of public investment. Ideally, government invests in the projects where social returns are higher than private returns when such project is financed by private parties (or in other words, because of inherent market failure, private parties underinvest in these projects). To such projects one can include investments in infrastructure, some investments in human capital, etc. The projects of this type are characterized by a spill-over effect (or externality) which positively influences the productivity of private sector and raises returns to private capital. Because of externalities, private provision of such goods is sub-optimal and leaves space for substantial improvement, which is possible only if the government finances such projects.

In many papers there is a discussion of the nature of public investment which enters directly in private sector production function and promotes the growth of output. In the arguments stated above it was implicitly assumed that public investment is a complement to private investment and has positive external effect on the economy as a whole (investment in infrastructure and human capital). On the contrary, there are arguments that some public investments can also be a substitute for private investments (such as public investments in commercial projects where there is no apparent market failure). Under such conditions, it is expected that even in the long-run such investments are not fully productive because, ceteris paribus, investments by private sector firm can be more productive and can generate higher returns. By definition, this type of investment does not have a spill-over effect and thus it should not be done by government.

In the preceding discussion it was also implicitly assumed that higher government expenditures are financed by higher taxes or domestic borrowing. The third source to finance government

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iv More formal analysis of this relation is discussed in the next section.
expenditures is borrowing from abroad. This option eases the burden of government in the short run. Thus, in figure 1 there may be no immediate shift to the TT₂ production possibility curve. However, in the future, government obligations to foreign creditors increase and government should either reduce capital expenditures and increase current expenditures or impose higher taxes. In the long-run this will have partially offsetting negative effect on growth. Transition economies are rather limited in their abilities to borrow on the international markets or from foreign governments. Thus, the assumption on non-borrowing is quite reasonable.


As a general framework for the thesis I chose an endogenous growth model against neoclassical one.¹²

The neoclassical model limits the analysis of real GDP dynamics to two major factors of production, capital and labor, each of them exhibits diminishing marginal returns. The production function is characterized by constant returns to scale. This model predicts that for given savings/investment rate the economy converges to steady state level of GDP per capita. Thus the growth rate of income per capita in the long-run is independent of the level of savings. The only factor which determines dynamics of income in the long-run is exogenously determined technological progress.

The main drawback of the neoclassical model of economic growth is that it considers diminishing returns to accumulation due to which changes in accumulation of productive factors do not affect steady-state growth rates.¹³ This model rejects the long-run influence of public policy which affect savings and investment on the growth of GDP per capita. Also it does not provide a framework to investigate the causes of technological progress, treating it as purely exogenous phenomenon.
The advantage of the models of endogenous growth is that they break the limit of economic growth imposed by diminishing returns to investment. In the case of fiscal policy, the constraint of diminishing returns to accumulation is relaxed by the externalities inherent in public investment: even if private returns can be diminishing, social returns can be increasing. Thus, provision of such investment by private parties can be sub-optimal and there is a scope for government intervention (in terms of higher public capital expenditures) to improve efficiency and reach optimality. The important fact to note is that sustained growth is generated not by external effect but by constant returns to scale.

The most vivid examples of investment with externalities are public investment in education and in Research and Development (R&D). Investment in education and primary health care are proxies for investment in human capital (the part of investment in human capital omitted in this measure is on-the-job training). In competitive markets there is under-investment in human capital because private parties do not obtain all returns; some portion of which is dispersed as external effect on third parties. The correction comes from government expenditures on education which stimulate investment in human capital and generate additional positive effect on society. Expenditures on R&D are likely to have an even stronger external effect because, once generated, knowledge can be easily used by third parties and can generate additional returns for them, leaving the “generator” without the full amount of returns. By the same token as with education, additional government expenditures on R&D are to compensate for under-investment by private parties. Following Romer, R&D can be considered as a contribution to technological progress, which is the major determinant of steady-state economic growth. In turn,

\[
Y = AL^{1-\alpha}K^\alpha \quad \text{for which neoclassical growth is possible and} \quad Y = AL^{1-\alpha}K^\alpha G^{1-\alpha} \quad \text{for which endogenous growth is possible. For both cases} \ 0 < \alpha < 1. \text{For discussion see Plosser, Charles. “The Search for Growth”, 1992, pp. 66-68.}
\]
expenditures on infrastructure also exhibit external effects by decreasing transaction costs and stimulating economic development.

The effects of current and capital expenditures of government expenditures on economic growth in the long-run were formalized within a framework of endogenous growth model developed by Barro and Sala-i-Martin. This model considers the behavior of two sectors in the economy, namely households and firms.

The households, which are assumed to be infinitely lived, maximize the present value of their utility

\[ U = \int_{0}^{\infty} u(c) \cdot e^{-\rho t} dt \]  

(1)

in which the individual household utility function is isoelastic function

\[ u(c) = \frac{c^{1-\sigma} - 1}{1-\sigma} \]  

(2)

where \( \rho > 0, 0 < \beta < 1 \) and \( \sigma > 0 \).

The production process for this one-consumption-good economy is characterized by the function

\[ y = f(k) \]  

(3).

In this system \( c \) is private consumption, \( \rho \) is the constant rate of time preference, \( y \) is output (net of depreciation) per worker and \( k \) is capital per worker.

The general solution of the model of maximization of household’s utility determines the growth rate of consumption as
\[
\gamma = \frac{\dot{c}}{c} = \frac{1}{\sigma} \cdot (f' - \rho)
\]  \hspace{1cm} (4)

As far as this model is always in the steady state (there are no transition dynamics) the variables c, k, y grow at the same rate as in (4).  

By adding the government to the system, the individual household utility function and production function become, respectively,

\[
u(c, h) = \frac{(c^{1-\beta} \cdot h^\beta) - 1}{1 - \sigma} \]  \hspace{1cm} (5)

and

\[y = f(k,g) = Ak^{1-\alpha} g^\alpha\]  \hspace{1cm} (6)

where h is government expenditures on consumption service per household and g is government expenditures on productive services.  

The specified production function reveals the possibility of endogenous growth. As far as k encompasses physical and human capital per worker, holding the number of workers fixed, the function exhibits diminishing returns to each factor of production separately but constant returns jointly.  

The key in the production process is that government expenditures on production services are complementary to the private inputs (additional government expenditures of this type increase marginal product of the private capital). Such expenditures includes spending on physical infrastructure, national defense, enforcement of law, etc.  

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vi More specifically Barro (1988, 19) identifies them as government expenditures for consumption services and government expenditures for production services.  

vii More explicitly it can be illustrated if production function is given in its general form \(Y = AL^{\alpha}K^{1-\alpha}G^{\alpha}\), where L is a number of workers. This function can be easily transformed into the form used above. For more details see Barro and Sala-i-Martin (1995, 152-158).
Assuming non-deficit finance of the government expenditures through the flat rate income tax, correspondingly $\tau_h$ and $\tau_g$ ($\tau_h = h/y$ and $\tau_g = g/y$), the expression for the growth rate of consumption transforms into:

$$
\gamma = \left(\frac{1}{\sigma}\right) \cdot [(1 - \alpha) \cdot A^{1/(1-\alpha)} \cdot (1 - \tau_g - \tau_h) \cdot (\tau_g)^{\alpha/(1-\alpha)} - \rho] 
$$

(7).

For any given $\tau_h$ the relationship between $\gamma$ and government expenditures on productive services is inverted U-shaped with optimal $\tau_g = \alpha(1-\tau_h)$. The growth rate is also dependent on productivity parameter $\alpha$, the productivity of economy A, patience of consumers $\rho$ and intertemporal substitutability $\sigma$. The economy exhibits positive rates of growth if in (7)

$$(1 - \alpha) \cdot A^{1/(1-\alpha)} \cdot (1 - \tau_g - \tau_h) \cdot (\tau_g)^{\alpha/(1-\alpha)} > \rho.$$

The growth rate is highest when $\tau_h = 0$.

This general result offers several testable hypotheses, two of which are: (1) in the long-run the relationship between government expenditures on productive services is non-linear, first it affects growth rate positively and then negatively, (2) in the long run government expenditures on consumption services reduces economic growth.

Theoretical models usually find positive externalities for large portion of public investment in GDP because they assume that public expenditures are financed by a flat rate tax which is less

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*Easterly and Rebelo (1993) concluded that there is no reverse causality between fiscal policy and growth.*

*Devarajan et al. (1996, p. 317-318) considers the impact of composition variables on economic growth. The main findings suggest the similar hypotheses as Barro’s: up to a certain share of expenditure in total budget the capital expenditure are productive and positively affect economic growth, for shares of capital expenditure above this, model predicts negative relationship. In the simplest case this relationship is explained by the following conditions:*

... if relative share of public expenditure devoted to the goods $g_1$ (productive) and $g_2$ (non-productive) is below their relative output elasticities... then a shift in the mix towards $g_1$ will increase economy’s long-run growth rate... and vice versa.
distortionary for economic activity. But in practice the higher the tax rate (to finance higher government expenditures) the more distortionary it is and the earlier and greater is the offsetting effect on positive externalities. However, even if a large government project is to have positive external effect, under distortionary taxation it can have much smaller effect than expected. Thus, in practice, the optimal point is for lower level of government spending.

The next section gives the short review of the literature, develops the functional form of the model and gives results of empirical estimates.
III. Empirical Estimations.

One purpose of this section is to briefly review the empirical and theoretical literature dealing with the relationship between fiscal policy variables, especially public investment, and economic growth. In addition, this section offers an approach to test the short- and long-run effects of fiscal variables and presents the results of this thesis’ empirical analysis of the impact of fiscal expenditure in a sample of 69 developing countries. The findings of that analysis and the review of the empirical and theoretical literature will serve as the basis for an assessment of public investment policy in Ukraine. That assessment will be carried out in Section IV.


The nature of the relationship between fiscal policy and economic growth has stimulated a series of theoretical and empirical studies. There are a number of papers that survey the existing literature on the impact of fiscal policy on economic growth. Extensive summaries are given in the recent papers by Tanzi and Zee (1997) and Gerson (1998). Drawing on those surveys, this subsection will briefly summarize the major results. First, the theoretical results are discussed, then the empirical findings.

Major theoretical work was done by Barro (1988), Barro and Sala-i-Martin (1995) and Devarajan, Swaroop and Zou (1996). In his seminal paper, Barro develops a simple endogenous growth model of government spending. In this model he finds a non-linear relationship between public expenditures which are complementary inputs to private production and a negative relationship between government consumption, and growth of the economy. However, one simplification of the model, that is non-deficit budget financed by lump sum taxation, underemphasizes the distortionary effect of fiscal
policy. Thus, the model may overstate the optimal level of productive government expenditures on economy.

The model presented in Devarajan, et al. develops the relationship between changes in composition of public expenditures and growth. In this model, the condition for achieving higher steady state of growth depends not only on the productivity of the specific government expenditures but also on their initial share in total expenditures. Thus, increasing of even productive expenditures can have a negative impact on growth if the share of these expenditures is already high.


Using world data, Barro found that government consumption and public investments relate to economic growth as is predicted by his theoretical model. However, the effect of expenditures on education, which is viewed by Barro as a proxy for investment in human capital, was found to be insignificant. In their work Easterly and Rebelo find a positive and robust impact of the share of public investment in transport and communication on growth. The influence of most of the other government expenditure variable was found to be fragile.

Levine and Renelt used extreme bound analysis to test the robustness of the correlation between budget variables and growth. They found that relation between most of the fiscal variables and growth is fragile. Thus, the correlation between total government expenditures and government consumption

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Note: The terms “robust” and “fragile” are used in the Extreme Bounds Analysis (EBA). As Levine and Renelt (1992, p. 944) define it, if the coefficient of the variable of interest “remains significant and of the same sign at the extreme bounds, then one can maintain a fair amount of confidence in that partial correlation. In such a case we refer to the results as ‘robust’.” Otherwise the results are referred as fragile.
and growth, although negative was not robust. They came to the same conclusion about government expenditure influence on capital formation, education, and defense.

The results of Levine and Renelt were challenged by Sala-i-Martin. \(^31\) In his work, he employed a different test of robustness. However, on the government expenditure variables, his findings support results of Levine and Renelt. In particular, he found that results for public investments, public consumption, government spending on education and defense to be fragile.

There were some estimations of the relationship between aggregated public investment in infrastructure and growth. Two studies, one by Aschauer and one by Munnell, \(^32\) estimated this relationship for the USA. \(^31\) They found this relationship positive and significant. Other studies report the same relations for OECD and developing countries. \(^33\)

The general conclusion that one may draw from the recent empirical work is that the impact of most of fiscal policy variables on economic growth is insignificant and fragile. One exception is public investment in infrastructure. Most studies found that type of spending to be significantly and positively correlated with economic growth.

Generally the approach used in empirical papers to estimate the impact of public investment in infrastructure is criticized from the following perspectives. \(^31\) Firstly, it is not clear whether the causation goes from government expenditures to economic growth but not in the opposite or in both direction. The findings of Munnell suggest that “the coefficient of public capital is not seriously tainted by the

\(^{34}\) A second criticism of these empirical studies is that if data on the variables is

\(^{\text{xi}}\) However, in other studies for the USA it was found no robust and positive relations. The use of more disaggregated data on public investment in infrastructure also gives unsatisfactory results. For Discussion see Gerson (1998).

\(^{\text{xii}}\) This criticism is equally applicable to other types of government expenditures, such as current and capital expenditures on the economy, social sphere, education, etc.
not stationary it may be that, due to the common trends in dependent and independent variables, there can be spurious correlation which imposes upward bias of the estimated coefficients. One way to correct the problem is to run regressions in the form of first differences. In the view of Munnel, such a remedy has its own disadvantages because it estimates only short-run effects, while the relationship between variables is predicted to be long-run. Such analysis can give wrong results. In the empirical analysis that follows, the paper uses the Error Correction Model, which avoids the flaws of the utilization of the first difference approach.

This paper goes beyond the work done before by identifying and estimating both short-run and long-run effects of fiscal policy on economic growth.

2. Specification of the Regression Model.

Technically the short-run and long-run impact of public expenditures on economic growth can be estimated by a simple unlimited dynamic model. However, a more sophisticated approach is to use an Error Correction Model. The general specification of the model can be presented as

\[ \Delta Y_t = \beta_0 + \beta_1 \Delta X_t - \lambda \ast (Y_{t-1} - \beta_2 \ast X_{t-1}) \]  

(3.1)

where

\[ \beta_1 \] - coefficient which shows the impact of \( X \) in the short-run;

\[ \beta_2 \] - coefficient which shows the impact of \( X \) in the long-run;

\[ \lambda \] - coefficient which shows the speed of adjustment or how much of disequilibrium is removed during one period.

Following Strauss, the ECM specification has several advantages over the unrestricted model. First, the unrestricted model can suffer from correlation in the error term, which is due to
dynamic misspecification of the model. One of the procedures to eliminate correlation in the error term is to use the Cochrane-Orcutt procedure of differencing. However, this method only corrects autocorrelation in the error. It does not correct dynamic misspecification. Second, to investigate the long-run effect, the unrestricted model should contain lagged variables. This, in turn, leads to multicollinearity. On the contrary, the ECM corrects for correlation in error and avoids the problems with multicollinearity.

Another advantage of the ECM is that it distinguishes between short run and long run impacts of fiscal variables on economic growth and determines the speed of adjustment to the long-run.

**Variables.** Empirical studies use two types of variables to measure public expenditures: level variables and composition variables. The level variables are defined as a share of public expenditures in GDP. The composition variables are defined as share of public expenditures to total budget. This measure shows the relative magnitude of different public expenditures categories to each other.

Estimated impact of the same level and composition variables on economic growth in different studies often gives different results (for contrast see Devarajan et. al and Easterly and Rebelo). A possible explanation is that level variables primarily determine the crowding out effect of fiscal policy (how much it was withdrawn from real economy) irrespectively of how these funds are shared between different types of public expenditures. Theory predicts that such an impact is negative. The impact of composition variables on economic growth shows the productivity of one public expenditure relative to another, as well as changes in productivity, when the structure of the budget changes. For example, if we want to increase the share of one type of expenditure we can do this at the expense of others, keeping the size of total spending fixed. These variables contain mainly the information about productivity of public expenditures irrespective of their level in GDP.
3. Results.

The goal of the following empirical analysis is to test six major hypothesis. They are: (1) the effect of total government expenditures is likely to be zero in the short run, (2) and negative in the long run, (3) the effect of current expenditures on economic growth in the short-run is positive, (4) in the long-run it is negative, (5) the effect of capital expenditures on economic growth in the short-run is negative, (6) and in the long-run is positive. The summary of the hypotheses is given in table 7.

The first two hypotheses are based on the following assumptions. As far as total expenditures contain both productive and unproductive components in the short run the opposite effects of these components cancel each other. In the long-run this effect is complicated with tax burden which lowers return on the private inputs and thus retard growth.

The estimations use data for 69 developing countries for the period 1970-1990. The sample includes 29 low income, 31 middle income low level and 9 middle income upper level developing countries. The data on public expenditures is taken from the Public Spending web-site of World Bank. The data on investment (RINVGDP) and real GDP per capita (Laspeyres index, 1985 international prices) are taken from the Penn World Tables.

All fiscal variables used in regressions are expressed as shares of GDP. They include total expenditures (TE), current expenditures (CURE), capital expenditures (CAPE), government expenditure on education (ED), government expenditure on health (HLTH), government expenditure on transportation and communication (TAC). The government expenditure on education is also disaggregated as expenditure on preprimary, primary and secondary education (SCHOOL), expenditure on tertiary education (UNIV), and other education (OTHED). The government expenditure
on health is disaggregated as expenditure on hospitals (HOSP), expenditure on clinics and practitioners (INHLTH), and other health (OTHLTH). xiii

The results of regression analysis for both linear and non-linear specifications are given in table 1. In each equation, according to the theory, an investment variable is included. As far as the intent of the empirical analysis is to estimate the relation between fiscal variables and economic growth, the constant is not reported. In each equation in table 1, the dependent variable is growth rate of real GDP per capita. Equations 1 and 7 test the hypotheses (1) and (2), equations 2-6 and 8-10 test hypotheses through (2) to (6).

**Linear Specification.** The results of equation 1 support the hypotheses (1) and (2). The coefficient for each variable is significant and has the expected sign. The influence of total government expenditures (TEGDP) is not statistically significant in the short-run. However, in the long-run, it is negative and statistically significant.

Equation 2 estimates influence of current (CUREGDP) and capital (CAPEGDP) expenditures. Almost all coefficients have the expected signs and are statistically significant. The exception is for short-run coefficients of current and capital expenditures. Current budget expenditures are insignificant even in the short-run. So, they either do not influence production by stimulating consumers’ demand or the positive impact of higher consumer demand is offset by the negative impact of higher taxes. xiv The capital expenditures show significant and positive impact on growth in the short-run. This result agrees with the preposition of Munnel. 39 The immediate positive effect of this variable can be explained by the effective use of funds spent on capital expenditures. For example, if for construction of road a

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xi iii More detailed description of variables and data is given in the Appendix I.

xiv In empirical studies the usual instrument used to test the influence of government expenditures on economic growth financed by taxes is to include in the regression the budget deficit variable as a control variable.
government purchases inputs and services from the private sector, this can have immediate positive Keynesian type impact across the whole private sector. The results on the influence of capital expenditures on growth in developing countries is supported by other studies. As Gerson reports, the same results were obtained by Knight et al. (1993) only for developing countries, by Cashin (1994) for OECD countries, and by Hadjimichael et al. (1995) for Sub-Saharan Africa.\(^{40}\)

Equation 3 estimates the impact of fiscal variables classified by function.\(^{xv}\) The impact of expenditures on education (EDGDP) and health (HLTHGDP) is undetermined. Both short- and long-run coefficients of expenditures on these services are not statistically significant at the 5% level. The possible explanation is that these variables contain expenditures on primary and secondary education, mostly viewed as investment in human capital, and expenditures on tertiary education which is partially consumption and partially investment. In turn, expenditure on health also contains spending on primary health care services (such as immunization), which is investment in human capital, and secondary and tertiary health care services, which are substitutes for private expenditures. Also, these variables are not divided into current and capital. The possible opposite effects may give misleading results. Thus, as Gerson reports, Diamond (1989) found that capital expenditures on health care and education have positive and significant effects on growth, while current expenditures have insignificant effect.\(^{41}\) Public expenditures on infrastructure (transportation and telecommunication, TACGDP) have positive and statistically significant effect on growth in the short-run and insignificant in the long run. The possible

\(^{xv}\) For the purpose of our analysis it would be better to have the breakdown of each of these variables by type, that is capital and current. Because of the lack of the data such breakdown is impossible.
explanation is the multicollinearity between total investments (RINVGDP) and investments in infrastructure.\textsuperscript{xvi}

To correct this problem, in equation 4 the infrastructure investment are subtracted from total investment (new variable is PrivRINVGDP which is further used as a proxy for private investment). The results are quite similar to equation 3, except that public expenditures on infrastructure (TACGDP) now has a significant and positive effect in the long-run. Easterly and Rebelo report similar results.\textsuperscript{42} In the case of current expenditures on infrastructure, which are expenditures on operation and maintenance, they do not have adverse effect on economic growth. This type of current spending of the budget is equally important with investment. The reason is that public physical infrastructure, unless it is managed by private sector, can be fully effective if it is maintained by government in a good condition. That is roads, irrigation systems, ports, utilities systems and others are to be repaired properly and in time. Thus, a certain portion of funds, allocated by government on current expenditures to provide operations and maintenance of public infrastructure, can be as productive and beneficial for economic growth as public investments. It is also important to point out that expenditures on operations and maintenance can be productive in the short- and long-run. This adds to the explanation of the positive impact of TACGDP on economic growth in the short-run.

The next step is to break down expenditure on education and health care to allow for opposite effects of their components.

To test the hypothesis on the impact of investment in human capital (implicitly they are included in hypotheses (5) and (6)), equation 5 estimates the impact of government expenditures on schools (SCHOOLGDP) and hospitals(HOSPGDP). Most of the coefficients are insignificant, except that

\textsuperscript{xvi}The reason is that the RINVGDP variable contains public as well as private investments.
expenditures on hospitals in the long-run are statistically significant and negative. Equation 6 tests the hypothesis on the productivity of public expenditures on universities (UNIV) and clinics and practitioners (INHLTHGDP). Neither of the coefficients is significant. Thus, the estimations have not proved the hypothesis of positive influence of investment in human capital on economic growth. The possible explanation is that these variables are poor measures, since they mix investment in human capital with current expenditures.

**Non-linear Specification.** The results of theoretical research give the hypotheses about non-linear relationship between budget expenditures and growth. These hypotheses are tested by introducing squared variables to the model (see equations 7-10 in table 1). The non-linear relationship is predicted in the long run, so the modified specification includes only lagged squared variables (i.e. fiscal variables in parentheses).

Equation 7 reports that total expenditures squared is significant. The negative sign shows that its relationship with growth is inverted and U-shaped. That is, the total expenditures up to a certain level have positive impact on growth, after which its impact is negative. In this equation, a linear term is excluded (the specification with linear term makes both linear and squared terms insignificant), so the maximum positive impact of TEGDP is when it is almost nil. This relationship can be approximating to linear, so it is consistent with negative long-run impact of TEGDP on growth found in equation 1.

Equation 8 gives rather unusual results. Neither of the linear terms in the long-run is significant. The squared term is positive and significant only for capital expenditures. It means that its impact on growth is U-shaped, while the theory predicts an inverted U-shape, as it is illustrated on the figure 2, segment AB. Thus, for a low level of public investment the impact on growth is negative, but starting from the certain level it becomes positive. There are two possible explanations. First, as far as we use
panel data there may be a small portion of countries in which public investment projects are not determined by benefit-cost considerations. For such countries the growth-public investment line is downward sloping, which is depicted on the downward sloping portion of AB line. Second, the completeness of the projects is important for productivity public investments. Public investment is usually a long-term project. Its completion requires permanent investment during a certain time period. If not enough funds are devoted to the project, it will be a waste of money, and thus has a negative impact on growth. The vivid example of such waste of resources is unfinished projects. The unfinished road or sea port has no value either for society or for private producer. They do not contribute but, by crowding out investments from the private sector, retard growth of the economy. However, such results do not give support for the proposition that as much as possible should be spent on public investment. Very high level of public investment is likely to crowd out more productive private investment, which is even more harmful for the economy. For them it is highly probable that marginal cost exceeds marginal benefit, so the net contribution of high level of public investment to growth of real GDP is negative. Also, the private sector may not be able to absorb all the benefits of developed infrastructure.

The possible true relationship is illustrated on figure 2. The available data is likely to be clustered on the segment AB, so that results show insignificant linear term and positive quadratic term of the function. However, it is highly possible that true relationship should also include segment BC. Without sufficient data this hypothesis can not be rejected. The valid interpretation is that obtained result is valid only for given range of capital expenditures of the government.

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The further investigation should involve more data, maybe for developed countries, which include rather high investment in public investment and which allow to estimate their impact on growth. Some early studies, as Gerson (1998, 17) reports, found that government capital expenditures have positive impact on economic growth in developing, but not developed countries.
The results of equation 9 show that only expenditures on health care have significant non-linear impact on economic growth. However, the further breakdown gives a rather different picture (see equation 10). The coefficient of expenditures on transport and communication shows the same pattern as capital expenditures in equation 8. Expenditures on schools seem to support the hypotheses on investment in human capital. Its non-linear impact on growth is significant and inverted U-shaped.

Crowding-in and out effects. As theory suggests, the influence of government expenditures on growth in the short-run and in the long-run is accompanied by certain patterns of private investment: (1) public investment in the short-run may crowd-out private investment and (2) in the long-run may crowd-in private investment. The influence of current public expenditures on private investment is not clearly defined, however in the long-run they may crowd-out private investment. These hypotheses will be tested in the form of the major specification (3.1).

The variables of the interest are government capital and current expenditures (equation 11) and government expenditures on education, health care and transportation and telecommunication (equation 12). Results are given in table 2.

As equation 11 reports, in the short-run, capital expenditures of the government crowd-in and current expenditures crowd-out private investment. This result corresponds to the positive impact of public investment on growth in the short-run (see equation 2). However, in the long-run neither of the variables have significant impact on private investment.

The further breakdown of the variables in equation 12 gives the following results. Public expenditures on infrastructure crowds-out private investment in the short-run and have no impact in the long-run. These results are supported by theoretical predictions. Also, Easterly and Rebelo report that
government investment in infrastructure does not crowd out private investment in long-run.43 Other variables do not have a positive impact on private investment either in the short- or in the long-run.

**General Conclusions.** The summary of the main results are given in table 7. The undertaken tests of linear model do not reject the hypothesis on the influences of aggregated government expenditures, namely, total expenditures, current and capital and disaggregated investment in infrastructure on economic growth. They main findings are (1) total expenditures have an insignificant impact in the short run and a significant negative impact in the long-run; (2) capital government expenditures have a positive and significant effect in the short- and long-run; (3) current expenditures have an insignificant effect in the short-run and significant negative effect in the long-run; (4) investment in infrastructure proxied by expenditures on transportation and telecommunication has a significantly positive effect both in the short- and long-run. The disaggregated budget expenditures on health care and education do not support the hypothesis of the effects of investment in human capital and current expenditures in the linear model.

In the non-linear model, only a few variables have significant non-linear impact on growth. They are total expenditures, capital expenditures, expenditures on schooling, expenditures on transportation and communication. Only in the non-linear specification the government expenditures on schooling (which is a proxy for public investment in human capital) revealed a positive impact.

Research on the relationship between growth and fiscal expenditures in the short- and long-run clearly leaves some issues for further investigation. There is still no coherent theoretical model. The model, developed by Barro, is a base model which examines only long-run relationships. Clearly, government expenditures have short-run impacts as well. Thus, by adding to the model some restrictions
on the capital stock and modifying production function can add transitional dynamics which is better fitted to the empirical observations.

The empirical work in this paper was done on the macroeconomic level, while the analysis of mechanisms through which government expenditures become effective should involve mostly microeconomic investigation. Also, macroeconomic analysis should be extended to include a more detailed breakdown of government expenditures by functions and by type. Such a breakdown would allow extension of the analysis and distinguish among the impacts of the investment in human capital and different current expenditures on growth. Also, the source of funds used to finance public spending should be identified and taken into account in the analysis. For this purpose some additional variables should be used as control variables. Among them are total tax revenue and the budget deficit.

One of the major shortcomings of the results of the empirical section is that we do not know whether they are robust. The optional test for robustness is extreme bound analysis used by Levine and Renelt (1992). The usual practice is to include in the general regression additional variables such as the premium in the black market for foreign exchange, supply and demand shock variables, as was done by Devarajan et al. (1996) and other related variables.

Despite these deficiencies in the empirical work, some clear findings have been established. The next section uses them, together with the theoretical models and lessons learned from the experiences of other economies in transition, to assess fiscal policy in Ukraine.

Due to insufficient data (for analysis of growth the time period should be not less than 15 years) it is impossible to conduct a similar analysis for Ukraine and other transition economies. The next section will investigate problems of fiscal policy in Ukraine. From the perspective of the empirical findings, there
will be policy discussion dealing with possible directions for Ukraine in restructuring its public investment
decisions so as to permit maximum economic gains.
IV. Analysis of Fiscal Policy in Ukraine.

The highlighted above problems of different impact of fiscal variables in the short- and long-run are equally important for all countries in the world. The findings of empirical section suggest that (1) total expenditures and current expenditures have insignificant impact in the short run and significant negative impact in the long-run; (2) capital government expenditures have positive and significant effect in the short- and long-run; and (3) expenditure on transportation and telecommunication which is used as a proxy for investment in infrastructure has a significantly positive effect both in the short- and long-run.

Due to lack of sufficient data it is impossible to test statistically these hypotheses for Ukraine and other transition economies. However, early experience of other transition economies suggests that there is a reason to believe that these results should hold for Ukraine as well. Therefore, this section draws on that experience as well as relying on the theoretical and empirical literature, as reviewed earlier, in order to assess fiscal policy in Ukraine and to formulate policy recommendations. Particular emphasis will be paid to public investment.

In this section I will review fiscal policy (and public investment policy in particular) in light of modern neo-classical economics. This section starts with establishing the framework for analysis of fiscal policy in transition economies. Then follows a brief comparative analysis of changes in fiscal policies in Ukraine and successful transition economies. That will be followed by a discussion of the role of public investment in transition economies for stimulating economic growth. It will be also argued that the lack of efficient recipients of government expenditures is one of the major reasons of different impacts of fiscal policy in Ukraine and other transition economies. So, the fiscal policy should be complementary to the growth promoting reforms. The policy recommendations conclude this section.
Examination of the effects of government expenditures (e.g. current and capital) on growth perspective is very relevant to Ukraine for a set of reasons, which can be divided into two broad groups: (1) political and (2) economic. Ukraine, like other transition economies, adopted the goal of quickly reviving the economy. However, not all of the transition economies fully recognized that economic growth is a long-term phenomenon which requires heavy investments today to have returns in the future. In all countries, there is political pressure to have immediate results. That pressure heavily influences the type of budget expenditures to be undertaken. Those transition economies that cut the unproductive expenditures on economy during early stages of reform turned out to be successful in economic recovery and in speeding up growth. These successful economies are Poland, the Czech Republic, Slovenia and, to some extent, Hungary and the Slovak Republic (hereafter referred to as CEE, Central and Eastern Europe). Reduction in unproductive expenditures on economy and redirection of other spending in these countries imposed hard financial constraint on the enterprises which in turn promoted restructuring of enterprises on micro level.

On the contrary, those countries which chose gradualist approach to reform (mainly Ukraine, Russia, and others) needed to have “immediate success” which can provide support for and irreversibility of reforms. The short-run oriented policy of the government determined the patterns of fiscal policy. Budgetary expenditures on public infrastructure were cut to a minimum and expenditures on social sphere and commercial projects were preserved or even increased. As a result, in these countries, the situation is different from the successful reformers. Particularly the poor performance in
Ukraine, in terms of providing market oriented reforms and economic recovery, became a parable in view of most of the economic analysts.\textsuperscript{xviii}


During the transition period, fiscal policy should be one of the first candidates to be reformed both in terms of the scope and composition of budget expenditures. The reason is that the government should reorient its activity towards performing those functions which comply with the development and functioning of the market.

Two economists, Stern and Stiglitz, in a study for the European Bank for Reconstruction and Development have identified what is required in that regard. They point out that the government should clearly define the scope of activities (1) in which it can outperform private sector, (2) in which it should share financing together with private sector, and (3) which should be left to the private sector.\textsuperscript{44} Under this classification, government should remain the major partner in provision of institutional infrastructure (which includes the legal framework and regulatory system which affects such key industries as telecommunication and financial services,) ensuring macroeconomic stability, provision of safety net and environmental security.\textsuperscript{45} It is excepted that government should share its responsibility with private sector in such areas as education, technology, promotion of savings and investments. Today, it is widely recognized that government should also stimulate participation of private parties in provision of public physical infrastructure. For example, in telecommunication sector and generation of electricity competition is viable and desirable.\textsuperscript{46}

\textsuperscript{xviii} However, as it will be shown later, the more relevant question is not only whether fiscal policy is conducive for growth but also does it pay to rely solely on government expenditures to facilitate economic recovery?
The major conclusion from the discussion by Stern and Stiglitz is that government should refuse to be involved in activities which can be effectively provided by the private sector. Within expenditures on the economy, there should be limited current expenditures, including producer and consumer subsidies. Such expenditures, in light of the preceding theoretical arguments and results of empirical evidence, are substitutes for the private inputs and thus retard growth by reducing returns on private capital. Besides, commercial investments of the government, because of their substitute nature, need to be redirected towards investments in public infrastructure because latter are more efficient in accelerating productivity growth. Even if government expenditures are perfect substitutes to private expenditures the net effect on economic growth is likely to be negative. The more distortionary taxes, which are used to finance government expenditures, the more negative is the net effect on economic growth.

Some of transition economies in CEE started radical market reforms in 1989. Since 1992-1993, most of these countries experienced growth. During the period of reforms, fiscal policy in the region has changed substantially. Total expenditures till 1995 showed the steady convergence to the threshold of 50 % of GDP, which is the average level of rich Western European countries (see table 3). In this respect, Ukraine achieved greater “success" by reducing total government expenditures from 58.45% of GDP in 1992 to 39.47% of GDP in 1996. As figures 4-8 illustrate, during the period

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\textsuperscript{xix} Such countries as the Slovak Republic, the Czech Republic and Hungary reduced their budget expenditures by 11.6%, 9.1% and 5.2% of GDP correspondingly. However Poland and Slovenia increased their expenditures by 9.9% and 5.6% of GDP. The possible reason is that these countries are oriented to integration with Western Europe and thus they adjust their fiscal policy indicators to the level of European Union countries.  

\textsuperscript{xx} There is still a substantial portion of off-budget government expenditure. Among them are commercial loans guaranteed by government from domestic and foreign financial institutions.  

\textsuperscript{xxi} These figures are taken from the «Public Expenditures Review», World Bank. According to data provided in «Ukrainian Economic Trends» bulletin in 1996 government expenditures totaled 43.2% of GDP. This discrepancy is mainly due to exclusion of Pension Fund by the World Bank. The combined effect of increase in expenditures on Pension Fund and social policy pushed total government expenditures in 1997 up to 49.6% of GDP.
of 1989-1995 the CEE countries substantially reduced subsidies to consumers and producers. According to the data calculated by the World Bank, xxii which are given in figure 3, these items of the budget in Ukraine also changed. 48 Thus, consumer subsidies after some fluctuations went down from 3.98% of GDP in 1992 to 2.46% of GDP in 1996, and producer subsidies correspondingly from 23.66% of GDP to 1.96% of GDP. Dabrowski and Kosterna criticize fiscal adjustments in CEE countries as a misleading indicator of success because along with reduction in producer and consumer subsidies these countries increased social transfers by almost the same share. 49 In Ukraine, government expenditures on transfers were almost on the same level during the whole period. Capital expenditures in CEE countries remained almost unchanged, they fluctuate around 4% of GDP, while in Ukraine they decreased from 4.17% of GDP in 1992 to 1.12% of GDP in 1996.

Given these changes, theory can predict the following outcomes for economies: (1) the reduction in the current expenditures on production sector and increasing of other current expenditures, given capital expenditures and total expenditures unchanged, are likely to have zero effect on economic growth in CEE countries, (2) the reduction in total government expenditures at the expense of consumer and producer subsidies and capital expenditures in Ukraine should give mixed effects on the economy, possibly there could be no effect. xxiii Actually, as it is illustrated on figures 3-8, all countries have the same pattern of development: decreases in current expenditures and unchanged capital expenditures (for Ukraine there is sharp decline) in the economy are accompanied by higher rates of economic growth. The only distinction is that there is rather strong growth in CEE countries and continuous, although

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xxii Here I directly refer to the data of the World Bank because it is the only source which contains consolidated budget expenditures by type. Unfortunately I was not able to find out the methodology which the World Bank used in their calculations. For the reasons discussed in the previous footnote, the figures on current expenditures on national economy for 1995-1996 are underestimated. In this respect the more reputable source is «Ukrainian Economic
slower, decline in Ukraine. These patterns of economic growth can be explained by further examination of the overall government involvement in the economy.

The CEE governments to revive growth, placed their bets on the emerging private sector. Their policies were aimed at privatization of existing enterprises and stimulation of creation of new private enterprises. The result was a growing and more efficient private sector (see table 5) and as an effect the acceleration of economic growth. In 1996-7 in almost all successful reformers (CEE) the share of non-state sector totaled above 65% of GDP. The rapid recovery of the economy allowed these countries to preserve current expenditures at a very high level.

Despite the criticism of Dabrowski and Kosterna, there is one positive aspect in the reform of fiscal policy in CEE. The reduction of producer subsidies imposed harder budget constraints on enterprises, or in terms of Kornai, it was a shift from supply-constrained economy to demand-constrained economy. This policy by itself made enterprises orient and respond to consumer demand, and fostered increases in production efficiency of SOEs and privatized enterprises.

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Evidently, in both CEE and Ukraine neither governmental policy is optimal and needs further reforms.

Relatively high official share of private sector output in Ukraine can be misleading indicator for the following reason: the sharp decline in the official output of SOEs by 70% (or actually even more) boosted the share of private sector even without rapid growth of its output. The actual share of private sector is estimated to be even more if one consider shadow economy (the general level of shadow economy in Ukraine is estimated to be about 50% of total economy). The existence of large shadow sector shows the fragility of official environment for emerging private sector. Another striking difference between Ukraine and CEE countries is GDP per capita. As table 3 shows on average the GDP per capita in Ukraine is 5 times smaller than in CEE countries. Thus, the volume of production of private sector in Ukraine is comparably lower than in CEE.

The reason for decline in government expenditures in Ukraine was restoring fiscal discipline. Table 4 shows that during 1992-1997 tax revenue was rather volatile. Government expenditure and budget deficit reveal the same pattern. Some initial success in stabilizing fiscal policy was achieved by 1996 and reversed in 1997. This short lasting stabilization was rather shaky because it based on cosmetic rather than structural changes.

As it was mentioned above the policy of high government expenditures on social sphere can be explained by struggling of CEE countries to join EU. However, as Sachs and Warner (1996, 22-28) argue, budget policy in Western Europe can not serve as a model for CEE. First, the CEE countries have much lower GDP per capita (according to Table 3 for some countries it is 10 times less). Second, Western Europe is in the process in redesigning of its generous social policy. Third, the productivity in CEE countries is much lower than in Western Europe.
The idea of reducing and reorienting government intervention in the economy has received support of some leading Russian economists. Among them, Illarionov points out that in Russia the main crises which led to sharp economic decline were caused by the great scope and ineffectiveness of government involvement in regulation of economy.\textsuperscript{51} During the period of reforms government expenditures in Russia declined from 71.1\% of GDP in 1992 to 43.4\% of GDP in 1996. According to him, government expenditures affect the economic development through two channels: (1) the effectiveness of government expenditures on non-governmental sector comparing to effectiveness of the use of funds not withdrawn from private sector, and (2) effectiveness of government as a producer of public goods. He considers government expenditures on consumption, servicing and repaying state foreign debt, and increased transaction costs due to ineffectiveness of government in performance its functions as the most harmful for economic growth.\textsuperscript{52} As a strategy out of economic decline, Illarionov suggests the substantial reduction in governmental obligations. The government should concentrate its financial resources on providing public goods, which will benefit all citizens but not only a certain group, all other (including commercial projects of the government - A.V.) should be left to private sector. According to Illarionov, to achieve 1\% growth of real GDP Russia should balance its budget on the level of 35 \% of GDP.\textsuperscript{53}

2. The Effectiveness of Fiscal Policy in Ukraine.

Two of the most crucial steps for making fiscal policy in Ukraine efficient and conducive for growth are: (1) redirecting the government capital expenditures from commercial projects to the most urgent projects on infrastructure, along with reformed budgetary procedures and methods of project
analysis, (2) promoting the development of private sector (this is the feature which distinguish current economic situation in CEE and Ukraine). An elaboration on both recommendations follows.

Public investments. The inadequate investment policy undertaken by the Ukrainian government, both in terms of scope and targeting, is one of the reasons for the disastrous real GDP dynamic.

As it is shown on figures 3-8, in CEE countries during the transition period the percentage of capital expenditures of government on the economy remained fairly stable. In Ukraine since 1992, scarce investment was reduced by almost three times. Comparing to other successful transition, developing, and developed economies presented in table 6, Ukraine has the smallest fraction of public investment. Ukraine’s total government investment is 3-8 times less compared to other transition economies and 2-4 times less than in developed countries.

The contraction of investment in Ukraine can be explained mostly by political and partially by economic reasons. Firstly, under the pressure of imposing fiscal discipline it is politically easier to cut capital expenditures and preserve high level of social expenditures. Secondly, it is viewed by some politicians that the key barrier for growth of production is not inadequate structure and mismanagement of enterprises but lack of working capital, which reduces industrial capacity. Thus, to revive industry it is enough to increase current expenditures on economy or to increase expenditures on social protection which will increase the purchasing power of domestic consumers and will revive production.

Yet this approach of stimulating consumer demand during 1992-1997 proved to be inefficient. The direct and indirect subsidization of state industrial sector in 1992-1996 has not revealed positive

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\(^{\text{xxvii}}\) Other crucial issues of fiscal reforms include (1) structural changes of social sector to decrease expenditures on social sector while improve their targeting, (2) reform of the budget expenditures management, etc.
results. In case of reorienting expenditures from producer to consumer the SOEs are constrained while consumers’ demand can be easily satisfied by non-subsidized private sector or higher quality imports. So, without radical restructuring of industrial sector and creating beneficial environment for emerging new private sector, reviving growth is impossible.

Some positive steps to redefine the role of government in the economy were taken by adopting in 1995 of Cabinet of Ministers Resolution #384 “The Concept of Regulation of Investment Activity under Conditions of Market Transformation of the Economy”. This concept provides the new guidelines for the government investment policy reorienting it from the full provision of the investments in production sector by state towards the selected support of several “most important” industries. These industries include: agriculture, energy, production of medicines, export oriented industries, production of consumer good, and social sphere. From the presented list, it can be concluded that the commercial orientation of the government investment is preserved and infrastructure, which is a very important and valuable public intermediate good, is left aside and, probably, will be financed by the principle of residual activity.

Theory and basic empirical results support the view that growth of productive private sector in all countries heavily depends on development of infrastructure. As Wylie argues

It is clear that output in the goods producing sector ... depends on more than its own direct capital and labour inputs, and level of technology. Goods producers rely on a supporting infrastructure of services, such as transportation, telephone systems, electric power systems, trade, finance, insurance and real estate services, schools, universities and hospitals, commercial services, and services of the federal, provincial and municipal governments.54

In general, infrastructure consists of two components: physical (roads, communication, sewage system, etc.) and institutional (mainly it is legal framework and regulatory system). The mechanisms by which physical infrastructure affects economic development are: (1) reduction of transaction costs, (2)
building new networks of production and distribution, and (3) decrease of local market power and increase of competition.\textsuperscript{55}

The importance of infrastructure for enhancing of private sector productivity is not enough to guarantee approval for any project to be undertaken. Each country and each city has its own bottlenecks that must be removed. For example, the construction of a big airport near a small city with underdeveloped industry may not be a prudent decision. Instead, improving of roads and communal services can play its role in facilitating economic growth. On the contrary, building new roads in a region with a dense road network will not add to the productivity of the region. May be an airport or further development of communication services is a better approach to attract new businesses.

According to the survey done by German Economic Advisory Group in Ukraine in the summer of 1997, the underdeveloped infrastructure was one of the main impediments for foreign direct investments and thus domestic investments in the country. Similar problems are also reported for Poland. In the study of the reasons for which foreign companies refrained from direct investments into the country, 58.5\% of foreign companies reported that this was due to the underdeveloped infrastructure.\textsuperscript{56}

In Ukraine, investments are still required in basic infrastructure. For example, compared to other transition and market economies, rail and road networks per 100,000 of population are less developed in Ukraine, and the waiting time for connection to telecommunication is 2-3 times higher than in Poland, Czech Republic, Slovak Republic, Slovenia and Hungary.\textsuperscript{57} According to the survey done by DHL, the phone line installation costs in Kyiv is $1,500. That is more than 13 times higher than in Warsaw, and 15 times higher than in Prague and London.\textsuperscript{58} The overall costs of doing business in Kyiv is almost two times higher than in Bratislava, Budapest, Prague and Warsaw, and it equals to New York and slightly
lower than in London. In Ukraine the underdeveloped infrastructure combined with high costs of doing business results in slowed development of private business and stagnated economy.

The difficulties that foreign investors (and domestic as well) meet shows that Ukraine is not unique and its successful economic development depends on the well known factors: redesigning of government intervention into economy in the spirit of Stern and Stiglitz (1997). In order for fiscal policy to become effective the scope of intervention of government into economy should be drastically reduced and radically reoriented. The state should clearly define narrow scope of activities in which it can outperform private sector, in which it should share financing together with private sector, and which should be left to the private sector. To the last should be included all commercial projects.

The more fundamental problem of investments is their targeting. According to the findings of the World Bank, “the current mix of public investments in Ukraine still largely reflects the old priorities and construction of new facilities. By their nature, since such investments serve as substitutes for private inputs into production, they are destined to be unproductive. In 1995 about 30% of scarce government capital expenditures were invested in commercial projects such as agriculture, industry and construction. Following the pattern of the old command system, investments were made in construction of new facilities but not equipment and technology.

Another dimension of the targeting is selecting among the variety of similar projects, concentration of the public investment among these projects and allocating of expenditures on operation and maintenance of existing infrastructure.

As argued by Tanzi and Davoodi, capital expenditure, on the contrary to current, is highly discretionary. Usually there is a group of officials that decides which projects public investment will be
spent on. To ensure the best choice among similar projects, the usual practice is to apply benefit-cost analysis. According to the results of research done by World Bank, the Ministry of Economy of Ukraine, which is entitled to select the public investment projects, does not employ any quantitative analysis to calculate the costs and benefits of the projects.62

The discretionary decision on investment projects can lead to malfeasance. First, there can be a bias towards new and large construction projects63 caused by three reasons: (1) corruption within officials (the larger projects can bring corrupted officials higher commissions) and (2) officials may want to gain a “fame” by promoting the completion of gigantic projects, or (3) dual budgeting system (more on this see below). In all three cases the bias is harmful because of inefficient use of resources.

Second, there can be intense pressure from different groups to allocate scarce public investment resources among too many projects. Obviously uncompleted projects have little value to the society and do not add to the productivity of private sector. Ukraine had inherited from the Soviet times a number of unfinished projects. According to the State Committee for Construction and architecture the total number of unfinished (or frozen) objects is estimated at 200,000-250,000 units or 35,000-40,000 sites.64 Their fate was not decided until recently when Enactment of President of Ukraine “On Privatization of Objects under Construction” adopted a procedure on their privatization.

Third, the allocation of too much resources on expensive capital projects can leave smaller, although maybe more valuable, projects without proper financing or push them out of the plan at all. Also due to lack of resources there can be cut of expenditures on operation and maintenance of existing infrastructure, which are classified as current expenditures. The marginal benefit of new project can be lower from the marginal costs (losses) caused by deteriorating existing structures. Another reason for underfinancing of expenditures on operation and maintenance is dual budgeting. Under the dual budget
system, the Ministry of Finance of Ukraine decides in general how budgetary funds should be allocated between current and capital expenditures, while Ministry of Economy of Ukraine decides how capital expenditures will be allocated between investment projects. Thus, the decision on current and capital expenditures on infrastructure are separated between two ministries. As it is reported by World Bank, in Ukraine the authorities can make a decision to built a new water supply system while the existing system, if repaired and better maintained, can completely satisfy the needs of the region.

The Role of Efficient Recipients. The government of Ukraine has not recognized that a key element of a growth strategy is the development of a dynamic new private sector. It continues to rely mainly on restructuring state-owned enterprises (SOEs) through privatization and investments, but discouraging further development of new private sector. Although direct budget subsidies to producers were reduced, hard budget constraints were not imposed because, besides direct government subsidies, SOEs receive subsidized loans (including foreign loans guaranteed by government) and widely exploited interenterprise and tax arrears. The non-budgetary part of financial support to economy goes to state-owned or privatized enterprises from commercial loans guaranteed by government. According to the Minister of Finance of Ukraine, the foreign commercial loans to 58 Ukrainian enterprises guaranteed by government totaled $1.4 bl. in 1997, from which the government in 1997 should have paid from the budget $268 ml. of unperformed loans. Also, commercial loans to large enterprises are provided by large commercial former state-owned banks as a payment for their right to service budgetary funds. So, the scope of government support of the economy is not fully depicted in the budget. This poses a considerable problem in analyzing the effects of government intervention in economic activity. Interenterprise arrears, in turn, serve as unlimited credit in the system of production. This problem is self accelerating when all enterprises choose the equilibrium of arrears.
Fiscal policy can be fully efficient only if there is an efficient recipient of governmental inputs into production for which government expenditures is a complementary input. The importance of an efficient recipient can be illustrated by the following example. In the market economy, the goal of private enterprises is profit maximization. Under severe domestic and foreign competition, to maximize their profit firms should increase productivity and reduce costs. Both of these items depend on accessibility of suppliers and consumers, distribution network, transaction costs etc. Investment in infrastructure promotes productivity growth in industrial/private sector in the long-run. In Ukraine the industrial sector still consists mainly of big SOEs.\textsuperscript{xxvii} The destiny of some gigantic SOEs is not decided yet and some of them still wait for new owners. Their behavior differs from the similar private and state-owned economic entities in market economies. The target of SOEs is to survive,\textsuperscript{68} not to maximize profit.\textsuperscript{xxix} These enterprises have weak incentives to make necessary radical restructuring of the production process, reorient on new suppliers and consumers by producing products which are scarce and highly demanded on the market. They are still supply-constrained. For these reasons, these enterprises demand from the government mostly subsidies which allow them to remain afloat. On the contrary, if government increases investment in transportation or developing of network capital\textsuperscript{xxx} the SOEs do not use the

\textsuperscript{xxvii} According to official data (see Kozhevina, 1997) at the beginning of 1996 there are 281,2 thousand of registered small and medium sized enterprises in Ukraine compared to 2 mln. in Poland. The main reason for insignificant private sector is adverse regulatory policy of government, which includes very bureaucratized procedures of registration and licensing of companies, and also badly regulated procedures of inspections. The privatization of big enterprises is still an issue on the agenda of State Property Fund of Ukraine.

\textsuperscript{xxix} The problem of misallocation of resources in transition economies is two-dimensional. The evolutionary theory (Murrel, 1992) explains the behavior of SOE and ministries in transition economies in decisions about public investment and financing of economic development. The former are used to relying on past routine in their managerial plans. That is, they continue to hope for financial assistance from the state, and the latter, in order not to lose their power in the hierarchical structure, continue to demand financial resources for disbursement among SOEs. By allocating scarce budgetary resources to SOEs via commercial investments and subsidies, governments leave the infrastructure underdeveloped.

\textsuperscript{xxx} As Ickes and Ryterman (1994, p. 95) argue «Public investment can play a critical role in rebuilding network capital and shortening the noisy phase of the transition». 
advantage of the developed infrastructure, so its effect in the short run and medium run will be minimal.

Reduction of transaction costs and greater access to other suppliers or consumers is not enough incentive for SOEs to reorient and restructure production. From this standpoint, the current fiscal policy alone is destined to be inefficient and not fully productive unless there is a developed private sector which is sole efficient recipient of government investments.
V. Conclusions.

Ukraine, as all other CEE economies in transition, should pay especially close attention to designing a new fiscal policy. The transition period is a suitable time for major changes. The early stages of transition are more tolerable to radical changes than the mature period of economic development. The painfulness of radical reforms in mature economies can be illustrated on the example of Western Europe, which mostly suffers from the overburdening “welfare state”.

It is reasonable for Ukraine on the early stages of market reforms to design fiscal policy in such a way that it is conducive for long-term economic growth and does not require substantial changes in the nearest future. In this respect, this paper gives some current observations of fiscal policy in Ukraine and other transition economies and suggests some general recommendations for designing new fiscal policy.

First, reduction in current expenditures on economy and increase in capital expenditures (or at least fixing them on the same level as it was in CEE) are beneficial for growth. This proposition is supported by the findings of the empirical section. The empirical section extends the analysis to distinguishing between short- and long-run effects of fiscal variables on economic growth. Thus, (1) total expenditures have insignificant impact in the short run and significant negative impact in the long-run; (2) capital government expenditures have positive and significant effect in the short- and long-run; (3) current expenditures have insignificant effect in the short-run and significant negative effect in the long-run; (4) investment in infrastructure proxied by expenditures on transportation and telecommunication has significantly positive effect both in the short- and long-run. In the non-linear model only several variables have significant impact on growth. They are total expenditures, capital expenditures, expenditures on schooling and transportation and communication. Only in the non-linear specification
did government expenditures on schooling (which is a proxy for public investment in human capital) reveal a positive impact. So, government should increase capital expenditure from the budget up to 3% of GDP, where these expenditures are allocated according to the benefit-cost criterion.

Second, government should reorient capital expenditures from commercial projects to public infrastructure, where basic infrastructure such as transportation, communication and utilities should be a priority. Moreover, the government needs to improve the budgeting procedures and project analysis.

Third, based on the observation that the efficient recipient of capital government expenditures is crucial for successful fiscal policy, government should foster the development of the new private sector and clearly define the fate of all state-owned enterprises.
Endnotes.


6 Ibid.

7 Ibid., pp. 224-225, 235-238.


10 See review in Strauss, Jack. «Modeling the Dynamic Effects of Government Investment on GDP in Developing...”


14 Ibid., pp. 66-69.

15 Ibid.


19 Ibid

20 Ibid., p. 3.


41 Ibid., 11-12.


43 Ibid., p. 13.


45 Ibid., p. 5.


52 Ibid., s. 20.
53 Ibid., s. 22.
60 Ibid.
63 Ibid., p. 24.
64 Ibid., p. 7.
67 For extensive discussion see Gros, D., and Alfred Steinberr. Winds of Change; Economic Transition in Central and Eastern Europe, 1995, 162-168.
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