International Journal of Economics and Financial Issues
Vol. 5, No. 1, 2015, pp.240-248
ISSN: 2146-4138
www.econjournals.com

Does Fiscal Illusion Impact Budget Policy? A Panel Data Analysis

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ABSTRACT: This study employs a panel data analysis to examine the relationship between fiscal illusion and budget policy of 15 African countries over the period between 1980 and 2012. The empirical results of the test of Hausman suggest the use of fixed effects estimators. But to check the robustness of the empirical results in different econometric specifications we have also conducted many regressions using alternative estimation methods (such as random effect and population averaged models). Empirical results obtained show a positive and significant association between fiscal illusion and public deficit. An increasing of 1 percent of fiscal freedom leads respectively to, *ceteris paribus*, an augmentation of 0.27, 0.24 and 0.3 percent of budget deficit in the fixed, random and population method. As a conclusion, fiscal illusion affects budget policy.

Keywords: Fiscal illusion; Public deficit; Public debt; Government policy; Panel data
JEL Classifications: C33; E62; O38

1. Introduction

"*How can a politician best use his powers of the purse to promote his political projects?*"
Puviani (1903)

It is with the work title "the theory of fiscal illusion" that Puviani (1903) intended to answer the above question. Indeed, Puviani (1903) has introduced the hypothesis of "fiscal illusion" as an observable answer to the previous interrogation. In spite of the precedence of Mill (1848) writing, with these concepts, Puviani (1903) has pointed out the opacity that could be administered by public policymakers in the collection of taxes or in government spending management. These categories of illusions are the product of the association between voters (electors or local populations) and decision-maker (rulers or policymakers). There both sides can be studied and considered. The fiscal illusion can be defined as a situation, where the agents do not realize the real value of fiscal measures. However, the term fiscal illusion has been used in different meanings in the economic literature since 1903.

Basically, fiscal deficit is considered as the difference between current plus capital spending and current receipts. Indeed, when a public sector spends more than it receives in taxes and other revenues in a given year, it has a budget deficit (Stiglitz and Walsh, 2008) which is commonly corresponded to a fiscal deficit. When a government runs a negative gap; it borrows on financing the deficit between public spending and tax collection. As a result, the stock of outstanding debt has increased. In any economy, there are three main deficits: public, private and external. The foreign flows of net borrowing are considered as investment minus saving, which as a matter of accounting must sum to zero. Doctrines widely accepted about how open macroeconomies operate focus on these gaps or surplus positions.

Regarding the twin deficits, the results indicate that fiscal and external net borrowing do not usually move in mutually offsetting fashion as the economic theory predicts. The important observed

exception is a decrease in public borrowing when extra foreign exchange is made available. Where surplus considered as net lending, is equal to saving minus investment. The twin deficits and the rational expectations/Ricardian equivalence (Barro, 1974) models are widespread in mainstream literature, while development and heterodox economists often favor a structural deficit explication of external balance.

Economists' are interesting in economic theories and evidence about fiscal policy (Barro, 1989) because the persistent budget deficits have increase. A public budget is an official document presenting the government's proposed revenues and expenditure for a financial year. The public budget balance**,** also alternatively referred to as general public balance, governmental budget balance, or public fiscal balance is the overall difference between public revenues and expenditure. A positive balance is called a public budget surplus, and a negative balance is a public budget deficit. A budget is prepared for each level of government (from local to national) and takes into account public social security obligations. Budget policy refers to public attempts to run a budget in equilibrium or in surplus. The goal is to reduce the public debt. Also known as government debt and national debt, public debt is the debt owed by a central government. Budget deficit is not to be confused with government debt.

Over time when the government spends more money than it collects in taxation, public debt increases. When a government engages in more deficit spending, the amount of his debt accrues. Many different categories of debt make up public debt. A great deal of it is foreign debt, which is money that is owed by the government to external lenders, either in the form of international organizations, other governments, or groups like sovereign wealth funds, which invest in government bonds. Public debt is also made up of internal debt, where citizens and groups within the country lend the government money to continue operating. In some ways, this is a lot like lending to oneself, since ultimately the responsibility for it falls back on the very people lending money.

Theories related on budget deficits run in two important directions. Some of the theories look on the effect of fiscal deficits on fundamental economic variables. Others look on the reverse direction, that is, what macroeconomic and fiscal variables (including budget rules and institutions) affect and determine fiscal deficits. Keynes (1936) proposed that the appropriate mix of financing fiscal deficit is the adoption of compensatory fiscal policy to manage the economy during the periods of low economic activity. He, argued for accrued public spending and for it to have the desired impact, it should not be borne out of taxes. Keynes then advocated for debt-financed public spending or deficit financing.

The objective of this paper is to contribute to the current strand of literature related on fiscal illusion and governmental deficit, by investigating the relationship between budget policy and fiscal policy. In order to fulfill this objective we raised and answered the following research questions: Does fiscal illusion affect budgetary policy? Is there evidence of a relationship between fiscal illusion and public deficit?

The organization of the paper is as follows. Section 2 reviews in detail the previous and related literature. Section 3 presents the methodology and describes the econometric model, the variables, the descriptive statistics, and the data sources. The empirical results are presented in section 4. Section 5 presents the study's conclusion and policy implication.

2. Review of Literature

The effects of fiscal policy on budgetary policy have been the subject of long debate. Many studies, both theoretical and empirical, show that tax subjects are not able to fully recognize their tax liabilities. Such wrong perception of taxation, usually called the tax illusion, can have several reasons. Low level of economic literacy, high costs of information or complexity of the tax collection system can be mentioned as examples. The tax illusion can be considered as a part of fiscal illusion. For its purposes, the tax illusion is understood as a situation where the taxpayers do not fully realize their tax liabilities. There are several possible causes of such situation. But two main causes of tax illusion - the income elasticity of tax revenues and tax system complexity - are described here.

Taxes have usually the role of automatic stabilizers in the economy. This role can become one of the sources of illusion. If the nominal income grows, appropriately set taxes can draw off higher share on total income. It means that although the marginal tax rates remain unchanged, the average tax

rates are higher. However, this factor depends on how the taxes are constructed. The more is the tax construction similar to the flat tax. The lower is the role of income elasticity of tax revenues as a source of fiscal illusion. The more complex the tax collection system is, the more it is likely to be a source of tax illusion. The taxpayers are either unable or unwilling to fully understand the information contained in the tax system. There are three main factors, which make the tax system more complicated (and less understandable for the taxpayers). These are the tax system fragmentation, visibility of taxes and the space for tax liability minimization.

Downs (1957), in his seminal theoretical book, recognized that local leaders involving in politics have little incentive to correct fiscal illusion. Their incentive is to spend more on public investment projects that pay off within a four-to-seven-year electoral cycle. The median voter model for production of government services as formulated in Downs (1957) is a natural point of departure. Within this framework a franchise extension usually implies a new decisive voter located further down the income distribution and facing a lower tax price for the public service. As shown in Kenny (1978), this increases the provision of public services if the uncompensated price effect exceeds the income effect. Meltzer and Richard (1981) consider a pure redistributive government and show that government expenditure increases as the median voter is located further down the income distribution. Taking these two approaches together, the predictions are that franchise extension increases government expenditure on redistribution items, while the impact on general government services is ambiguous.

The usual image of the traditional case of fiscal illusion is identified by Galbraith (1958). As a consequence, Galbraith (1958) identified that public institutions would take the option for a "sub-optimally low" value of government provision of services. Galbraith (1958) argues that government expenditures is less than optimal and notes that advertising and marketing are greater in the private sector. In 1967, Buchanan has signed the work and in the title of one of the chapter, the term fiscal illusion appears. Other authors have recurred to fiscal illusion for many objectives and with many different senses after Buchanan's quotes.

In the nineteen, Twight (1994) and, Alesina and Perotti (1996) have outlined several instruments by which politicians may make governmental budgets less transparent. This is by raising the transaction costs of monitoring fiscal conditions for a governmental subject to fiscal illusion or incomplete information: biased macroeconomic forecasts, biased estimates of the effects of policy changes on budgetary outcomes, strategic use of on- and off-budget spendings and receipts, manipulation of budgetary baselines, and multiyear budgeting. Von Hagen and Harden (1994) developed a framework in which there is a failure to fully internalize the true economic costs of governmental spending - another kind of fiscal illusion.

Besides Easterly (1999), the most recent macroeconomic literature has focused on the impact of governmental expenditure contraction. Cohen and Percoco (2004) state and provided two alternative theories: the theory of asymmetric effects of governmental expenditure and the theory of fiscal illusion. The effect of downward in government investment in the lack of competitiveness and a consequent worsening of fiscal gap has also been analyzed by Calderón et al. (2003). These authors have developed a theoretical framework to explain the importance of what is called fiscal illusion.

The hypothesis of fiscal illusion is complicated and complex, as observed by Mourao (2006). It is complex because nowadays there is a large set of authors who contributed to its analysis with different views and senses. It is complex because it refers to a wide range of economic realities. Finally, its complexity is also derived from the methodological use that is given to fiscal illusion itself. Sometimes authors use fiscal illusion as an assumption. Then other researchers employ the terms relating them to hypotheses of solving previous problems and other economists identify fiscal illusion with consequences of fiscal manipulation, as Mourao (2006) states.

When public institutions finance spendings by debt rather than by tax collections, fiscal illusion is created. According to the theorem related on Ricardian equivalence people would be indifferent between debt and tax financing if they had rational expectations (Seater, 1993). Ricardian equivalence (Barro, 1974) emerges from dynamic optimal savings models postulating that all resources are fully employed and that households are fully rational. Since they do not, they experience a fiscal illusion or more precisely debt illusion, underestimating future tax liabilities in the form of current government debt.

According to Blewett (1981), a major strand of modern governmental finance literature concerns itself with governmental debt. Buchanan's early work (1958) on the weight of the governmental debt set off a now famous and quite furious debate which lasted most of a decade. As pointing out, this debate was the result of economists using "burden" to discuss two different terms (West, 1975). Modern economists accept the fundamental theorem of Ricardian equivalence that equaled at once and for, all tax with the emission of debt. However, classical economists, including Ricardo himself, did not believe that individuals would consider the two alternative equivalents. After explaining his equivalence theory, Ricardo, went on to offer an important qualification which was based on fiscal illusion. The propensity of governmental debt to generate fiscal illusion was almost globally accepted by classical economists. One can only just find a scholar of that time who was not opposed to the excessive use of debt because of its ability to "blind" the persons or populations who pay taxes.

The publications of Saez (2013), Piketty (2014) and, Piketty et al. (2014) have triggered an intense debate in the profession due to the policy recommendations related to the tax rates that should be applied to top earners. According to these authors, the empirical evidence on the taxpayers' behavioral responses to tax reforms sustains policies directed to taxing capital, reducing the complexities of the tax codes, and to drastically increase the marginal income tax rates for top earners. Taking this as a starting point, many authors have analyzed the feasibility and optimality of these proposals using macroeconomic structures.

3. Methodology: Econometric Model, Variables, Descriptive Statistics and Data Sources

3.1. Econometric Model

We have collected observations for 15 countries (Angola, Cameroon, Central African Republic, Chad, Congo Dem Republic, Congo Republic, Côte d'Ivoire, Egypt, Gabon, Ghana, Morocco, South Africa, Tunisia, and Zambia) over the period between 1980 and 2012. We utilize several panel data estimation methods. Since in this paper, the objective is to contribute and document the association between budgetary policy and fiscal illusion. We use budgetary policy as the dependent variable and use several other variables as explanatory variables. In static setting, the panel equation is as followed:

$$dp_{i,t} = \beta_0 + \beta_1 tax_{i,t} + \sum_{k=2}^{n} \beta_k X_{k_{i,t}} + \eta_i + \upsilon_t + \varepsilon_{i,t} \qquad (1)$$

From equation (1) i is for country and t for year. dp is the dependent variable representing the budgetary policy, tax is one of the independent variables which capture the fiscal illusion and $X_{k_{i,t}}$ are other independent variables included in the regression. η_i and υ_t represent the country and period of fixed-effects, respectively. $\varepsilon_{i,t}$ represents the disturbance term.

3.2. Variable Selections

Usually in the literature, as proxy for budget policy we take public deficit which can be defined as general government revenue minus general government total expenditure (in billions of local currency unit).

Public debt, which is also most of the times referred to as public institutions, is all of the finance owed at any given period by any branch of the government. It takes in debt having to pay by the federal government, the state government, then even the municipal and local government. It is, in effect, an extension of personal debt, since individuals make up the revenue stream of the government. For public debt data (in percentage of GDP), we rely on Abas et al. (2010).

Fiscal policy is the use of public revenue collection (mainly know as taxes) and spending (expenditure) to influence the economy. According to Keynesian economics, when the government changes the levels of tax collection and public expenditure, it influences aggregate demand and the level of economic activity. Fiscal policy is generally employed to normalize the economy over the course of the series of cycles of economic expansion and contraction. When a public's total spendings exceed the revenue that it generates (excluding revenue from borrowings). There is a fundamental difference between deficit and debt. Debt is a gradual gathering of yearly deficits.

Budget policy and fiscal policy are not the same. Fiscal policy is based on the fiscal stimulus to the economy, the repartition of taxes and the generosity of allowances. Fiscal policy (fiscal illusion) defined as the fiscal freedom indicator of the Heritage Foundation which is a composite index stemming from the top tax rate on individual income, the top tax rate on corporate income, and total tax revenue as a percentage of gross domestic product-GDP.

Moreover, in order to isolate the impact of the variation of the fiscality on the change in the level of public deficit, we use various check variables. Real GDP at constant 2005 national prices (in millions 2005 USD), is a standard macroeconomic unit use to capture the size of the value of economic output balance for price variations (inflation or deflation). This modification transforms the money-value measure, nominal GDP, into an index for the amount of total output. GDP is the sum of consumer expenditure, Investment made by private, Excess of Exports over Imports and Public Expenditure. Due to inflation GDP increases and does not actually reflect the true growth in economy. That is why inflation rate must be subtracted from the GDP to get the real growth percentage called the real GDP. Inflation based on the consumer price index which reflects variations in the cost to the average consumer.

Trade openness is considered as the ratio of the sum of exports and imports to GDP. This variable is captured as the Openness Index and is an economic metric calculated as the ratio of country's total action of selling and buying goods and services, the sum of exports plus imports, to the country's gross domestic product. The main analysis of the Openness Index is: when the index is higher, the influence of trade on domestic activities is larger.

Exchange rate (national currency/USD) is a synonym of foreign-exchange which is the proportion between two currencies. Exchange rate is the tariff at which one money will be exchanged for another. It is also regarded as the value of one country's money in terms of another money.

Real interest rate is the loan interest ratio adapted for inflation as measured by the GDP deflator. The real interest rate is the proportion of interest an investor expects to receive after allowing for inflation. Real interest rate is described more theoretically by the Fisher equation. Fisher equation considers that the real interest rate is roughly the nominal interest rate minus the inflation rate.

As measure of active population, we use the variable number of persons engaged (in millions). Per person engaged is defined in the Penn World Table (PWT) to include all persons aged 15 years and over, who during the reference week performed work, even just for one hour a week, or were not at work but had an occupation or business from which they were momentarily absent.

Domestic credit (as a percentage of GDP) is the sum of internal credit provided by banking institutions and national credit to private organizations. Internal credit is a commercial credit or lending that does not involve export of import of goods.

3.3. Descriptive Statistics and Data Sources

Descriptive statics of all the variables is presented in Table 1 below. The test of asymmetry or normality and the test of distribution have being conducted. The skewness is used to capture the asymmetry of the distribution of a real-valued random variable about its mean. The skewness values here are positive and negative. It confirms the asymmetry of the distributions. The kurtosis is any measure of the peakedness of the distribution of real-valued random variable. The kurtosis is a descriptor of the shape of a distribution. The Jarque-Bera (1987) test is a goodness-of-fit test of whether sample data have the skewness and skewness matching a normal distribution. The Jarque-Bera test suggests that the selected variables are not distributed. The complete dataset is an unbalanced panel with 15 countries data spanning from 1980 to 2012, as one can check from the last column of Table 1, not all the data is available for every single year.

Table 1. Descriptive statistics

	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
Budget Deficit	-0.079	0.25	0.35	5.67	22.75***	281
Fiscal Freedom	4.15	0.17	-0.00	2.04	29.60***	251
Exchange Rate	1.65	0.17	-0.74	3.31	29.43***	450
Persons Engaged	1.59	1.15	-0.39	2.79	11.26***	480
Openness	4.35	1.23	2.64	9.98	.	464

(real) GDP	10.18	1.31	0.21	2.54	9.29***	480
Inflation	2.76	5.03	-4.18	20.87	.	466
Public Debt	4.13	0.70	-0.35	3.06	9.25***	475
Domestic Credit	65.50	67.41	2.07	7.92	.	475
(real) Interest Rate	5.63	15.95	-1.76	11.93	.	364

Budget deficit in logarithm form is the dependent variable. Only Domestic credit and Real interest rate are not in logarithm form. *, ** and *** respectively indicates significance at 10, 5 and 1% level. The values in parentheses are the standard deviations.

Sources: Authors' calculations

The data sources of all the variables (dependent and independent) are provided in Table 2. Data sources are mainly collected from World Economic Outlook Database, World Development Indicators, Penn World Tables, Heritage Foundation, and Abas et al. (2010).

Table 2. Data Sources

Variables	**Sources**
Budget Deficit	World Economic Outlook Database
Fiscal Freedom	Heritage Foundation
Exchange Rate	Penn World Tables 8.0
(real) GDP per-capita	Penn World Tables 8.0
Openness	Penn World Tables 7.1
Consumer price index	World Development Indicators
Real Interest Rate	World Development Indicators
Persons Engaged	Penn World Tables 8.0
Domestic Credit	World Development Indicators
Public Debt	Abas et al. (Historical Public Debt Database, 2010).

Sources: Authors' calculations

4. Empirical Results

Table 3 shows the empirical results of tests. In the Table 3 we have presented a set of tests around the estimation methods. Among these methods, we have: the poolability test, the Hausman test, the Hausman-Taylor test and the Breusch Pagan test. The poolability test rejects the hypothesis of no individual effect. Hence, we use an error component model specification. The Hausman test rejects the hypothesis of random effect at 5% level (but not at 1%) and the Hausman-Taylor also suggests that we use fixed effect estimation. However the Breusch-Pagan test rejects the null hypothesis and thus supports the presence of an individual random effect.

Table 3. Diagnostic tests

Tests statistics	**Value**	**P-value**	**Null hypothesis**
Poolability test	F(14, 171) = 4.56	0.00	No individual effect
Hausman test	$\chi^2(7) = 15.45$	0.03	Random Effect
Hausman Taylor test	$\bar{\chi}^2(7) = 74.70$	0.00	Random Effect
Breusch-Pagan test	$\bar{\chi}^2(1) = 19.91$	0.00	No random Effect

Sources: Authors' calculations. Note: The values in parentheses are the degree of freedom.

The empirical results of the Hausman test (Table 3) suggest that we have to use fixed effect. Then, we have conducted our estimation by using fixed effects estimators. Moreover, to check the robustness of the empirical results in different econometric specifications and to address several

econometric issues, we have also conducted many regressions using alternative estimation methods (such as random effect and population averaged models).

Table 4. Estimation results

	Fixed Effect			Random Effect ML			Population Averaged		
Models	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Constant	-1.19**	-0.75	2.75	-1.28***	-0.74	-0.26	-1.33***	-1.71***	-1.17*
	(2.59)	(1.55)	(1.59)	(0.45)	(0.69)	(0.84)	(3.12)	(3.26)	(1.81)
Fiscal Freedom	0.27**	-0.11	0.18	0.24**	-0.02	0.13	0.30***	0.10	0.14
	(2.48)	(0.71)	(0.90)	(0.11)	(0.13)	(0.15)	(2.90)	(0.97)	(1.08)
Exchange Rate		0.07***	-0.04	0.05***	0.04***	-0.01	0.03***	0.05***	0.01
		(3.75)	(0.32)	(0.01)	(0.01)	(0.03)	(5.21)	(6.19)	(0.29)
Persons Engaged		0.48***	0.60	0.00	-0.09***	-0.07*	-0.05***	-0.11***	-0.08***
		(2.84)	(1.46)	(0.04)	(0.03)	(0.04)	(3.20)	(6.06)	(3.77)
Openness			-0.16		-0.01	0.00		-0.01	0.02
			(1.16)		(0.02)	(0.04)		(0.97)	(0.69)
Real GDP			-0.30		0.09**	0.02		0.12***	0.06**
			(1.43)		(0.03)	(0.05)		(5.77)	(1.97)
CPI			0.03		0.04*	0.02		0.04*	0.05
			(0.36)		(0.02)	(0.04)		(1.81)	(1.06)
Public Debt			-0.13***		-0.07***	-0.09**		-0.03	-0.03
			(2.64)		(0.03)	(0.04)		(1.07)	(0.90)
Domestic Credit			-0.00			-0.00			-0.00*
			(0.72)			(0.00)			(1.75)
Real Interest Rate			-0.01***			-0.01***			-0.01***
			(2.75)			(0.00)			(2.78)
R^2	0.03	0.16	0.28						
Observations	227	212	123	212	193	123	212	193	123

Budget deficit in logarithm form is the dependent variable. Only domestic credit and real interest rate are not in logarithm form. *, ** and *** respectively indicates significance at 10, 5 and 1% level. The values in parentheses are the standard deviations. The weakness of coefficient of determination in the fixed effect is surely due to missing data.

Sources : Authors' calculations

Table 4 shows the empirical results of the equation (1). In this Table, we have reported the empirical results of nine (09) regressions. In the first three regressions, we have presented results of the fixed effect linear panel estimation. Then, in the second three regressions – model (4), (5) and (6) - we have also reported the coefficients of the regression with the maximum likelihood random effect estimation. Moreover, in addition to these two estimation methods, we used the population averaged estimator - models (7), (8) and (9).

From Table 4, we have obtained positive and significant association between the fiscal illusion and the public deficit. This increasing relationship is robust to the inclusion of certain check variables to the regression equation or use of different estimation methods. An increasing of 1 percent of fiscal freedom leads respectively to, *ceteris paribus*, an augmentation of 0.27, 0.24 and 0.3 percent of budget deficit in the fixed, random and population method. In Africa the budget deficit increases due to the higher illusion entertained by politicians. However this is in line with the ideas that, only a stable, democratic and serious government can formulate adequate fiscal and budgetary policies and implement these policies efficiently.

Exchange rate, real GDP and inflation have significant and positive estimated coefficients. However, public debt, and real interest rate have significant and negative estimated coefficients. Among these results, real interest rate is robustly correlated and negatively with dependent variable. Domestic credit is not significant.

Finally, the association between the persons engaged and the public deficit with different sign in certain regressions is significant. An important purpose of budget deficit is the payments of debt servicing. In Africa the budget deficit increases due to the higher debt repayments. Government of the state must focus on such policies that would address the issue of growing dependence on the international aid financing agencies. Our empirical results have completed the theoretical evidence of Blewett (1981), related on fiscal illusion. Indeed, the capability of the policymakers to operate fiscal illusion concerning the advantages of public projects was observed in African countries.

Empirical results from Mourao (2006) show that, without considering the impacts of fiscal as a complicated process of dissimulation of the real fiscal situation from the political agents (policymakers and voters), election-year government balance shifts downwards and post-election year government surplus turn upwards. When considering the fiscal illusion hypothesis, it was observed that countries with higher values of a fiscal illusion index show poorer quality of budget deficits and their budget cycle is more negatively pronounced (more significant negative differences to the average national budget deficit). Evidence further shows that these effects are contingent on the economic development level and on the maturity of the democratic system.

5. Conclusions and Policy Implications

The principal objective of this article was to explore the association between fiscal illusion and budget policy. The empirical results using panel data analysis show that fiscal illusion affects positively and significantly budget deficit. An increasing of 1 percent of fiscal freedom leads respectively to, *ceteris paribus*, an augmentation of 0.27, 0.24 and 0.3 percent of budget deficit in the fixed effect method, random effect method and population averaged method. So the hypothesis of fiscal illusion is valid in the 15 selected African countries. Fiscal illusion impacts budget policy.

The most interesting economic policy recommendation of this paper is that the more recent models of political budget cycle gain if they consider and integrate the fiscal illusion phenomenon. More practically, the following policy recommendations are provided in order to reduce the budget deficit: (i) Formulate an objective and oriented fiscal policy to reduce the gap between policy formulation and implementation; (ii) Set in relevant and consistent public interventions in order to improve efficiency and reduce the gap between their cost and their expected effects; (iii) Harmonize tax, fiscal, and monetary policies in order to minimize the distorting effects of taxation; and (iv) Stable, democratic and serious government should formulate adequate fiscal and budgetary policies and implement these policies efficiently.

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