PUBLIC-PRIVATE PARTNERSHIPS IN DEVELOPING COUNTRIES: ARE PPPS IN INFRASTRUCTURE USEFUL FOR GOVERNMENT BUDGET BALANCE AND ECONOMIC GROWTH

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Abstract- Public-Private Partnerships (PPPs) are increasingly growing and becoming a major means for investment in public infrastructure in most countries over the last two decades. For empirical investigation, panel data approach is utilized to develops a PPP model in 25 developing countries during 1990-2015 regarding the relationship between PPPs and government fiscal position. Findings reveal that a weak relationship between PPPs investments and budget deficit, while PPPs investments have a positive significant relationship with economic growth. Consistent with previous studies the findings confirm the results of previous studies about the use of PPPs as a means of evading expenditure controls and hiding budget deficits.

Key words- Public private partnerships (PPPs), Infrastructure, budget deficit, economic growth.

I. INTRODUCTION

Typically, expansion in infrastructure investments improves the productive capacity of an economy, thereby its economic growth. Moreover, lack of such investments can result in enormous economic and social cost (World Bank, 2008). Unfortunately, global infrastructure needs investments with $3.7 trillion annually while the actual investments are $2.7 trillion, that is, global infrastructure faces an annual infrastructure investment gap of some $1 trillion as the World Economic Forum estimates. On the level of developing countries, according to UNCTAD (2013), this gap is expected to ranges from $0.7 to 1.6 trillion annually till 2030. To bridge this gap, governments can resort to Public-Private Partnerships to implement the required investments in infrastructure. Traditionally, infrastructure investments are financed by public expenditures. However, on one hand this required investment actually increases over years due to geographic reasons (e.g. population, urbanization, etc.). On the other hand, developing countries suffer from fiscal constrains due to increasing budget deficits. As a result, the gap in infrastructure investments tends to extrapolate over years. In this context, private sector participation have the potential to close the infrastructure gap by leveraging scarce public funding and introducing private sector technology and innovation to provide better quality public services through improved operational efficiency. This study has focused on previous literature review to investigate the impact of PPP investment on budget deficit and economic growth in developing countries.

II. OVERVIEW OF PPPS

Public–private partnership arrangements in infrastructure may vary across countries, sectors and projects. There is thus no standard method of public–private partnership implementation. Investment commitments to PPPs for infrastructure also started in the early 1990s, growing cumulatively from US$18 billion in 1990, to US$782 billion in 2000 and reaching US$2.5 trillion in 2015. Table. 2 show the number of projects by sector and PPP type, while table. 2 & 3 represent payment to government and total amount of investment by Sector and PPP type respectively.

Table 1. Number of Projects by Sector and PPP type.

Sector	No. of Projects	concession	Divestiture	Greenfield	Other mode
Energy	1478	188	423	2740	45
Telecommunication	709	6	189	609	11
Transportation	4224	932	69	504	91
Water	285	352	28	371	138
	6696				

Source: World Bank's PPI database.

Table 2. Payment to government by Sector and PPI type. Million dollar

Sector	Amount of payment	concession	Divestiture	Greenfield	Other mode
Energy	130258.5	46634.9	81255.704	2107.59	260.28
Telecommunication	173880.3	10	105541.26	68053.067	276
Transportation	111994.9	59194.67	15632.08	32454.19	4713.98
Water	11605.24	4746.3632	6190.2156	527.98	140.68
	427739				

Source: World Bank's PPI database

Table 3. Total amount of investment by Sector and PPP type Million dollar

Sector	Total Amount of investment	concession	Divestiture	Greenfield	Other mode
Energy	**854214.4**	105657.42	136298.08	611666.63	592.31
Telecommunication	**1006949**	842.35	370105.21	635724.99	276
Transportation	**514915.5**	284347.51	17380.11	207109.76	6078.13
Water	**62605.27**	31738.768	9590.5041	19860.362	1415.64
	2438684				

Source: World Bank's PPI database

III. LITERATURE REVIEW

A public–private partnership (PPP) is a government service or private business venture that is funded and operated through a partnership of government and one or more private sector companies. However, literature clearly agrees that Public-Private-Partnerships appear to have no clear definition or standard implementation methods. Since the beginning of the 1990s, a number of empirical studies have found that public investment in infrastructure has a positive and significant impact on output. Aschauer's seminal study suggests that the rate of return of public infrastructure investment on productivity in the United States is 50 – 60 percent (Aschauer, 1989). Given these results, it is not surprising that Aschauer's work is to initiates the public infrastructure debate which has since resulted in numerous academic studies.

According to the World Bank Report (2006) there are the various constraints to infrastructure financing including financial constraints, fiscal barriers, inadequate administrative capacity and poor infrastructure regulations. Battacharya et al. (2012) show how most developed economies a temporary boost in investment and infrastructure spending has indeed been necessary to move to the next stage of economic growth and development.

with respect to Public-Private partnerships,There are various theories explaining the growing popularity of the use of PPPs in financing and implementing public infrastructure projects.Leibenstein (1966) proposed what is called, "X-efficiency" hypothesis by which government entities are inefficient. Subsequent studies try to identify how the efficiency of public entities can be improved?. This debate sheds the light on the important public-private partnerships in particular; some studies argue that the PPPs enable public entities to respond more efficiently to market forces and to be more competitive.

Kopp (1997) argues that the private sector as an intermediary, enable the public sector to leverage more financial resources especially in countries facing fiscal problems. Some prior studies have been conducted to examine the variables that affect PPPs. For example, Hammami et al. (2006), using panel data analysis attempts to investigate the determinants of PPPs arrangements. They find that the critical success factors for PPPs implementation are debt burdens; aggregate demand and market size are the most significant factors affecting the PPPs arrangements. Moreover, macroeconomic stability, institutional quality and previous PPPs experience play important role in the success of PPPs arrangements.

According to the value for money Sappington and Stiglitz (1987), suggested that PPPs are desirable in infrastructure financing because they promote technical and allocative efficiency among public projects. Reeves (2004) also argues that PPPs might help derive value for money so long as they are established in an environment rooted in long-term cooperative relations among stakeholders. This co-operation should incorporate risk sharing and proper delineation of authority, communication and information channels as well as responsibility and accountability.

Benito (2008) expressly analyzes the private financing of infrastructure in Spain as an example of creative accounting in the public sector. The author believes that the main reason for the increasing use of PPP is to defer payments and in this way control their deficits and debt without cutting investment in infrastructures and public services.

In contrast to the above, IMF, (2004) notes that one of the main concerns surrounding the use of PPP is that they can be used to "bypass spending controls, and to move public investment off budget and debt off the government balance sheet, while the government still bears most of the risk involved and faced potentially large fiscal cost". While increasing efficiency through the involvement of the private sector, PPP also provide sources of private financing. It allows public investment without immediately increasing the public debt.

Efraim (2006). Found Partnership taken initially as a way to evade the controls on public spending and hide the budget deficit, which enable government to distribute investment spending on a number of years Instead of paying the full amount at once, as is the case, thus transforming the current budget deficit to a deficit in the future. Efraim recognizes that PPP are not driven by the search for a proper allocation of risk for greater efficiency. Instead, "they are means to disguise conventional contracting undertakings that are subject to standard budgeting processes as some new undertakings are carried out off budget." In the same context, Maskin and Tirole (2007) consider that the desire to avoid budgetary constraints have also favored the use of PPP.

Posner et al. (2009), concluded that the use of private financing and delivery for public services has advantages. Private efficiencies can deliver real benefits that might overcome higher financing and transaction charges. The risk sharing and bundling of all phases of capital services may very well promote incentives to achieve improved outputs with lower costs. However, these promises rest on assumptions and ideal conditions that are often missing in many cases. In addition, not available to provide the level of competition necessary to motivate private innovation and efficiency. sharing of risks is often overturned in practice The long-term financial impacts of PPPs may be better absorbed in countries with good long-term growth prospects, while countries with slowing economies and large long-term commitments are advised to be far more cautious.

Arezki, R. et, al., (2016), see it is now increasingly apparent that the early aspirations of a new investment and development boom have largely been disappointing. Not only has the flow of new PPP infrastructure projects been disappointing, but also the touted greater efficiency of PPPs has not always materialized. The cost of capital of PPPs relative to public funding, and assumption of risk, has proved to be significantly higher than initially estimated. Although risk transfer to the private sector inevitably requires compensation increases in the cost of capital sometimes incorporated more than just compensation for risk. This in turn has driven user costs up disproportionately, which has led to adverse public opinion around PPPs. The bad reputation of some PPP projects has been further exacerbated when the quality of service delivery of some PPPs deteriorated due to budget cuts or other constraints. These reasons partly explain why PPP deal flow has not been as large as some hoped.

Finally, there are those who believe that the main defect of the partnership lies in the degree of complexity making transactions expensive in terms of money and time and therefore compatible only with major projects.

The existed budget deficit and public debt create constrains on increasing expenditure, and investments in public infrastructure would decrease accordingly. In turn, governments resort to alternatives to satisfy infrastructure needs. Especially PPPs arrangements. However, few studies examined the effect of PPPs on budget deficit and economic growth (checherita (2009)). The current paper addresses this issue to contribute the existing literature with examine the impact of PPPs on budget deficit, as well as economic growth based on a sample of developing countries.

Data:

The study sample includes 25 developing countries, sorted by regions (according to the World Bank classification). The selected countries have experience use PPPs to implement public infrastructure projects, over the period 1990-2015.

Table 4. The selected Countries sorted by regions

EAP	China	Cambodia	Indonesia
	Malaysia	Philippines	Thailand
ECA	Turkey	Russia	
LAC	Argentina	Brazil	Peru
	Chile	Mexico	Colombia
MENA	Egypt	Jordan	Morocco
	Tunisia		
SA	India	Bangladesh	
SSA	Ghana	Kenya	Nigeria
	Senegal	S. Africa	

Data Sources: the paper depends on different sources to collect data on the model variables for the selected countries. The most important is World Bank (WB) database on private participation in infrastructure (PPI),[0] which covers four sectors: (i) energy; (ii) telecom; (iii) transportation, and (iv) water and sewerage. The projects are classified into four main categories: (i) concessions; (ii) divestiture; (iii) greenfield projects; (iv) management and lease contracts, each of these categories including specific contractual sub-types. In addition to world development indicators database (WDI), World Economic Outlook (WEO), and International Financial Statistics (IFS). The definition of each of the variables expressed in the model and sources found on Table 5.

Table 5. Description of the variables

variable (% of GDP)	definition	Source
PPP_inv	Total value investment in realized PPP	World Bank
PPP_gov_pay	Payments to government due to PPPs	World Bank
PPP_invf	investment in realized PPP without Payments to government	World Bank
Private_inv	private investment (proxied by private capital formation)	IMF, WEO
Public_inv	public investment (proxied by public capital formation)	IMF, WEO
GDP_growth	Real GDP growth rate	IMF, WEO
Gov_bal	Balance of the general consolidated government budget	IMF, WEO
PPG_debt	Public and publicly guaranteed debt	WDI
Real_Lending	Real lending rate	IFS
Inflation	Consumer Price (annual %)	IMF, WEO
tax_burden	Total revenue of the general consolidated government budget	IMF, WEO
FDI	Foreign Direct Investment	WDI
Ca_bal	Current Account balance as % of GDP	IMF, WEO
GDP_pcap	GDP per capita in purchasing power parity terms	WDI

Panel unit root test

Unit root test is a test of stationarity that has become widely popular tool over the past several years, most panel data sets have a time dimension to them, and it is normal to apply panel data unit root to avoid spurious problem to ensure that the model variables is

stationary. The most often used tests to check the stationarity of economic variables are the Levin-Lin-Chu (LLC) test (1992), Im, Pesaran, and Shin (IPS) test, Augmented Dicky-Fuller (ADF) test and Philips-Perron (PP) test.

Table 6. Panel unit root tests

test	LLC	IPS	ADF	PP
PPP_inv	-6.83*	-5.5*	113.7*	144*
Cal_bal	-4.81*	-1.4***	56.9***	44***
D(Cal_bal)	-14.1*	-10.9*	191*	269*
FDI	-6.1*	-5.2*	104.9*	115*
Gdp_growth	-13.04*	-10*	156.9*	199.6*
Gdp_pcap	-4.01*	0.83***	62***	16***
D(gdp_pcap)	-9.2*	-6.4*	129.5*	190.2*
Gov_bal	-4.2*	-0.79***	47.9***	34***
D(gov_bal)	-11.6*	-4.8*	107.7*	133.4*
Real_leanding	1.4***	4.2*	90*	86.6*
inflation	-15.3*	-9.6*	114*	227.4*
PPg_debt	0.2***	-0.03***	44.5***	28***
D(ppg_debt)	-12.3*	9.3*	145.5*	160.7*
Private_inv	-9.1*	3.9*	79.4*	32.5**
Public_inv	-1.4***	-0.97***	70.1**	35***
tax_burden	-6.5*	-4.2*	97.5*	75.99*

Robust t-statistics in parentheses: * significant at 1%, ** significant at 5%,*** significant at 10%.

In this section, Despite The ADF test has become the "standard" test for stationarity in the literature, we applying the panel unit root tests reviewed above to a panel of annual data spanning the period 1990-2015. The results show that most variables is stationary according to the unit root tests results. While some variables be non-stationary at level but they become stationary at first difference.

Cointegration Test

There are three tets for panel cointegration: Pedroni (engle-granger based), Kao (engle-granger based) and fisher (combined johansen). We applied Kao test for cointegration, the test result as follow:

Table 7. Kao test for co-integration analysis

	t-statistics	prob
ADF	-2.8	0.0025

Where probability value for ADF test is less than 1%, So our variables are co-integrated, And therefore have long-run relationship.

IV. HYPOTHESES AND MODEL SPECIFICATION

The current paper hypothesizes that PPP are significantly related to budget balance and economic growth. Subsequently, it seeks to examine this hypothesis using a sample of 25 developing countries, over the period 1990-2015, therefore, it uses the panel regression model, which offer more consistent estimates in the results through combining time series and cross sectional data dimensions. It allows for variability of individual countries while still preserving the dynamic adjustment within countries. We develop four models to investigate hypotheses, presented as follow:

Hypothesis (1): there is a significant effect of PPPs on budget balance.

According to a theoretical literature review, we predict that the PPPs have impact on budget balance, following Checherita (2009), the model (1) used to investigate this hypothesis.

$$Gov_bal = \alpha_i + PPP_inv_{it} + Public_inv_{it} + Real_Lending_{it} + financing\ sources_{it} + GDP_growth_{it} + ppg_debt_{it} + PPP_components_{it} + error\ term_{it} \quad (1)$$

Hypothesis (2): there is a significant effect of PPPs on economic growth.

Hence, the annual growth rate of real gross domestic product is hypothesized to depend on: annual growth rate of real GDP per capita, three types of investment, private; public; and investment under PPP, foreign direct investment and tax burden:

$$GDP_growth = \alpha_i + gdp_pcap_{it} + PPP_inv_{it} + Public_inv_{it}\ Private_inv_{it} + FDI + tax_burden_{it} \quad (2)$$

V. ESTIMATION RESULTS AND DISCUSSION

The necessary pre-estimation tests were conducted to choose appropriate model. We conduct Breusch-pagan Lagrange Multiplier test (LM), to choose between random effects model and OLS model. We find that LM test is significant for both models. So, we use the random effects model. But we still need to test for fixed versus random effects therefore, we use Hausman test, according to hausman test results fixed effects model is more appropriate for both models.

i. The effect of PPPs on budget deficit

The paper points out that effect of total PPPs is insignificant while, its components have significant impacts with different signs on budget balance. The payments to governments would raise the budget balance but net PPP investment would decrease that balance (have insignificant impact on budget deficit, except first lag in third fixed effects model, results shows that have negative sign and significant impact on budget balance). This mean that payments represent revenues to the government whereby increase the budget balance. On the other hand, pure PPP investments represent debts to governments by which the budget balance will decrease. This result consistent with paper of Grimsey (2004) who argues that governments use less discount rate than private sector to discount the expected cash flow for infrastructure projects. This implies that private sectors bear higher cost of capital than public sector. Since the PPPs are considered as liabilities to governments and must be repaid, the greater PPP result in higher budget deficit.

Blanc-Brude et al (2007), using data about the costs of road construction projects in Europe to make a comparison between the costs of those projects when implemented through PPPs arrangements and implemented by public sector, the study found that the cost of construction through PPPs arrangements higher by about 24% on average than the traditional method.

On the contrary, pure PPPs investments, (PPP_invf) have negative insignificant impact on budget surplus.

ii. PPPs and Economic Growth

Fortunately, the PPPs are related to economic growth, which is ultimate goal of any policy maker. This reflects that governments enter in several PPPs projects so as to implement the required infrastructure projects at a high quality. Subsequently, improved infrastructure base is associated with enhance productive capacity of an economy.

CONCLUSIONS

The political, financial and developmental pressures may drive governments to accept PPPs for the wrong reasons, in addition to desire to pay investments outside the balance sheet, as a result of increasing constrains on government budget stifle. Which could lead governments to follow inefficient and unsustainable PPPs programs.

The study concluded that the application of PPPs programs in many developing countries, have seen a large increase over the last two decades. However, analysis of proposed model did not indicate to presence of significant effect of the PPPs investment to relieve the burden on budgets of developing countries. and thus to reduce budget deficit.

On the other hand, Although the PPPs is likely to have negative and statistically insignificant impact in increasing budget deficit. However, the analysis showed a significant impact to raise economic growth rates and thereby raising the standard of living. Thus, it can be said that the partnership in itself is not harmful tool to the economy but should not be selected in order to reduce public capital spending budget in order to reduce the budget deficit because often this will not happen. So Countries should be wary of using private capital to finance infrastructure and capital assets especially as budgets become more encumbered with financial commitments.

According to above, the study recommends adopt PPPs methods does not involve future payments from the government to the private sector, Depending on the methods that rely on the user fees. Therefore, there must be reasons and clear objectives for the partnership. Resorting to PPPs to deliver Public infrastructure should be motivated to achieve efficiency and effectiveness, and not just untraditional method to finance public projects. In the sense that the main objective of the Partnership is to achieve value for money.

i. The effect of PPPs on budget deficit

$Gov_bal_{it} = \alpha_i + PPP_inv_{it} + Public_inv_{it} + Real_Lending_{it} + financing\ sources_{it} + GDP_growth_{it} + ppg_debt_{it} + PPP_components_{it} + error\ term_{it}$ (1)

Table 4. PPPs and budget deficit

Dependent variable: Government Balance (% GDP)	pooled	FE	FE	FE
CA_bal	0.034 (1.65)*	-0.062 (-2.25)**	-0.027 (0.296)	-0.01 (-0.39)
ppg_debt	0.017 (2.9)***	0.0127 (0.54)	0.037 (3.36)***	0.018 (2.39)**
Real_lending			0.009 (0.7)	
inflation	-0.0378 (-2.38)**	-0.057 (-3.23)***	0.036 (0.19)	
GDP_growth	0.011 (0.36)	0.123 (4.01)***	0.097 (2.7)***	-0.051 (-1.87)*
Tax_burden			0.155 (3.3)***	
Public_inv			-0.14 (-2.6)***	
PPP_inv	-0.148 (-1.29)	0.022 (0.15)	-0.008 (0.89)	
PPP_gov_pay				0.215 (1.8)*
PPP_invf				-0.054 (-0.89)
Gvnt_inv		-0.208 (-2.86)***		
Constant	-0.875 (-2.9)***	-2.72 (-3.85)***	-4.6 (-4.17)***	-1.37 (-3.14)***
Obs	237	222	217	464
R-squared	74.5	0.83	0.81	0.69
Adjusted R^2	73.7	0.81	0.78	0.67
Hausman test (chi2)		40.1 (0.0021)		

Robust t-statistics in parentheses: * significant at 10%, ** significant at 5%,* significant at 1%.**

ii. The effect of PPPs on economic growth

$$GDP_growth = \alpha_i + gdp_pcap + PPP_inv_{it} + Public_inv_{it} + Private_inv_{it} + tax_burden_{it} + error\ term_{it} \quad (2)$$

Table 4. PPPs effect on economic growth

Dependent Variable: GDP_growth	Pooled	FE	RE
gdp_pcap	-0.0006 (-1.67)*	-0.00002 (-0.257)	0.00007 (-1.43)
PPP_inv	0.185 (2.14)***	0.077 (2.866)***	0.132 (1.53)
Private_inv	0.187 (5.88)***	0.249 (5.89)***	0.222 (6.03)***
Public_inv	0.214 (4.52)***	0.112 (1.4)	0.179 (2.94)***
Tax_burden	0.003 (0.111)	0.124 (2.55)**	0.037 (1.04)
Constant	0.4668 (0.574)	-2.63 (-1.91)*	-0.359 (-0.358)
Obs	0.13	0.25	0.11
R-squared	0.12	0.21	0.10
Adjusted R2	394	394	394
Hausman test (chi2)		30.603 (0.0013)	

Robust t-statistics in parentheses: * significant at 10%, ** significant at 5%,*** significant at 1%.

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