Does the Adoption of Public Private Partnership (PPP) Policy Frameworks Increase the Viability of Infrastructure-Based PPP Projects in Sub-Saharan African Countries?

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Christopher Jackson

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Advisor: Dr. Christopher Day   Secondary Reader: Dr. Karyn Amira

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Revised Introduction: Public Private Partnership Policy and Viability

Public Private Partnership (PPP) agreements have been developing rapidly since the 1980's and are capable of offsetting the soaring costs governments must endure to develop infrastructure within their countries. As a result, scholars, NGO's, businesses, and governments alike have demonstrated a positive attitude toward engaging with PPP-style projects, particularly with respect to the developing world (Kahyaogullar, 2013, p. 244). Thus, considering the generally accepted need for infrastructure development in Sub-Saharan Africa, the PPP-model (PPPM) presents itself as a potential solution to the infrastructure deficiency the region experiences. Addressing Sub-Saharan infrastructural needs could be a major step toward reducing rampant unemployment of the region: "While both the state and the private sector can create jobs, the greatest obstacles to their ability to do so are a lack of effective basic infrastructure and services combined with poverty and insecurity" (Urio, 2010, p. 3). Accepting the negative relationship between infrastructure-deficiency and employment rate, one can argue that PPPM is a potential step toward bolstering the economies of Sub-Saharan countries. The current discourse of PPP-related scholarship posits that if governments development and adopt PPP policy frameworks (PF), PPP projects will become both more attractive and successful, what I will denote as "viable". Conceptualizing distinct indicators of PPP viability in Sub-Saharan Africa allows for a statistical and qualitative analysis of the generally accepted notion that PF increases PPP viability (PPPV) in a given state.

Definition of Variables

Establishing a clear conceptual framework and consistent, standardized terminology is vital to meaningfully study the relationship between PPP-viability and PF adoption. Due to the interdisciplinary nature of PPP as a subject, there are wide variations in terminology regarding PPP coupled with varying understandings of what constitutes PF. In fact, determining a universal definition for PPP alone can be troublesome as there are many variants of the PPPM being implemented today. The table below clearly lists all terms used in this paper and their respective acronyms. An explanation of all terms will follow.

Table 1: Terms and Acronyms					
Term	**Code**	**Term**	**Code**	**Term**	**Code**
Public Private Partnership	PPP	PPP-model	PPPM	PPP Policy Framework	PF
PPP Viability	PPPV	PPP Project	PPPP	Number of PPPPs in Year 'X'	N_x
Number of Int. Org. from whom Commitments were received	Aid_crnio	Success Aggregate	SA	Multilateral Cooperation	MC
Adoption of PF	PFA	Indicators of Viability	IOV	Private Participation in Infrastructure Database	PPI
The Infrastructure Consortium for Africa	ICA	Quality of Government Database	QOG	Debt to IMF Expressed as Percentage of GDP	imf_gd

The research question this essay seeks to address is as follows: *Does the Adoption of Public Private Partnership (PPP) Policy Frameworks Increase the Viability of Infrastructure-Based PPP Projects in Sub-Saharan African Countries?* For the purpose of this research, a simple and World Bank-based definition of PPP will be used; as I am drawing from World Bank sponsored PPI, I will highlight the types of projects included in the dataset: "The database records contractual arrangements with and without investments in which private parties assume operating risks in low- and middle-income countries (as classified by the World Bank)" (Methodology 2015); "Projects included in the database do not have to be entirely privately owned, financed or operated. Some have public participation as well" (Methodology 2015). Thus, projects analyzed in this research must meet the preceding conditions. It should be noted

that the dataset may contain error as collecting accurate, local-level data in African countries is notoriously difficult.

The unit of analysis for this research will be dependent on the particular hypothesis being tested. 'Country' and 'Project' are the two units of analysis utilized for this research. The *independent variable* in question is 'Governmental Adoption of a Policy Framework (PF)', denoted as PFA through the duration of this essay. With respect to what constitutes PF, I simply classify any official governmental policy that outlines the functioning, operation, regulations, or terms in of PPPPs as PPP policy framework or PF. Due to the constraining nature of data available on actual PPPPs, this study must rely on the World Bank; as a result, it is vital to define 'PF' as something that the World Bank would recognize, ergo the governmentally-official criterion. Moreover, policies that are not officially claimed by a particular government will not suffice as these types of policies, such as a private sector contract, do not have the same legal weight nor do they have a direct connection to the government, or public aspect of PPP projects. In the appendices, one will find varying types of PF's and corresponding explanations: in short, certain countries' PF's were installed in stages. In such a case, the earliest complete form of a PF is considered the PF in question.

The dependent variable is threefold and noted as PPP Project Viability (PPPV). First, I have been limited in my variable selection to what is available from the World Bank PPI data set. Furthermore, as the literature review will illuminate, PFA is already established in most regions to be a bolsterer of PPP success and viability; however, there are no systematic understandings of viability and success. Yet, PFs are still understood as able to increase attractiveness for investment and PPPP success, thus bolster viability. Studying whether or not PFA affects the success rate of PPPM endeavors in Sub-Saharan Africa is not only difficult as projects are

primarily in progress, but also somewhat redundant as the World Bank, the main reporter of PPP related data, heeds countries to adopt PF. In order to expand the research and delve into the *political* aspects of PFA, it is valuable to conceptualize indicators of viability (IOV) based on what types of data the World Bank records as they are the principal propagators of PPP related information and know-how. For this study, viability is understood as 'attractiveness' and 'success'. Within PPPV, this research has selected three separate dependent variables, known as Indicators of Viability (IOV): (1) Change in Number of Projects in a Given Year (ΔN_x), (2) Aggregate Number of Successful Projects (SA), and (3) Multilateral Cooperation (MC). A breakdown of each dependent variable will be presented in the "Hypothesis and Causal Theory" section; however, the IOV selected for this project demonstrate 'attractiveness' and 'success' in that the number of projects suggests a level of attractiveness for the country as well as success, while MC indicates levels of attractiveness in that multilateral cooperation's will need to find a country attractive enough to offer endorsement.

Existing Literature on the Impacts of Policy Frameworks on PPP Projects

In order to get a full picture of the environment surrounding PPP policy, several types of literature must be examined. For the purposes of this study, I will be utilizing primary government documents (policies), academic PPP policy critiques, and PPP project case studies, as well as academic journals written by scholars of public private partnership. Considering that the realm of PPP projects is influenced and strongly determined by a variety of fields and disciplines, such as economics, politics, sociology, and business, it is essential to draw from not only NGOs such as the World Bank, but also from those sources that can provide a glimpse into what it is like working within the frameworks themselves.

I. Distinctions between PPP project considerations in the developed and developing world

PPP literature in general has had a heavy emphasis on projects in the developed world until more recently (Kumaraswamy, et al, 2005, p. 5), principally in the UK and the USA (Kahyaogullari, 2013, p. 244). This then presents a major challenge to studying PPP policies in developing countries, thus suggesting a knowledge gap due to developing country PPP projects' lack of scholarship. On the other hand, Urio (2010) notes that in both Western developed countries and in-transition countries, the private sector is vital in infrastructure development, at the very least signifying that developed and developing countries experience similar phenomenon with respect to the *private* sphere (p. 73). While Urio's book investigates the value of Western models in in-transition countries, the study utilizes Russia, China, Ukraine, and Poland as in-transition country case studies, thus challenging the notion that these ideals hold true in Sub-Saharan Africa as Africa is a completely separate region, dominated by low-income, developing countries: according to the World Bank, 66 countries within Sub-Saharan Africa are considered developing (2014), making up 973.4 million people of the total 1.1 billion people recorded to be in Africa by the Population Reference Bureau (2013). However, comparative studies, such as Kahyaogullari's (2013) study, begin to investigate the differences between PPP policies in developing and developed countries, with particular importance to understanding the contextual differences that developing countries experience, including those in Sub-Saharan Africa.

Kahyaogullari's (2013) literature review details the previous work carried out with respect to the functioning of PPPs in both developed and developing countries, but signifies a gap in the literature in which he notes no comparative studies had been carried out (p. 245). Of the various findings he discloses in his article, perhaps the most relevant to PPP policy

frameworks is as follows: "…the regulatory frameworks established by developing countries are mostly inadequate, while developed countries are more successful in establishing sound regulatory frameworks" (p. 246). Noting this difference, Kahyaogullari cites Appuhami, et al's (2011) findings that, as with the case of Sri Lanka, the "weak regulatory framework" (p. 252) of PPP projects in developing countries serves as a principle challenge to their development and success, which is echoed by Urio (2010) as he notes that in-transition countries (see above) suffer from a great deal of corruption that prevent successful PPP endeavors (p. 325). Kahyaogullar's work, thus, attempts to compare the UK and Turkish cases of PPP implementation to distill key differences, one of them being that the Turkish case lacked "an overarching guideline or law to coordinate [the] independent laws and regulations" (p. 267) that he posits are in existence in Turkey. His finding can also present the question of how corruption affects Sub-Saharan African countries. With all of the above literature in mind, the next logical step in advancement of thought would be found in literature on the specific impacts of PPP policy within the context of actual projects.

II. The Impact of Policy Frameworks on PPP Projects with Non-African Country Examples

The importance of having a PPP framework when carrying out infrastructure based PPP projects has been studied by a variety of scholars, all of which seem to find the same pattern: strong PPP frameworks are necessary for PPP project attractiveness and success (Urio, 2010, p. 82). Research carried out by English and Guthrie (2003) and Kumaraswamy and Zhang (2001) is cited frequently within the literature as support for the notion that PPP policy frameworks are vital to PPP success. Kumaraswamy, et al (2005) cite Asian Development Bank studies (1996, 1997) and Harris (2003) to emphasize the notion that a coherent and comprehensive PPP

regulatory framework is necessary for BOT style PPP projects to be successful, referring to South African projects as evidence.

Thus, Kumaraswamy, et al (2005) touches on the African (p. 5) continent but fails to address Sub-Saharan Africa specifically, thus revealing a potential gap in the literature. Furthermore, the study focuses on BOT style PPP projects, thus limiting the scope of PPP projects to be included in the study. Mohammed and Babanyara (2012) expand on claims made by Kumaraswamy, et al, by positing that BOT style projects must have a framework in order to better allocate risks, thus increasing the attractiveness to potential investors (p. 104). The authors go on to note, "that BOT developers can structure a contractual vehicle that will be compatible with that country's laws" (p. 105), further emphasizing the importance of a logical and coherent country-specific PPP policy framework. Furthermore, the World Bank (V 2.0) *PPP Reference Guide* posits that a strong PPP policy will contain the following features, all of which providing considerations to analyze when interpreting the results of *this* study: efficiency, accountability, transparency, decency, fairness, and participation. "One of the aims of establishing a sound PPP framework is to ensure these principles of good governance are followed in the implementation of PPP projects" (p. 66).

In a study on Pakistan, Khan, et al (2008) reinforce these concepts by noting that Pakistan faced BOT project challenges due to a lack of comprehensive economic, legal, and technical framework (p. 93), further supporting the notion that countries need frameworks for PPP projects to be successful. Chuo, et al's (2012) analysis on Taiwanese PPP projects supports the notion that PPP frameworks matter: "Because the policy-making process is poorly documented, information that can enable governments to avoid knowledge management mistakes is not shared among policy makers worldwide" (205). Chuo, et al's piece places most of its focus on offering

specific PPP policy implementation advice rather then studying the actual causality between policy existence and success. The World Bank also cites the presence of a PPP framework as one of the driving factors influencing the high success of PPP projects in Chile (PPP Reference Guide 2.0, pp. 68-69). Thus, more analysis must be considered on the affects of such policies on projects existing within *Sub-Saharan Africa* with respect to project success.

III. The Literature Gap – Sub-Saharan African PPP Policy Implications

Perhaps one of the most relevant case studies for the African case with respect to PPP policy regulation is Farquharson, et al's (2011) analysis on the PPP based Inkosi Albert Luthuli Central Hospital in South Africa. The project was the first of its kind in South Africa to operate under the regulations of Treasury Regulation 16 (p. 126), or the South African National Treasury PPP Manual. The review, commissioned by The International Bank for Reconstruction and Development, cites the case as a success as it is confirmed to produce more services than the public sector could've done on its own (p. 126). In the "Lessons Learned" section of the review, notions of clearly defined project goals and continued communication between all involved parties are iterated as important concepts for completing PPP projects (p. 131). This is echoed by Kumaraswamy, et al (2005), as the authors note that in South Africa, a strong regulatory framework helped to make a Build Operate Train Transfer style PPP project that aimed at providing clean water a success (p. 5). Farquharson, et al's study serves as a benchmark in that it offers a review of a completed, successful PPP project in Africa; however, it does not directly correlate with infrastructure projects nor does it relate to the traditionally accepted notion of Sub-Saharan Africa as South Africa is frequently categorized as a unique country within Africa. It is also noteworthy to consider that this information was produced and distributed by the World

Bank, who's status as an NGO can limit the critical lens through which academic sources rely on.

The literature on PPP policies seems to run dry when looking specifically at Sub-Saharan Africa. The World Bank is the primary producer of Sub-Saharan African policy recommendations, which suggests that a body of scholarly work on the subject seems to be lacking. While Shendy, et al's (2011) World Bank commissioned study notes that PPP frameworks along with PPP units (ie a body to carry out PPP policies) are necessary to PPP success in a general context (p. 27), there are no definitive claims about African countries made. However, the World Bank's publication does offer a data table of African countries with listed respective PPP policies and units, revealing that Cameroon, Ghana, Kenya, and Nigeria have both PPP legislation and PPP units, while Cote d'Ivoire lacks both (p. 28). This information serves as an excellent springboard for considering cases to study within the context of my own research question. By carrying out a quantitative study, I hope to add to the current literature surrounding effects of PFA by statistically analyzing whether or not PFA has any effect on my identified IOV's. If a causal relationship is found, there will be a level of certainty added to the case that PFA leads to higher viability for PPPPs in Sub-Saharan Africa; however, if no causality between IOVs and PPPV is established, this research will be able to challenge current understandings of PFA on PPP success.

Hypothesis and Causal Theory

In addition to the factors listed in the literature review that contribute to policy success, the PPP Reference Guide 2.0 also suggests that "policy," "legal framework," "processes and institutional responsibilities," "public financial management approach," and "broader governance arrangements" are concepts to be detailed or achieved by PPP policies (pp. 67-68). With this in

mind, one can argue that having a policy will ideally *increase* governmental transparency and economic responsibility through providing a structure through which the government and private sector must operate, both parties having a financial and credibility-based obligation to fulfill. Thus, the **independent variable**, **PFA**, or **policy framework adoption**, is based on a body of literature that already suggests that PFA enhances the viability of a PPP endeavor as I have defined it. I posit that this mutual, bilateral responsibility, which will be detailed in a PPP policy, will help to compensate for other variables such as GDP, governmental structure, and the head of state in explaining the effect of policy on PPP projects. Moreover, three relationships will be tested in order to address my research question, all utilizing data collected from 1990-2015:

　　1. Hypothesis One (H1): *If PFA occurs in a country in year X, the number of projects in in that country will increase after year X ($+\Delta N_x$).* The **dependent variable**, $\Delta \mathbf{N_x}$, is utilized as a *Measure of Attractiveness*. If the number of projects increases on a year-to-year basis, it can be assumed the country is deemed more "attractive" to outside investment. If this hypothesis is true, the opposite would hold true as well: in the absence of PFA, the number of projects will either decrease or remain constant. Thus, the actual variable is a change in the value of the number of projects, represented by the figure ΔN_x. This relationship isn't particularly complicated and will be more fully explained in the following methodology section. The data will be tested with consideration to countries' income group (Lower, Lower Middle, or Upper Middle) as well as to countries' percentage of GDP that represents the amount of IMF debt the country has. It will be interesting to see whether or not income group or outstanding debt has any influence on a country's attractiveness. Moreover, *all* projects are included in this test; in other words, failed, cancelled, and obstructed projects are accounted for in the data as I believe that attractively can be measured in attempted projects. I will draw from PPI and QOG.

2. <u>Hypothesis Two (H2):</u> *If PFA occurs in a given country at any point, the total number of PPPPs in that country will increase.* The **dependent variable**, **SA**, is being utilized as a *Measure of Attractiveness and Success.* By testing aggregate data, the research will be able to distinguish between year-to-year fluctuations and all-time project accumulation. I have decided to include this data set as a way to juxtapose actual year-to-year causation with large-range, aggregate level data due to the nature of business reporting. The data utilized for this hypothesis accounts only for successfully completed projects. Moreover, PFA is considered in a one-time, binary-level manner; in other words, if PFA occurred at any point during data collection, the country will be considered to have PFA, regardless of whether or not PFA occurred in temporal relation to project completion. I suggest that such a dataset would likely be utilized by agencies such as the World Bank or private corporations. This data will be analyzed with consideration to countries' income groups as well as to the number of international organizations that committed aid to the country by/in the year 2012. I will draw from PPI and QOG.

3. <u>Hypothesis Three:</u> *If PFA occurs, there will be a higher probability that multilateral cooperation (MC) occurs as well.* The **dependent variable**, **MC**, is being utilized as a *Measure of Attractiveness.* I suggest that if there is a positive relationship between PFA and MC, then PFA creates a more inviting environment through which multilateral corporations can endorse support. If there is a relationship between PFA and PPPV, then it would be logical to see an increased level of multilateral support if PFA occurs. The overarching hypothesis (H_{main}) of this research is thus: *If PFA occurs in a Sub-Saharan country, PPPV will be bolstered in that country.*

Table 2: Summary of Proposed Causal Relationships

PFA – Independent Variable	IOV 1: ΔN_x – Dependent Variable	IOV 2: SA- Dependent Variable	IOV 3: MC – Dependent Variable
PFA Occurs	Change in number of projects will be positive after PFA $(+\Delta N_x)$	Total number of projects in given country is increased	Endorsement from multilateral organization
Absence of PFA	Change in number of projects will equal 0 or be negative	Total number of projects is comparatively lower	No endorsement from multilateral organization

Methodology and Data Analysis

Introduction to Methodological Approach

I will adopt a quantitative methodology based on statistical analysis in which I will test the statistical significance of any potential relationships that exist between the independent variable and corresponding dependent variables. This study is best executed quantitatively when considering the surrounding literature: the aim of this study is to statistically test the validity and implications of the commonly held assumption that PFA leads to PPPV. It is then necessary to run actual statistical tests to determine *significance.* The value and a specific explanation of my methodology are detailed in the *Data Analysis & Presentation Strategy* section. The data presentation will manifest in three different statistical tests: for H1, the data will be analyzed using a Logistic Regression model, controlling for income group and debt to the IMF as expressed as a percentage of country GDP; for H2, data will be analyzed using a Linear Regression model, controlling for income and committed international organization aid; H3 data will be analyzed will a simple percentage test. Data has been recoded to best fit the respective model utilized and has been taken from PPI and QOG.

Data Selection Justification: Strengths and Limitations

The actual numeric data analyzed in this study is sourced from the Private Participation in Infrastructure Database (PPI), which is a self-described "joint product of the World Bank's Public Private Partnership Group, and the Public-Private Infrastructure Advisory Facility

(PPIAF)" (About Private Infrastructure Projects Database 2016), as well as from the 2012 Quality of Government Database (The Quality of Government Standard Dataset). Selecting data from PPI is not, unfortunately, a calculated choice; rather, the incredibly limited data available with respect to PPPPs around the world, particularly within Sub-Saharan Africa, required me to select this data source. I attempted to draw controlling factors from the QOG in order to provide a richer data analysis.

Despite this constraining factor, utilizing this data set does in fact offer an element of standardization; as the definitions of concepts in this paper are based on terms produced by the World Bank and PPI, using data from the same source allows for a consistency in definitions. While there are additional data sources containing PPP-relevant information, the PPI dataset produces the most consistent set of variables and definitions. Furthermore, the dependent variables for this study (ΔN_X, SA, MC) have been selected on the basis of data categories available on the PPI website. Considering the reality that the World Bank and PPIAF are principal delineators of PPP-related literature and policy prescription, it can be assumed that the indicators chosen to categorize PPI datasets are intended to represent meaningful concepts of PPP success and progress. Considering the World Bank, PPIAF, ICA's positions regarding the importance of PFA in bolstering project success (IRBD, The World Bank, ADB, and IEDB, 2014, p. 65), my methodology gains internal validity. In order to create an internally valid conceptualizing of PPPV, data sources utilized should manipulate variables that compliment and coordinate with institutional definitions. Thus, despite the constraining nature of this data set, it offers internal validity.

However, the selection of this data set presents a number of limitations. While relying on PPI and World Bank data bolsters internal validity on the basis of standardizing consistent

variable definitions, the data is inherently biased. If liberalist political theory is considered, it can be argued that relying on World Bank data will reflect liberalist institutional ideals. While this bias limits the external validity of my results, it also opens the door for meta-analysis: regardless of the results produced via statistical analysis, relying on World Bank data will both force and allow me to consider the implications of neoliberal, institution-based perspectives on development. By simultaneously drawing from the QOG, I hope to question certain liberal factors, via the inclusion of data regarding IMF debt, income group, and international organizational aid.

Finally, PPI notes several limitations of the datasets available, highlighted in the bulleted list below. The shortcomings of the dataset are explained by PPI as being a result of relying on publically available information (Methodology 2015):

- PPI lacks information on small scale projects

- PPI tends to "underestimate" investment data within the telecommunications sector

- PPI has difficulty gathering entirely accurate information on distressed projects

- PPI notes that data is as accurate as possible but asks readers to consider that all information comes from a public source, thus creating the potential for inaccuracies in data reporting (Methodology 2015).

Data Analysis and Presentation

First, it should be reinforced that Sub-Saharan African *countries* will serve as the unit of analysis for H1 and H2 while *project* will serve as the unit of analysis for H3. The datasets contain annual PPP information for each country. PPI offers researchers the opportunity to create specific data sets: as a result, I have created three data sets, all containing information for all Sub-Saharan African countries that have reported PPP data, bolstered with QOG data points.

Rather than taking a case selection approach that would require intensive qualitative justification, utilizing data from the entire region will help round out error in variance between governmental regimes, economic systems, and other societal factors across Sub-Saharan countries. Each hypothesis in this study will be statistically analyzed in isolation in the first stage of data analysis. Data drawn from PPI represents projects between 1990-2015 while QOG data reflects data recorded in 2012.

Hypothesis 1 Dataset: "ΔN_x All Projects.xlsm"

This dataset reflects the number of projects in a given year for each country (N_x), the change in project number from year to year (ΔN_x), the presence of PFA, the positive or negative result of ΔNx, income group, and percentage of GDP that is IMF debt (imf_gd). To determine if PFA has an impact on the number of projects, one can compare year-to-year fluctuations in the value of N_x (ΔN_x). If PFA occurs and there is a positive value for ΔN_x, it can be assumed that PFA had a positive impact on the viability of PPPPs in that country. I have included income group to test whether or not the affluence of a given country affects PPPV; I have included the IMF debt variable in order to determine whether or not debt owed to the IMF has any impact on PPPV. It could be argued that the amount of debt a country owes to the IMF could have an impact on the number of projects a country has in that debt levels could cause more PPPPs in attempts to curb debt *or* rising debt could deter project assumption on account of financial risk. Below is a representation of the data included in the set. A Logistic Regression model will be run to analyze the data in order to test the impact of PFA occurrence on the probability of increasing the number of projects in a given year. Finally, it should be noted that this data set includes data for all projects, whether completed, canceled, failed, etc.

Table 3a: H1 Dataset Sample								
Country (Unit of Analysis)	Financial Closure Year	N_x	ΔN_x	PFA*	Income Group 1**	Income Group 2	Income Group 3	Imf_gd[+]
Angola	2001	1	0	0	0	1	0	.16
Angola	2003	1	0	0	0	1	0	.16
*PFA: 0 indicates absence of PFA; 1 indicates PFA occurred								
**Income Group Key: Lower income; Income Group 2: Lower middle; Income Group 3: Upper middle (0 indicates criteria not met; 1 indicates criteria met)								
[+]imf_gd: Amount of debt owed to IMF as expressed as percent of GDP; recoded to 0-1 scale								

Hypothesis 2 Dataset: "Success Aggregate.xlsm"

This dataset reflects the total number of *successful* projects in a given country between the years 1990-2015; in other words, this data table presents aggregate level data. The total number of projects in a given country has been rescaled to reflect a value between 0 and 1 to offer consistency. Furthermore, the data reflects a country's income group and the total number of international organizations that committed aid to a country by/in 2012 (aid_crnio), drawn from QOG. This dataset does *not* attempt to test yearly affects of PFA on the number of projects; rather, this dataset simply tests if there is a relationship between PFA at *any point* and total number of projects in a given country. I have included this dataset as PPP research needs to be interdisciplinary. When considering the motivations of businesses and perhaps international monetary organizations (such as World Bank or IMF), it could be speculated that yearly information is less positive. By testing aggregate level data, one can see if PFA has a stronger/weaker influence on PPPV in terms of the number of projects in a country without respect to *when* the policy is implemented. This notion will be further explored in the "Results and Discussion" section. A linear regression will be run in order to analyze data for Hypothesis 2

to test whether or not there is a positive or negative relationship between PFA and SA, expressed as total $N_{x1900-2015}$. Below, a summary of table data is provided for reference.

Country (Unit of Analysis)	$N_{x1990-2015}$	$N_{x1990-2015}$ Scaled	PFA*	Income Group 1**	Income Group 2	Income Group 3	Aid_crnio scaled[+]
Angola	9	0.1	1	0	1	0	0.15
Benin	5	0.05	1	1	0	0	0.08
Botswana	3	0.02	1	0	0	3	0.62

Table 3b: H2 Dataset Sample

*PFA: 0 indicates absence of PFA; 1 indicates PFA occurred

**Income Group Key: Lower income; Income Group 2: Lower middle; Income Group 3; Upper middle (0 indicates criteria not met; 1 indicates criteria met)

[+]aid_crnio: recoded to 0-1 scale; max value=13; min value=0

Hypothesis 3: "Multilateral cooperation.xlsm"

Data in this table reflects all projects in Sub-Saharan Africa that received some form of Multilateral Cooperation, as defined by PPI, between 1990-2015. "Project" is utilized as the unit of analysis for this dataset. In order to test the influence of PFA on MC, a time-dependent analysis was carried out. In other words, if MC occurred during or after the year of PFA (YPFA), criteria for analysis was met, indicated in data table column "YMC ≥ YPFA". If MC occurred before YPFA, then PFA is clearly not the causal agent affecting chances of MC. A simple percentage test will be carried out for this data set; in other words, I will run a simple test to determine the percentage of projects receiving MC in which YPFA is a criteria that is successfully met as per the parameters of this study. For example, if MC occurred in 2001 in a given country in which PFA occurred in 2003, the YMC ≥ YPFA criteria will not be met, indicating not relationship; however, if PFA occurs in 2003 and YMC equal 2006, it could be argued that PFA had an effect of MC. The following table presents a sample of the data included in this dataset.

Table 3c: H3 Dataset Sample			
Project (Denoted by Country)	**YMC***	**YPFA****	**YMC $\geq$ YPFA[+]**
Benin	2002	2002	1
Burkina Faso	2001	2009	0
Cameroon	2000	2006	0
Cameron	2006	2006	1
*YMC=Year of Multilateral Cooperation			
**YPFA=Year of PFA			
[+]YMC$\geq$YPFA= Does MC occur after PFA? Yes=1; No=0			

Results and Discussion

The findings for each hypothesis will be described and discussed separately followed by a cohesive discussion of the results immediately thereafter, taking all results into account. The general finding of this study suggests that the independent variable, PFA, *has no statistically significant effect* on the dependent variable, viability. Support for this result is demonstrated in the following summary of results.

I.   <u>**Results for Hypothesis 1:**</u> *If PFA occurs in a country in year X, the number of projects in that country will increase (+ΔN_x)*

Three logistic regressions were run on the data in order to compare the different effects each income group had on the dependent variable, viability. The dependent variable for hypothesis one was defined by a positive change in the number of projects in each country between individual years. The dependent variable, or change in number of projects, was coded as either 0 or 1: 0 indicated that there was either a negative change in the number of projects between years or no change; 1 indicated that there was a positive increase. The independent variable, PFA, was also coded as 0 or 1, 0 indicating that PFA had not occurred in a given year, 1 indicating that PFA occurred in the given year. Variables used for control included income group (lower, lower middle, and upper middle, as defined by the PPI database) as well as "imf_gd",

indicating the percentage of a given country's GDP that is outstanding debt to the IMF. This variable was standardized on a 0-1 scale to bolster the consistency of the logistic regression model.

Of the 285 data points in the dataset, the average debt to the IMF for all countries as expressed as a percentage of GDP was 40.18%. Of the observations for change in number of projects, 79.3% demonstrated either no change or negative change, while 20.7% demonstrated positive change. Moreover, 75.8% of the observations regarding PFA demonstrated that PFA had not occurred; 24.2% of the sample demonstrated that PFA had occurred. With respect to income groups, 49.1% of the sample belonged to the lower income group, 35.8% belonged to the lower middle income group, and 15.1% belonged to the upper middle income group.

Table 4a: Predicting the Influence of PFA on the Change in Number of Projects							
	Model 1		**Model 2**		**Model 3**	
Independent Variable	*Coefficient (Std. Error)*	*Change in Predicted Probability*	*Coefficient (Std. Error)*	*Change in Predicted Probability*	*Coefficient (Std. Error)*	*Change in Predicted Probability*
PFA	.014 (.344)	.002	.014 (.344)	.002	.014 (.344)	.002
Lower Income	-.721* (.395)	-.116	.090 (.340)	.014	-	-
Lower Middle Income	-.811* (.418)	-.122	-	-	-.090 (.340)	-.014
Upper Middle Income	-	-	.811* (.418)	.152	.721* (.395)	.133
IMF Debt	-.348 (.642)	-.055	-.348 (.642)	-.055	-.348 (.642)	-.055
Constant	-.586 (.44)	-	-1.397** (.384)	-	-1.307** (.325)	-
Nagelkerke R Square	.024	.024	.024	.024	.024	.024
N	285	285	285	285	285	285

The dependent variable is binary: a positive change in the number of PFAs is coded as 1 and no change or negative change is coded as zero. The second column for each model indicates the change in the predicted probability of having a positive change in PFA number when moving from the minimum value of the IV to the maximum value of the IV using the "prchange" command in STATA
*Significance is at $p \leq 1$; **Significance is at $P \leq 001$

Based on the results, there is no statistically significant relationship between the adoption of a policy framework and the change in number of projects in a given country in a given year. However, several findings were discovered by the regressions: being in the upper middle income group compared to the lower middle income group increases the probability of having more PPP projects by about 15% and compared to the lower income group by about 13% with all other variables being held at their mean or modal values. Moreover, being in the lower income group compared to the upper middle income group decreases the probability of having more PPP projects by about 11% and being in the lower middle income group compared to the upper middle income group decrease the probability of having more PPP projects by about 12% when all other variables being held at their mean or modal values. The significance of these findings was at p-values between .052 and .068. No relationship between debt owed to the IMF and the number of projects was found either. Thus, it seems that while policy frameworks, or PFA, does not have an effect on the number of projects in a country, income group might have some form of influence on the chances of increasing PPPPs in a given country. This suggestion was bolstered by two statistically significant correlation tests run on the data:

Table 4b: Correlational Relationships		
Coefficient	*Pearson Correlated Coefficient*	
Income Group	**ΔN_x – Change in Number of Projects**	**Debt to IMF**
Lower Income	-	-.133*
Upper Middle Income	.123*	-
N	285	285
*Significance at the .05 level (2-tailed)		

Interestingly, there was a negative relationship demonstrated between being in the lower income groups and the percentage of GDP made up of IMF debt. This seems like a reasonable

finding, however, as lower income countries likely are deprived of receiving loans on the basis of being unable to pay them back. Perhaps the IMF avoids providing loans to lower income countries out of fears of losing their investments. Moreover, there was a positive relationship found between being in the upper middle income group and the change in number of projects in a given year; while the logistic regressions demonstrated comparatively beneficial effects of being in the highest income group, this correlation test does suggest that being in the upper middle income group is enough to increase chances of having a positive change in project numbers between years. As this test was run independent of PFA considerations, I argue that being in a higher income group certainly seems to bolster the number of PPPPs in a country.

In short, with respect to hypothesis one I fail to reject the null hypothesis as the data presents no convincing evidence that adopting a policy framework increases the number of projects in a country in a given year. However, there were several interesting findings regarding income level that I will ultimately argue are worth paying attention to, particularly when one considers the implications of neoliberal institutions and ideologies, discussed further in the conclusion section of this essay.

II.   <u>Results for Hypothesis 2:</u> *If PFA occurs in a given country at any point, the total number of PPPPs in that country will increase*

Hypothesis Two was tested using a dataset with an N value of 47. It must be acknowledged that this N value is very low with respect to linear regression accuracy; however, due to the simple constraint of the number of countries in Sub-Saharan Africa, such an N value was unavoidable. Thus, with a higher N value, the model could potentially produce more statistically significant results. Of the 47 countries included in the model, the average number of projects in a country was 9.766, with the minimum being 1 and the maximum being 83,

demonstrating a standard deviation of 13.5906. For the actual regression, N_x was recoded to range from 1-0. The data also included the variable "aid_crnio", which reflected the number of international organizations that had pledged aid to a given country: the average number of organizations came to 2.936 across the sample, with the minimum value at 0 and the maximum at 13. This variable was also standardized on a 0/1 scale.

In order to test H2, three linear regressions were run on the data to examine the effect of the independent variable, PFA, on the dependent variable, N_x, or total number of projects in a country between 1991-2015. The first regression utilized the upper middle income group as the reference variable, the second regression utilized lower middle income group as the reference variable, and the third regression utilized the lower income group as the reference variable. This decision was made in order to be consistent with variable examination for H1. All three linear regressions suggested that when all other variables are held constant, adopting a policy framework (PFA) translates to a .088 unit increase in the dependent variable, total number of projects, with marginal statistical significance. However, the model only explains about 5.4% of the variance in the dependent variable. Results for the first regression are illustrated in the following table:

Table 5a: Predicting the influence of PFA on N_x (scaled 0/1) with IC3 as reference variable	
Linear Regression Estimates:	
Parameter	**Effect on N_x (Standard Error)**
PFA	0.088 (.052)*
Lower Income	-0.112 (.077)
Lower Middle	-0.066 (.089)
Pledged Aid	0.063 (.107)
Constant	0.118 (.097)
R^2	.054
N	47
*Significant at the .1 confidence level	

Brief Discussion of H2

Thus, when all other variables held constant, the linear regression suggests that when PFA occurs, there will be an increase of .088 units in the number of projects in a country on a standardized scale, with marginal statistical significance (P=.098). While this slightly conflicts with the results of H1, the level of significance demonstrated by the model combined with the low amount of variation described and low N value does not present a strong case for PFA influencing PPPV, the dependent variable in question for this study. The linear regressions that held the lower middle and lower income groups as the reference variable produced the same values for independent variables PFA and pledged aid (.088, P=.098; .063; P=.559), thus one can narrowly reject the null hypothesis. As a result, it can be suggested with much hesitation that PFA has a slightly positive influence on the number of projects in a country, suggesting a marginal level of increased PPPV when PFA occurs. Interestingly, there seems to be a statistically significant correlation between the variable "pledged aid' and the lower middle income group and upper middle income group: the number of international organizations pledging aid is negatively correlated with the lower middle income group at a .011 significance level and positively correlated with the upper middle income group at a .042 significance level (2-tailed test). This finding becomes relevant for the overarching discussion, which will take place in the final section of this research.

III.   <u>Results for Hypothesis 3:</u> *If PFA occurs, there will be a higher probability that MC occurs as well*

In order to test H3, a simple percentage test was utilized: in other words, I simply calculated the percentage of projects that received MC that also occurred in countries in which PFA occurred either in the same year of support of before the year of support. If a clear majority

of projects granted MC also reflected a country's adoption of a policy framework, it could be suggested that PFA positively increases the chances of MC. However, of the projects that received MC, only 33.1% received MC either in the same year as PFA or after PFA. Thus, 66.9% of projects receiving MC did not develop in countries in which PFA could've have a possible impact on receiving MC. Thus, the null hypothesis was accepted, suggesting once again that PFA, the independent variable, does not bolster PPPV, the dependent variable.

Conclusion and Implications

In order to draw meaningful conclusions from the three hypotheses tested, the results must be applied conceptually to test H_{main}: *If PFA occurs in a Sub-Saharan country, PPPV will be bolstered in that country.* Thus, it is necessary to look at the results from H1-H3 to draw a conclusion on the general effect of PFA, the independent variable in this study, on the dependent variable PPPV, as defined by the IOVs $+\Delta N_x$, SA, and MC. While H2 suggested a slightly significant relationship between PFA and the prediction of growth in the number of projects in a country, the N value, R square value, and marginal significance fail, in my interpretation, to support H2. Considering that the null hypotheses for H1 and H3 were demonstrated, I argue that the results of H2 are not strong enough to argue a case for the bolstering ability of PFA on PPPV. Thus, this research must accept the null hypothesis, H_{main0}, suggesting that *if PFA occurs in a Sub-Saharan African country, PPPV for that country will **not** be bolstered.* This finding directly contradicts the entirety of scholarship surrounding PFA and PPP success; thus, it is necessary to speculate why such a result has been reached by this research. The following discussion speculates the implications of the results as well as the possible explanations for such results, along with proposals for further research on the topic.

First, the implications of accepting H_{main0} are speculated: if PFA in fact does not bolster PPPV, the literature surrounding PFA is challenged with respect to the Sub-Saharan African region. Since there was limited literature available on the role of PFA in Sub-Saharan Africa, this research contributes significantly to scholarship in that it suggests, for the first time, that PFA may not be a strong bolsterer of PPPV in Sub-Saharan Africa. Thus the time and resources spent on developing PFA in Sub-Saharan Africa could've potentially been put to more productive facets of PPPV.

However, while this claim is exciting, it must be analyzed within the context of this study's constraints. First, the IOVs selected could've misled the results. Perhaps measuring viability in terms of the number of projects ($+\Delta N_x$ and N_x/SA) and multilateral cooperation (MC) was simply a poor variable choice; however, the data available on the topic is also highly constrained. Moreover, seeing as World Bank endorsed PPI data was used for this study, it could be argued that variable selection was actually quite internally valid: let us remember that the World Bank is a propagator of PFA and engages in writing manuals for PF creation. Thus, the types of data recorded by the World Bank would seemingly be useful for the purposes of the World Bank, indicating to me that my variable selection was not wildly off-base. Regardless, the N value of H2 and the R square values for H1 and H2 were not particularly strong, which could've certainly damaged the validity of the results presented in this research. Despite these constraints, there was very little to no evidence that PFA had *any* influence on PPPV as defined by the selected IOV, suggesting that the research presented does in fact add a considerable contribution to PPP scholarship in Sub-Saharan Africa.

In attempting to address and identify alternative explanations for the bolstering of PPPV,

I believe the findings from H1 and H2 provide hints. The H1 tests indicated that Income Group 3, in comparison to both Income Groups 1 & 2, had a slightly positive impact on $+\Delta N_x$; thus, it could be suggested that more affluent countries secure more PPPPs. This explanation is not only represented in the results with some statistical significance, but it is also intuitive: richer countries tend to experience more development. Moreover, in the correlation test run for the data used to test H2, it was noted that aid was pledged by international organizations to countries in Income Group 3 on a positive slope; in other words, the likelihood of having higher numbers of organizations pledging aid increased for those countries in Income Group 3. Moreover, Income Group 2 correlated negatively with pledged aid. This finding is interesting: while it is difficult to determine if the pledged aid in fact worked to placed countries in Income Group 3 or if being in Income Group 3 attracted aid, there is certainly something to be said about affluence and general attractiveness. In a similar way to H1 results, H2 correlation test results suggest that higher incomes have some form of relationship to investment attractiveness, whether it be in terms of PPPV or pledged aid. While this speculation in no way can offer any concrete explanation for what bolsters PPPV, it can perhaps point further research in a new direction.

If one considers the institutions backing much of the support surrounding PFA and PPPPs in general, it is noteworthy that they are typically neoliberal economic institutions, such as the World Bank and the IMF. In terms of liberalism in international relations theory, such institutions would consider development to manifest in the form of neoliberal, democratic principles based on Western models of development. As such, it is not particularly surprising that PFA is encouraged by such institutions and cited as a bolsterer of PPPP success and viability. This notion is compounded, or at least complemented by, the findings relating to income groups. Neoliberal ideology would favor more affluent states: it is counterintuitive to invest in a country

that holds high risk for the investor. Thus, Sub-Saharan Africa may be experiencing a self-reinforcing phenomenon with respect to PPPPs and PFA; in other words, research could investigate whether or not more affluent countries simply attract more PPPPs and thus have the relevant motivator to develop PFA, which is then lauded by neoliberal institutions such as the World Bank in order to maintain consistency of liberal regimes, in this case, written legal code and regulation. Such a framework could certainly begin to address the question of PPPV on the basis of the findings of this research.

In conclusion, the research carried out in this study challenges conventional wisdom regarding public private partnerships and their respective policy frameworks. While other parts of the world may in fact find success in adopting frameworks, this may not be the case for Sub-Saharan Africa. Considering widespread corruption and gaps in transparency in African countries, it is entirely that PFA is more of a formality than an actual influencing agent on the viability of public private partnership projects. While inconclusive, there does seem to be some role of income and affluence on the number of projects in a given country, which is further put into question with the correlation revealed between higher incomes and higher levels of pledged aid. Further research on what makes public private partnerships in Sub-Saharan Africa more successful is certainly needed before definitive claims can be drawn; moreover, research could seek to address whether or not public private partnerships are effective in any capacity as a means of development and service allocations for Sub-Saharan states. It can be argued, however, that the adoption of policy frameworks, when put against the scrutiny of statistical testing, does not seem to have an impact on the viability or success of public private partnerships in Sub-Saharan Africa, forcing both scholars and businesses to reevaluate best practices for public private partnerships in the region.

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