
Master of Science in Management – Major in Corporate Finance

Master Thesis

# *THE ENVIRONMENT OF PUBLIC-PRIVATE PARTNERSHIPS*

The economic determinants of PPP's

**Abstract**

The purpose of this paper is to analyse which are the fiscal, political, legal and economic environment determinants of aggregated investment in € in PPPs and number of PPP's created in 25 EU member-states from 1995 to 2011. In order to assess which variables had a bigger impact, this article presents 3 OLS regressions models.

There were several conclusions of which the most important were related to the fiscal variables. The raise of a country Primary Balance of a country spurs the creation of PPP's. Additionally, the Debt in percentage to GDP of a given country also decreases with this occurrence. This is explained by the accounting gap that PPP's allows, since the total costs of a given project are divided during the project lifetime and it scan take up to 30 years.

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# I. INTRODUCTION

The very idea of PPP is quite recent (1990). The main goal of implementing projects in this format is to harness the efficiencies and innovativeness associated with a competitive private sector to help government achieve its public service goals at lower cost (Betigness & Ross, 2009). It is worth noting that the notion of PPP is quite vague (Bovaird, 2005) and subject to several definitions. The characterization of PPPs depends mostly on the country where it is applied: "it covers a variety of transactions where the private sector is given the right to operate, for an extended period, a service traditionally the responsibility of the public sector alone, ranging from relatively short term management contracts (with little or no capital expenditure), through concession contracts (which may encompass the design and build of substantial capital assets along with the provision of a range of services and the financing of the entire construction and operation), to joint ventures where there is a sharing of ownership between the public and private sectors" (Grimsey & Lewis, 2009). PPP's are then in the middle between traditional procurement and full-scale privatisation. Additionally, PPP's are closely related to concessions, although very different concerning risk sharing and payment. In fact, the amount of risk transferred to the private sector is higher in concessions than in PPP's. Besides, in the case of concessions the government usually does not make payments to the private firm and thus their income depends solely on user charges, contrary to PPP's. Furthermore, concessionaires must pay a specific fee to the government in order to have the right to use and maintain the asset (OECD, 2008). To conclude, OECD defines PPP's such as "an agreement between the government and one or more private partners (which may include the operators and the financers) according to which the private partners deliver the service in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners".

The PPP market has been developing considerably during the last 20 years. This

approach was initiated in the United Kingdom, in the form of PFI (Public Finance Initiative), around 1990. It then became the largest PPP market inside the EU before the subprime crisis in 2008-2009 (Kappeler, 2012). The number and value of PPP deals contracted in the countries, have both increased by 116 and 110 times respectively, from 1995 over a 16-years period (Jasiukevicius & Vasiliuaskaite, 2013). Having growing steadily over the past two decades, the total PPP market in Europe reached its peak in 2007. The impacts of the subprime crisis were both a decrease in the number and aggregate value of deals. After that period, the PPP market followed a positive growth in nominal terms in 2010 and later a contraction in 2011. When it comes to the financing of PPPs, financing through loans remains of the primary source of funding, reaching 79% of the total financing requirements in 2012 (Kappeler, 2012). Contrastingly, financing through public sources has been decreasing, totalling 14% of the total financing requirements (Kappeler, 2012), possibly given the tightening fiscal constraints in the EU. Risk *premia* has been increasing over the years, despite a downturn in 2011. Moreover, infrastructure financing in the EU has also been decreasing since the subprime crisis (Kappeler, 2012), revealing an increase of capital needs, while the share regarding the volume of PPP stagnated over the years. Infrastructure financing represents a larger portion in new member states, such as Cyprus and Hungary.

According to (OECD, 2011), when it comes to PPP trends, countries tend to begin PPP's in the transportation sector, which represents the largest share of total PPP financing requirements, mainly by creating and maintaining roads, railroads, tunnels, bridges and airports. As soon as results start to emerge, these countries tend to create PPP's in the water, waste management and health care sector (OECD, 2011). It is necessary to understand that these arrangements should be fully understood by governments before been undertaken as they often consist of long and complex agreements between the public and private sector.

The purpose of this paper is to analyse to which extent specific factors, such as growth, public deficit, the political and legal environment can influence the choice of pursuing the PPP *route* in the EU.

The present literature review defends that developments of infrastructure

network boost economic development and they are often in the form of PPP given budgetary constraints. Additionally, it has been found some evidence about some determinants, such as macroeconomic stability, quality of regulation, governance and large size and high-income markets that foster the creation of PPP's.

Furthermore, the connection between infrastructure development and economic development has been strictly documented, providing examples and explaining the relationship of these two indicators in depth. PPP's have been mostly addressing this sector, and authors defend that these projects increase the capacity of a country to foster economic and human development, leading to a rise in economic output. This leads to an assumption that an environment where there exist high levels of economic development has a higher number of PPP's.

The following questions will be addressed: (1) *In which way does the economic development impact the choice of PPP's, (2) How does budgetary constraints impact the choice of PPP's.*

In brief, developments in the PPP market have shaped the economy of the European union. Since the beginning of the 1990's decade, both the investment and numbers of PPP's have been increasing at a considerable rate. These numbers, albeit having been reduced substantially during the sub-prime crisis, have been recovering. Although becoming popular, PPP projects are still controversial and thus it is important to study them and assess which is the environment that leads countries to make larger investments and create more PPP's.

The paper will be organized as followed: Section I: Introduction, Section II: Literature Review, Section III: Data, Section IV: Results and Section V Conclusion.

# II. LITERATURE REVIEW

Very little of the literature vis-à-vis PPP's is related to its economic determinants. Most articles address implementation issues and cases, different methodologies to quantify and value a PPP and motives why this format should be implemented. According to Neville, "governments worldwide recognize that the scale of infrastructure investment challenge they face is such that they cannot fund it alone (…) Consequently, there is an increasing use of public-private partnerships and other models where private parties become involved after the initial build". In other words, the development of the infrastructure network of a country must be enabled by private sector due to lack of public funding, and thus an increasing number of PPP projects have been initiated in the recent years. Furthermore, a clear connection between government expenditure and economic growth emerges (Pillai, 2008) if this spending is linked to infrastructure creation or development.

According to an econometric study (Cullison, 1993), public investment in education, labour training and hesitantly civilian safety, "have statistically significant (at the 5% level), and numerically significant, effects on future economic growth". As an introductory conclusion, we could infer that the design, building, financing and maintenance of a school propriety or the one of a labour training program could automatically lead to the growth of private productivity and therefore, the real GDP. Another conclusion that could be inferred is that if one sector of public investments is able to foster economic growth, the aggregate could eventually lead to the same results. By developing the network infrastructure of a country, the government enables connectivity between markets and producers, lowers transaction costs and is able to provide important services to its population, such as health care and education. These improvements can increase the capacity of a country to foster economic development, and increase economic output. Most of the times, these infrastructures developments are very costly and have vast capital needs that cannot be undertaken out of public financing. For example, the Government of

India acknowledges, "Infrastructure projects have long gestation periods and little financial returns". In this case, the union between the private and public sector is crucial in order to stimulate a country's infrastructure network by creating high quality facilities and structures and, in the long run, promote its growth. Additionally, another author defends that PPP infrastructure projects in transports "are very positive and urban public transport is benefiting substantially, with significant side-effects on poorer people's access to work and to services, air pollution levels and road accident rates" (Willoughby, 2012). In the case of very large cities, such as São Paulo and Seoul, a very rapid population increase, along with a possibility of very rapid growth of production and income levels, mandates a fast, well developed and reliable transport infrastructure in order to trigger industry and commerce expansion.

The presented literature defends the acceleration of economic growth and development by increasing and enhancing the infrastructure network of a country, mostly originated by PPP projects. However, it is intriguing that only few countries have had PPP experiences, given their acknowledged positive benefits. The main reasons for this phenomenon are: mandatory and time-consuming changes in government legislation, the development of new skills and the unwillingness to abdicate the privileges obtained if project is developed differently. It is obligatory for a country to have high levels of political skills of consensus-building and conciliation, as well as strong commitment (Willoughy, 2012).

According to Sharma, some important determinants of PPP in the infrastructure sector are macroeconomic stability, quality of regulation and governance. The author could not conclude any relationship between political factors and budget constraints and the implementation of PPP's. However, he did find that there is strong evidence of the impact of large size and high-income markets in implementing PPP's.

Although the standard benchmarks for undertaking the PPP route should be the Affordability[1] and increased Value for Money [2](OECD), the reason why most governments choose this format is to be able to fit in budgetary limit problems. First, in the case of a PPP, the initial capital outlay is provided by the private partners, followed by fees paid by the government to them. If the government has to operate under fiscal rules constraints, building an infrastructure through a PPP may fit the budget without surpassing the limits. What happens normally is that even if a PPP is affordable, sometimes it cannot be pursued. Governments, upon understanding that traditional procurement is too expensive, assume the PPP *route* without considering fiscal constraints, budgetary limits or limits to a budgetary allocation of central entities. Considering that one has a specific allocated budget provided by a government entity to spend on a project, thinking that a private provider is responsible for the initial capital outlay can lead to assume that the project can be practiced. Nonetheless, the fees that must be paid to them can cause the government to exceed the budget limits. Additionally, it may be the case that the private partner cannot get direct revenues from the service but only from the government, leading to a very difficult situation. In the case that these constraints are validated and governments are able to pursue these projects, the VFM benchmark is often neglected and thus PPP's are undertaken mostly because of being "off the book" and not because of their value for money.

As mentioned earlier, the motive to undertake a PPP project is for a government to benefit from the efficiency of the private sector and to be able to deliver it to the public in a reduced time and lower cost. If effectiveness, in the sense of creating an effective demand, reaching economically less favourable people, is part of the government policy, another incentive is then created for the creation of PPP projects. Moreover, PPP's can also bring advantages from a micro-economic point of view (McQuaid & Scherrer, 2010), which should also be taken

[1] It is important to distinguish affordability from fitting in the current budget. Whereas the former consists on the intertemporal budget constraint of the government, the latter consists on the set of books where the project is included.
[2] VFM stands for the maximum efficiency and effectiveness obtained from the lowest purchase price

into account when considering the PPP *route.* As the author states, benefits such as bringing in greater innovation and efficient management, in addition to the transfer of ownership of control from the public to the private sector consist of drivers to undertake these projects. Greater asset utilization, economies of scale, whole life asset management, the introduction of private sector management techniques and suitable creation and enforcement of performance measures and incentives are significant gains that should be considered.

From a macroeconomic point of view, many theories have been established relating economic development, economic growth and public investment. From a Keynesian point of view, public expenditure in infrastructures ultimately leads to the growth of the economy, by increasing business opportunities and demand, and creating more employment. This, leading to the creation and maintenance of a fiscal deficit, causes an increase in the market for business output, ultimately trigging a higher consumer spending and income. Finally, it leads to an upturn in GDP and drop of the unemployment rate. (Keynes, 1936). According to Seccareccia (2012), heterodox/post Keynesian economists emphasize fiscal policy as the principle tool to improve macroeconomic performance. Tobin (1984) mentions that every macro-econometric model concludes that additional government spending and reduced taxation have positive effects on aggregate demand, assuming monetary policies remain unchanged. Learner (1943), in the context of functional finance, defends that spending by the government "increases the real national income of goods and services by several times the amount spent by the government".

In contrast, another school of thought is the neoclassical economics one which in the long run, fiscal deficit will destabilize the economy and ultimately lead to the necessity of applying strong austerity measures. As observed recently in the Sovereign Crisis in the Eurozone, public spending became unsustainable. Such is the case of Greece, Portugal and Ireland in 2010 that suffered further austerity measures and an eventual bailout. According to a report of the World Economic forum, "many countries are at risk of overextending unsustainable levels of debt, which, in turn, will exert strong upwards pressures on real interest rates. In the final instance, unsustainable debt levels could lead to full-fledged sovereign debt

crises" (MccLearn, Matthew). To conclude, these academics believe deficits are prejudicial and threatening in the long term, given the consequent hikes on real interest rates.

A study found on the "Relation between economic growth and Public-Private Partnership market development in the countries of the European Union" observed that there is a tendency of the PPP market to reflect the changes of GDP growth during the analysed period (Jasiukevicius & Vasiliauskaite, 2013). Moreover, this correlation is stronger when it comes to the number of PPP projects than its value. This same study mentions that there is not any statistically significant difference when it comes to the relationship between the PPP market development and the predictive and current data of GDP growth, and in the correlations of PPP market development and GDP growth between net contributors and net recipient countries (except the case of GDP growth and PPP value in the group of the 25 countries).

# III. DATA

This study covers a number of variables that were used to compute the OLS regressions. A brief description of each variable will follow, as well as an estimate about its coefficient.

Three dependent variables were chosen to support this study: 1)*PPPInvestment; 2)NumberofPPPs* and 3) *LogInvestment.*

*PPPInvestment* is a continuous variable, and represents the aggregated investment in € in PPPs, by country and year. The data characterizes the investment, in millions, in the countries in 25 EU member-states[3] and covers the period from 1995 to 2011.

*NumberofPPPs* is a discrete variable and conveys the number of PPP projects that occurred in those countries, per year.

Finally, *LogInvestment* is the log of *PPPInvestment.* The purpose of this operation was to exclude outliers and obtain a more concise perception of the data.

The use of PPPs can be affected by several by several country characteristics, such as fiscal, political and legal/economic environment. In the partition of our independent variables, we divide them in three groups:

1) Fiscal variables: *DebtGDP, PrimaryBalanceGDP, GDPGrowthPerCapita, Intervenedcountries;*

2) Political variables: *RightWingGov, ElectionYear, ElectionYearLagT1, ElectionYearLeadT1, AbsoluteMajority* and *PoliticalParty;*

[3] Data was not available for Croatia, Estonia and Malta.

3) Legal/economic environment variables: *CorruptionPerceptionIndex, Hdi, HealthIndex and Schooling.*

*DebtGDP* is a continuous variable that expresses public debt, or the debt owed by the government of a country, relative to its GDP. PPP's are usually preferred over traditional procuring by the government, specially if they are under pressure to reduce their deficit or debt, given that the payment will only take place when the construction is complete and that can take as long as 30 years (OECD, 2013). Therefore, public debt will only reflect the total PPP's costs at the end of the project, leading to the conclusion that the coefficient should still be positive, but only reflecting past projects. Additionally, another study, Hammami, Ruhashyankiko & Yehoue (1999), revealed, "governments burdened by high debts tend to chose the PPP option frequently for building infrastructure", reinforcing the positive relationship between all the dependent variables and *DebtGDP.*

*PrimaryBalanceGDP* states a country's primary balance as a GDP percentage. It represents the current activity balance without paid interests. It is also a continuous variable. With the same reasoning concerning the previous variable, *PrimaryBalanceGDP's* coefficient should be negative given that the costs incurred with the PPP will be accounted as an expense and thus contribute to a possible deficit or the reduction of the surplus. Accordingly, this coefficient will reveal PPP projects that took place in the past, given the possible delay in accounting allowed by this type of project.

*GDPGrowthPerCapita* represents the annual growth rate of GDP, in percentage, based on constant local currency, divided by the country's population. It is a valuable index to compare the performance among several countries. According to a report elaborated by Shediac, Abouchakra, Hammami & Najjar (Booz&Co, 2008), economic growth is triggered by the amount of capital that is brought into the PPP market, that usually consists of large quantities, which are able to spur long-term employment. This kind of investment also appeals to private investors

who inject supplementary capital into the projects and therefore enables the creation of a more sustainable economic growth model. In parallel, this type of projects increases the number of financial resources of the economy because of the capital that is injected by the different agents, and this phenomenon leads to a decrease in government expenditure, that ultimately enables a better allocation of government expenses into more socioeconomically productive sectors, such as health. This allows us to infer that the coefficient should be positive in the OLS regressions of this article.

*IntervenedCountries*, is a dummy variable that states whether the country has received funds from the IMF. If the variable is 0, there were no arrangements on that year, and if the variable is 1, the country received external help. Glasser (2001) mentions that when a country lacks external source of revenue, such as natural resource or oil, it tends to have suffered more severe fiscal crisis than another country that is plentiful of external resources because this one has suffered minor crises and its government has less tendency to adopt market oriented policies. It can be inferred that countries with higher external sources of revenue are less prone to indulge in PPP projects, given that they are more able to absorb fiscal shocks (Hammami, Ruhashyankiko & Yehoue), whereas poorer countries might have a bigger tendency to opt for PPP's since this kind of shocks have a bigger impact on their economy. Concluding, this paper should present a positive coefficient for this variable, given that if a country was given external aid by the IMF it meant that it lacked this kind of external source of revenue.

*RightWingGov* is also a dummy variable and relates to the position in the political spectrum the government of that country locates. If the government was on the left side, the variable will be 0, otherwise, it will be 1, representing a right-wing government. Economic liberalism might be beneficial for the completion of successful PPP (Gawel, Erik; 2011), given that regulation might decrease potential profits and translate into less quality PPP's. The author also states "a certain tendency towards "self-service" in the private business sector is the main concern here". All this points preferably to an optimal government leaning on the

right side of the political spectrum. In other words, a right wing government should lead to better usage of PPP's. However, this does not mean that left-wing government are not able to create PPP projects. Hammami, Ruhashyankiko & Yehoue (1999), noted that the number of PPP projects is not affected by the political environment itself but it does influence the level of investment in PPP's, i.e the infrastructure sector. This same study revealed that while center-right governments tend to invest in PPP's related to the energy sector, left-right government show a higher tendency for this kind of partnerships in the transportation sector. Additionally, ethnically divided countries have a larger necessity of infrastructure projects, according to Alesina, Baqir, and Easterly (1999). This information cannot lead to a specific assumption about the coefficient.

*ElectionYear* is a dummy variable. The data indicates the years in which occured legislative elections. If the variable is 1, the election occurred on that year. If the variable is 0, there were no elections on that year. Political parties tend to shift into more opportunistic behaviours before elections in order to get elected again. In this period, they may indulge in several projects in order to obtain the desired popularity. Thus, the coefficient should be positive.

*ElectionYearLagT1* is also a dummy variable, and signals the year just before the legislative elections took place. If the variable is 1, the election occurred the following year. If the variable is 0, there were no elections the following year. As stated above, in the pre-election period, the government is prone to bigger public spending in order to be elected again. In this sense, the coefficient should also be positive.

*ElectionYearLeadT1* is also a dummy variable. It stands for the year just after the legislative elections occurred. If the variable is 1, the election occurred on the previous year. If the variable is 0, there were no elections on the year before. During elections, governments often get into public deficit because of the high spending and the fall of revenues (Clémence Vergne, 2006). In this sense,

governments tend to diminish the creation of new projects, as they cannot afford them. Therefore, a negative coefficient should appear, meaning that if a country has had an election on the previous year, the government is not able to create a new PPP.

*AbsoluteMajority,* designates years in which political absolute majority upon elections took place. A variable equal to 1 means that there was an absolute majority in that period, whereas a variable equal to 0 means that there were no absolute majority then, rendering it a dummy variable. As mentioned before, there is a more devious behaviour that government tend to adopt in the period before elections. Therefore, in order to get the approval of the majority of a certain population, parties should be inclined to create more PPP's given their attractiveness about delaying its costs to a future period. This leads to an assumption of a positive coefficient.

*PoliticalParty* conveys, as a dummy variable, whether the government consisted of a political party or a coalition. A variable equal to 1 stands for a one party government, while a variable equal to 0 represents a coalition government. It is expected for the coefficient to be positive given that when there is only one party in the government, there are fewer conflicts about the political agenda and new plans. Following the reasoning made with the previous variable, *PoliticalParty* should show a positive coefficient, meaning that when there is only one political party in the government there is a higher probability of creating new PPP's.

*CorruptionPerceptionIndex*, expresses how corruption is perceived among the countries. The data was divided into quintiles, where the first quintile represents the least perceived corrupted countries. According to Hammami, Ruhashyankiko & Yehoue (1999), low corruption and strong rule of law are imperative for providing institutional stability and legal framework to the PPP arrangements. A transparent democracy in which users are charged for the PPP infrastructure when they use, for example, a bridge, are also more desirable for several reasons. The first reason is that the part of the population that do not use that

infrastructure is not charged, and thus this burden is directed to users preferences and it seems fair to them paying for a service in return of using it. Additionally, there is no illusion that the infrastructure is free and therefore voters are able to see where their money is allocated. As the index decreases, the number of finished and successful PPP's increases, leading to an assumption of a negative coefficient that reflects this relationship.

*Hdi* stands for Human Development Index. It consists of a measure consisting of an average of 3 dimensions reflecting human development: health, knowledge and standards of living, expressed as a continuous variable. Taking into account that this kind of development is strictly linked with the current infrastructure network development of a given country, one can assume that increasing PPP projects leads to an increase in overall human development. As a matter of fact, governments have adopted more and more the PPP format in when choosing to fund their public investments, in these last years. As described in the previous chapter, most of the times the public sector lacks sufficient funding to develop their infrastructure network, and thus initiates PPP projects, partnering up with the private sector, in order to continue their infrastructure projects. Therefore, the study should show a positive coefficient for HDI in the OLS, given its assumed positive relationship.

*HealthIndex* is an index that signals life expectancy at birth. This continuous variable was developed using a minimum value of 20 years and maximum value of 85 years. Better infrastructures, such as better hospitals, care centres and nursing homes, lead to an increase in life expectancy. Applying the same reasoning as to the *HDI* variable, this phenomenon should be reflected in the coefficient, rendering it positive.

*Schooling*, a discrete variable, relates to the number of expected years of schooling received by children upon school entrance. The building and maintenance of schools is also considered an infrastructure. Higher schooling years leads to higher employment and innovation, leading to a possible economic

development. Alongside with the previous arguments, the coefficient should be positive since an increased number of public investment in schools have been undertaken as PPP projects in these last years.

**Table 1: Independent variables summary**

| Variable | Type | Definition | Source | Expected Sign | Reasons |
|---|---|---|---|---|---|
| DebtGDP | Continuous | Level of debt as a percentage of the country's GDP | EIB | + | PPP's have the budget advantage over traditional procuring due to the fact that payments are delayed. Countries in a hurry to reduce their debts or deficit may show a higher tendency to chose the PPP option. |
| PrimaryBalanceGDP | Continuous | Primary balance of a given country (millions millhares etc) | EIB | - | The costs incurred with the PPP will be accounted as an expense. Therefore, these expenditures will decrease a country's primary balance, either by reducing the surplus if the balance is positive or increasing the deficit if |
| GDPGrowthPerCapita | Continuous | Gdp growth of a given country per capita | Eurostat | + | The amount of capital that is brought into the PPP market is able to spur long-term employment, decreasing governmente expenditure and triggering economic growth. |
| IntervenedCountries | Dumy | 0 - No<br>1- Yes | IMF | + | Countries with higher external sources of revenue (oil, natural resources) are less prone to develop PPP projects, given that they are more able to absorb fiscal shocks and have lesser financial constraints. |
| RightWingGov | Dummy | 0 - Left-wing government<br>1- Right-wing government | Wikipedia | ? | The number of PPP projects is not affected by the political environment itself but it does influence the level of investment in PPP's, i.e the infrastructure sector. |
| ElectionYear | Dummy | 0 - No<br>1 - Yes | Wikipedia | + | Governments tend to shift into more opportunistic behaviours, such as increasing public spending, before elections in order to obtain the desired popularity. |
| ElectionYearLagT1 | Dummy | 0 - No<br>1 - Yes | Wikipedia | + | During this period, the government is prone to bigger public spending in order to be elected again. |
| ElectionYearLeadT1 | Dummy | 0 - No<br>1 - Yes | Wikipedia | - | Governments tend to diminish the creation of new projects, as they cannot afford them given the often created public deficit before and during elections. |
| AbsoluteMajority | Dummy | 0 - No<br>1 - Yes | Wikipedia | + | For a political party to increase popularity in order to get an absolute majority at legislative election it should be inclined to create more PPP's given their attractiveness. |
| PoliticalParty | Dummy | 0 - Coalition<br>1 - One political party | Wikipedia | + | If only one political party is in the government, fewer conflicts about the political agenda and new plans occur. In this collaborative environment, the probability of creating more projects is higher. |
| CorruptionPerceptionIndex | Continous | Index that converys how corrupt a given country's public sector is seen to be | Transparency International Database | - | Low corruption and strong rule of law are imperative for providing institutional stability and legal framework to the PPP arrangements. |
| Hdi | Continuous | Measure consisting of an average of 3 dimensions reflecting human development | United Nations Development Programme Database | + | Human development is strictly linked with a given country's current infrastructure network. Recently, when governments have these type of projects to implement and do not have sufficient funding, they cooperate with the private sector, creating a PPP. |
| HealthIndex | Continuous | Index that signals life expectancy at birth | United Nations Development Programme Database | + | Better hospitals, care centres and nursing homes are considered improvements made to a given country's infrastructure, and as mentioned before has been made possible in some countries due to the possible alliance between the public and private sector. |
| Schooling | Discrete | Number of expected years of schooling | United Nations Development Programme Database | + | As mentioned before, countries have been creating PPP's due to lack of public funding. The building and maintenance of schools is also considered an infrastructure, which is the major industry to which PPP projects deliver. |

# IV. METODOLOGY

The OLS model is used for estimating parameters in a linear regression model. It is a simplified linear modelling technique that can be helpful to model a single response variable within at least one interval scale. The OLS equation is the following:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \beta_{11} x_{11} + \beta_{12} x_{12} + \beta_{13} x_{13} + \beta_{14} x_{14} + \varepsilon$$

where $\beta_1$ represents the variable *DebtGDP,* $\beta_2$ is *PrimaryBalanceGDP,* $\beta_3$ is *Gdpgrowth/capita,* $\beta_4$ is *Rightwinggov,* $\beta_5$ is *Electionyear,* $\beta_6$ is *ElectionyearLagT-1,* $\beta_7$ is *ElectionyearLeadT+1,* $\beta_8$ *AbsoluteMajority* $\beta_9$ is *Politicalparty,* $\beta_{10}$ is *CorruptionPerceptionIndex,* $\beta_{11}$ is *Hdi,* $\beta_{12}$ is *HealthIndex,* $\beta_{13}$ is *Schooling,* $\beta_{14}$ is *Intervenedcountries.*

We performed several diagnostic tests: a correlation matrix, not formally reported, shows possible multicollinearity in the following variables: *Hdi* and *HealthIndex*. This way we will perform regressions with these variables separately. We also performed the Breusch–Pagan for heteroskedasticity, and reject the null hypothesis. The Jarque–Bera test on the normality of variables is statistically significant, meaning that data is normally distributed. The Wald test was also statistically significant, meaning that all regressors are not simultaneously equal to zero.

# V. RESULTS

## V.I PPP Investment

*Table 2* shows that in all tests, the variable *PrimaryBalanceGDP* has a positive value and is statistically significant, contrary to our previous assumptions. This indicates that raising a country's Primary Balance will increase in around 0.10 the investment in PPP's. Although we expected this coefficient to be negative, we can conclude that governments with a higher primary balance tend to create more PPP projects. As mentioned in the previous chapter, the costs incurred in a PPP will only be accounted at the end of the project. A possible reason for this result is that given that the concept of PPP is relatively new and that the first PPP projects were created around 1990, we can infer that the costs have not been totally accounted as expenses yet. Additionally, these investments will not be accounted in the deficit, leading to an improvement of the primary balance. As these PPP's can take up to 30 years to finish, perhaps most of the analysed data in this paper covered projects and those expenses have not been yet computed.
Another inferred conclusion is that when the GDP growth per capita increases, a decrease of the investment in PPP's will occur by around 0.70/0.80. As a matter of fact, the variable *GDPGrowthPerCapita* showed a negative coefficient and is statistically significant in the three tests. Our reasoning estimated that as investment flows and large amounts of capital are brought to the market, the GDP Growth *per capita* of a country tends to grow caused by the creation of long-term employment. Contrary to both our previous assumptions and several articles, we observe that as this indicator increases, the investment in PPP's decreases. This information tells us that poorer countries, as lower a GDP Growth *per capita* means an inferior level of wealth, are inclined to develop a higher number of this kind of projects. Given the fact that the Governments of less developed countries are in more need of creating, developing and maintaining their infrastructure network and often they lack sufficient funding, most of the times they ally with the private sector in order to be able to complete these infrastructure initiatives.

Interestingly, when the government is made of only one political party, the investment in PPP's increase by around 2.20/2.30. *PoliticalParty*, the dummy variable that conveyed whether the government of a country was made of only one party or a coalition, presented a positive coefficient and is statistically significant in the three tests. Broadly speaking, this validates our previous assumptions of a positive coefficient. When the present government of a given country consists of only one party instead of a coalition, projects are more easily debated and adopted because the party has more power in the Parliament. Moreover, this political composition contributes to a political environment where agreement is easier to achieve and is in overall more pacific.

Additionally, the variable *CorruptionPerceptionIndex* indicated a negative value, confirming similarly our expectations. Moreover, as the index passes to further quintiles, the investment in PPP's decreases by around 0.20. This variable was also statistically significant in the three tests and showed a negative coefficient. As expected, when the investment in PPP's increases, the Corruption Perception Index decreases. An explanation to this phenomenon is that for a government to be capable of creating and pursuing this kind of venture, there must exist low levels of corruption and strong law enforcement. This combination of factors contributes to an environment of institutional stability that is needed for a PPP project. Moreover, a stable and strong legal framework created for this specific kind of projects also essential to avoid possible conflicts and other adversities along the life of the PPP.

The variable *AbsoluteMajority*, indicates a negative relationship between the fact of having an absolute majority in a legislative election and the investment in PPP's, agreeing with our expectations. In other words, if a given country's has undergone a legislative absolute majority during the elections, the investment in PPP's will decrease at a 0.05 statistical significance level. *AbsoluteMajority* presented negative values along the three tests and is equally statistically significant. This coincides with the reasoning that when a certain party obtains the approval of the majority of a given country's population, there are less incentives in pursuing PPP investments. Our assumptions were that governments are inclined to behave more opportunistically in the period before

the election, and thus in order to get an absolute majority parties would have to indulge in several projects in order to get the approval of the voters. However, PPP's do not seem to be included in these pre-election projects, as shown in *Table 2.*

*HealthIndex,* the variable that conveyed life expectancy at birth, assumes a positive coefficient in test (3), and is also statistically significant. This information is in accordance with our assumptions, as life expectancy is a factor of economic development. Given that most of the PPP projects that take place are linked with the development of the infrastructure network of a specific country, it is easy to assume a positive relationship between investment in PPP's and the life expectancy. More specifically, these PPP's cover the building and maintenance of hospitals, care centres and others institutions that contribute to the delivery of health services to a given population.

Additionally, the variable *Schooling* only assumes any statistical significance in test (1), possibly due to the multicollinearity caused by the variables *Hdi* and *HealthIndex*. Accordingly with our expectations, the coefficient showed a positive value, as higher schooling contributes to a higher economic development. The PPP's analysed in this paper also comprehends projects related to the building and maintenance of schools. As more education institutions are provided to a particular population and as their infrastructures tend to improve, students tend to stay a higher number of years at school. Of course, these projects are backed by the investment in PPP that has been done. Consequently, in an environments in which there has been done a variety of projects related to education, PPP's are more popular.

*Table 2: PPPInvestment OLS Regressions*

Table 2 displays the results of the OLS regressions with the dependent variable *PPPInvestment*. Test (1) includes all the variables mentioned above, except for *Hdi* and *HealthIndex*, which could induce multicollinearity. Consequently, two other regressions are performed with adding only one of these variables separately: test (2) adds *Hdi* and test (3) *HealthIndex*. Robust standard errors in parentheses *** stands for p<0.01, ** for p<0.05 and * for p<0.1. Source: Own table.

| VARIABLES | (1) | (2) | (3) |
|---|---|---|---|
| **Fiscal Variables** | | | |
| DebtGDP | -0.37 | -0.47 | -0.62* |
| | *(0.33)* | *(0.35)* | *(0.32)* |
| PrimaryBalanceGDP | 0.10*** | 0.11*** | 0.10*** |
| | *(0.03)* | *(0.03)* | *(0.03)* |
| GDPGrowthPerCapita | -0.77*** | -0.77*** | -0.69*** |
| | *(0.27)* | *(0.28)* | *(0.26)* |
| IntervenedCountries | 0.00 | 0.14 | 0.20 |
| | *(0.13)* | *(0.18)* | *(0.14)* |
| **Political Variables** | | | |
| RightWingGov | -0.03 | -0.07 | -0.10 |
| | *(0.12)* | *(0.13)* | *(0.12)* |
| ElectionYear | -0.06 | -0.06 | -0.06 |
| | *(0.19)* | *(0.20)* | *(0.19)* |
| ElectionYearLagT1 | -0.13 | -0.17 | -0.12 |
| | *(0.21)* | *(0.22)* | *(0.21)* |
| ElectionYearLeadT1 | -0.01 | 0.00 | 0.00 |
| | *(0.24)* | *(0.25)* | *(0.24)* |
| AbsoluteMajority | -0.89** | -0.93** | -0.91** |
| | *(0.45)* | *(0.45)* | *(0.44)* |
| PoliticalParty | 2.27*** | 2.36*** | 2.16*** |
| | *(0.43)* | *(0.45)* | *(0.43)* |
| **Legal/Economic Environment variables** | | | |
| CorruptionPerceptionIndex | -0.23*** | -0.18*** | -0.19*** |
| | *(0.06)* | *(0.06)* | *(0.06)* |
| Hdi | | 3.03 | |
| | | *(2.45)* | |
| HealthIndex | | | 5.16*** |
| | | | *(1.85)* |
| **Schooling** | 0.15*** | 0.09 | 0.08 |
| | *(0.05)* | *(0.07)* | *(0.06)* |
| **Constant** | -1.32* | -2.93* | -4.65*** |
| | *(0.69)* | *(1.58)* | *(1.33)* |
| | | | |
| **Observations** | 425 | 410 | 425 |
| **R-squared** | 0.25 | 0.26 | 0.26 |

## V.II. Number of PPP's

As expected, *Table 3* indicates that the variables *PrimaryBalanceGDP, PoliticalParty* and *CorruptionPerceptionIndex* show the same coefficient sign (+/-) and statistically significance as the results presented in **Model 1.** It is predictable that the results analysed in **Model 1** are similar to those in **Model 2** given the fact that if some specific variables increase or decrease investment in PPP's, it is highly probable that the same variables will impact the number of PPP's.

As the primary balance of a given country increases in respect to its GDP, the number of PPP's increase by around 0.60/0.70. Again, this might be due to the fact that these projects usually have a long lifetime and their respective costs are only totalled at the end of that period. If there happens to be a government that consists of only one political party, chances are that the number of PPP's will increase by 13 to 14. The justification for this phenomenon is possibly the pacific political environment that promotes easiness of agreement and faster processes.

The number of PPP's created decreases by around -1.00 to -1.40 if a country increases its position in the Corruption Perception Index. As seen previously, a given society must have some specific criteria, such as low corruption and a strong rule of law, in order to accommodate an environment where PPP's can be created and developed during their life span.

This OLS also revealed that the variable *AbsoluteMajority* undertakes a negative value and is statistically significant in all three tests. In conformity with the previous model represented in *Table 1*, the fact of having an absolute majority in a legislative election leads to a decrease in the number of PPP's. In this case, it is estimated that this fact decreases the number of PPP's in about 6.90 to 7.20. We believe that governments do not chose to pursue PPP's given the fact that they have already gathered the support of the entire population by developing other type of projects, as analysed in **Model 1**.

In this OLS table results, the coefficients' variable *DebtGDP* is negative and is statistically significant in all three tests, although at different levels. This fact is coherent with the previous analysis elaborated in **Model 1.** The increase in debt

triggered by the number of PPP's created in a specific country will only take place at the end of the lifetime of the projects where its costs are incurred. As *NumberofPPP's* does not express the number of PPP projects finalized and built in a given year, but the number of PPP deals that are reaching financial close, we can deduce that there will still be some years left before this investment is represented in the balance sheet. As seen in the previous analysis, *DebtGDP* also has a negative coefficient when the dependent variable is *PPPInvestments.* However, this does not mean that countries with a lesser debt burden tend to invest more in these projects and create more PPP's, which would contradict previous articles and studies elaborated mentioned in Chapter 2. It only means that there is a time gap between where PPP projects are initiated and where its financial responsibilities are reckoned.

*GDPGrowthPerCapita* loses some statistical significance as the dependent variable changes, but still shows a some statistical significance and a negative coefficient. As seen similarly in **Model 1,** this information reflects that countries that have a smaller GDP Growth *per capita* usually create and develop more PPP's than those that have a bigger GDP Growth *per capita*. In other words, as the GDP Growth *per capita* increases, the number of PPP deals decreases. This information might be linked with the infrastructure needs of countries experiencing a smaller growth, which is often solved by creating and developing PPP's, as analysed in the previous model.

The variables *Hdi* and *HealthIndex* both express a positive relationship and are statistically significant. Following our guesses, as the Human development index raises, the number of PPP's created increases. The variable *Hdi* has problems of multicollinearity with *HealthIndex* due to the fact that the first one is a measure that represents human development and it covers health, standards of living and knowledge, while *HealthIndex* relates only to the part related to the life expectancy of a specific population, which globally reflects the levels of health. In other words, while *Hdi* measures three different dimensions, *HealthIndex* represents one of these dimensions. As it has been already discussed, life expectancy is a determinant of a given country's economic development, which can be enhanced by investing and enhancing its health care system and

infrastructure. Most of the PPP projects that have been developed are about creating and developing infrastructure, and they range from building high way roads to hospitals. It is then evident that this coefficient would be positive, given the fact that these very PPP projects have the goal to enhance the standards of living, the knowledge and the life expectancy of a population.

*Schooling* shows statistical significance in test (1) and (2). Again, this result can be explained by the multicollinearity triggered by *Hdi* and *HealthIndex.* It is of positive value, following the reasoning that if students have more years in school it possibly leads to a higher economic development. Similarly to the conclusions taken in **Model 1,** PPP projects often consist of infrastructure developments that can comprehend creating and maintaining schools and other education institutions. Thus, additional schools and better educational conditions, which are supported by the implementation of PPP projects, contribute to the increase in years a certain individual studies.

*Table 3: NumberofPPPs OLS regression*

Table 3 displays the results of the OLS regressions with the dependent variable *NumberofPPPs*. Test (1) includes all the variables mentioned above, except for *Hdi* and *HealthIndex*, which could induce multicollinearity. Consequently, two other regressions are performed with adding only one of these variables separately: test (2) adds *Hdi* and test (3) *HealthIndex*. Robust standard errors in parentheses *** stands for p<0.01, ** for p<0.05 and * for p<0.1. Source: own table.

| VARIABLES | (1) | (2) | (3) |
|---|---|---|---|
| **Fiscal Variables** | | | |
| DebtGDP | -4.91** | -5.85*** | -5.66** |
| | *(2.08)* | *(2.07)* | *(2.21)* |
| PrimaryBalanceGDP | 0.63*** | 0.65*** | 0.69*** |
| | *(0.20)* | *(0.20)* | *(0.22)* |
| GDPGrowthPerCapita | -3.22* | -2.95* | -3.23* |
| | *(1.65)* | *(1.61)* | *(1.68)* |
| IntervenedCountries | -0.13 | 0.59 | 0.96 |
| | *(0.70)* | *(0.72)* | *(0.97)* |
| **Political Variables** | | | |
| RightWingGov | -0.68 | -0.94 | -1.03 |
| | *(0.69)* | *(0.70)* | *(0.76)* |
| ElectionYear | -0.00 | 0.00 | 0.053 |
| | *(1.39)* | *(1.38)* | *(1.43)* |
| ElectionYearLagT1 | -1.34 | -1.30 | -1.57 |
| | *(1.37)* | *(1.36)* | *(1.43)* |
| ElectionYearLeadT1 | -0.74 | -0.69 | -0.69 |
| | *(1.30)* | *(1.30)* | *(1.34)* |
| AbsoluteMajority | -6.91*** | -6.99*** | -7.15*** |
| | *(2.16)* | *(2.18)* | *(2.23)* |
| PoliticalParty | 13.43*** | 13.01*** | 14.06*** |
| | *(2.76)* | *(2.77)* | *(2.86)* |
| **Legal/Economic Environment variables** | | | |
| CorruptionPerceptionIndex | -1.36*** | -1.21*** | -1.01*** |
| | *(0.33)* | *(0.33)* | *(0.36)* |
| Hdi | | | 24.73* |
| | | | *(14.85)* |
| HealthIndex | | 19.33** | |
| | | *(9.22)* | |
| Schooling | 1.00*** | 0.70* | 0.48 |
| | *(0.33)* | *(0.38)* | *(0.43)* |
| **Constant** | -7.79* | -20.24*** | -20.74** |
| | *(4.16)* | *(6.56)* | *(9.51)* |
| | | | |
| **Observations** | 425 | 425 | 410 |
| **R-squared** | 0.24 | 0.25 | 0.25 |

## V.III. Log of Investment

*Table 4* shows that only two explanatory variables show strong statistical significance, which are *PrimaryBalanceGDP* and *PoliticalParty*. Moreover, they show consistency with **Model 1** and **Model 2**, as *PrimaryBalanceGDP* and *PoliticalParty* are positive. When a country's primary balance as a percentage of its GDP increases, the investment in PPP increases by around 0.02, because as explained previously there is a gap between the period in which PPP's are created and the period in which its costs are reported. Besides, if the government of a country is made of one political party instead of a coalition, it adds around 0.30 to the investment in PPP's, due to the stronger political power of the party and thus faster processes.

The variable *RightWingGov*, as *Table 4* indicates, displays a negative coefficient in every test and is statistically significant. The literature was not able to provide any specific estimation concerning the coefficient for this dependent variable. **Model 3** therefore indicates that left-wing governments have more propensity to invest in PPP's, contrary to the theory that economic liberalism could be beneficial in order to accomplish effective PPPs (Gawel, Erik; 2011). If we analyse the top 3 countries that have done the highest investments in PPP's, it is observable that when the governments were on the left-side of the political spectrum, a larger amount of investments were made. First, the UK has been a pioneer in realizing PPP's, and has had a government that is inclined to the left (Labour Party) since 1997 to 2010. Another example is Portugal, which government was centre-left (PS) when the PPP's projects were drafted and began its development. Finally, the period that starts in 2004 and ends in 2010, was where the Spanish government, that consisted of the party PSOE, invested the most in PPP's. This might be supported by the ideology of these parties that is to provide social equality to the entire population, which is often achieved by the construction of infrastructures such as high ways and hospitals. As already mentioned, this type of projects has been later established as PPP's due to the lack of funding by the governments. Therefore, this positive coefficient is explained by the fundamental ideologies of left-wing parties and by the type of

investments they undertake. However, it must be noted that typically parties of the left do not believe in the cooperation with the private sector. In this case, budgetary constraints have more weight in their decision than their ideological principles.

As mentioned in **Model 1** and **Model 2,** the variable that represents corruption, *CorruptionPerceptionIndex* is strictly linked to the investment and number of PPP deals given the fact that the political and legal environment must be propitious for the completion of those projects. The same happens in **Model 3,** as *Table 4* reveals. The variable has a negative coefficient in all tests and has a statistical significance in test (1) and in test (2).

*Table 5* summarises all the coefficients and their respective statistical significance for all the dependent variables and the three models.

*Table 4: LogofInvestment OLS Regression*

Table 4 displays the results of the OLS regressions with the dependent variable *LogofInvestment*. Test (1) includes all the variables mentioned above, except for *Hdi* and *HealthIndex*, which could induce multicollinearity. Consequently, two other regressions are performed with adding only one of these variables separately: test (2) adds *Hdi* and test (3) *HealthIndex*. Robust standard errors in parentheses *** stands for p<0.01, ** for p<0.05 and * for p<0.1. Source: own table.

| VARIABLES | (1) | (2) | (3) |
|---|---|---|---|
| **Fiscal Variables** | | | |
| DebtGDP | -0.06 | -0.10 | -0.09 |
| | *(0.08)* | *(0.08)* | *(0.08)* |
| PrimaryBalanceGDP | 0.02*** | 0.02*** | 0.02*** |
| | *(0.01)* | *(0.01)* | *(0.01)* |
| GDPGrowthPerCapita | -0.27 | -0.26 | -0.26 |
| | *(0.20)* | *(0.21)* | *(0.20)* |
| IntervenedCountries | 0.05 | 0.08 | 0.05 |
| | *(0.06)* | *(0.07)* | *(0.08)* |
| **Political Variables** | | | |
| RightWingGov | -0.07* | -0.08* | -0.08* |
| | *(0.04)* | *(0.04)* | *(0.04)* |
| ElectionYear | 0.04 | 0.04 | 0.04 |
| | *(0.06)* | *(0.06)* | *(0.06)* |
| ElectionYearLagT1 | 0.01 | 0.012 | 0.02 |
| | *(0.06)* | *(0.06)* | *(0.06)* |
| ElectionYearLeadT1 | 0.00 | 0.01 | 0.01 |
| | *(0.06)* | *(0.06)* | *(0.06)* |
| AbsoluteMajority | -0.08 | -0.08 | -0.07 |
| | *(0.10)* | *(0.10)* | *(0.10)* |
| PoliticalParty | 0.30*** | 0.29*** | 0.30*** |
| | *(0.06)* | *(0.06)* | *(0.06)* |
| **Legal/Economic Environment variables** | | | |
| CorruptionPerceptionIndex | -0.04** | -0.04* | -0.03 |
| | *(0.02)* | *(0.02)* | *(0.03)* |
| Hdi | | | 0.40 |
| | | | *(0.81)* |
| HealthIndex | | 0.77 | |
| | | *(0.72)* | |
| Schooling | 0.01 | -0.00 | -0.00 |
| | *(0.01)* | *(0.02)* | *(0.02)* |
| **Constant** | -0.15 | -0.65 | -0.34 |
| | *(0.19)* | *(0.53)* | *(0.51)* |
| | | | |
| **Observations** | 425 | 425 | 410 |
| **R-squared** | 0.11 | 0.12 | 0.12 |

*Table 5: Summary of OLS Regressions*

| | *PPPInvestment* | | | *NumberofPPP* | | | *LogofInvestment* | | |
|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| **Fiscal Variables** | | | | | | | | | |
| DebtGDP | - | - | -* | -** | -*** | -** | - | - | - |
| PrimaryBalanceGDP | +*** | +*** | +*** | +*** | +*** | +*** | +*** | +*** | +*** |
| GDPGrowthPerCapita | -*** | -*** | -*** | -* | -* | -* | - | - | - |
| IntervenedCountries | + | + | + | - | + | + | + | + | + |
| **Political Variables** | | | | | | | | | |
| RightWingGov | - | - | - | - | - | - | -* | -* | -* |
| ElectionYear | - | - | - | - | + | + | + | + | + |
| ElectionYearLagT1 | - | - | - | - | - | - | + | + | + |
| ElectionYearLeadT1 | - | + | + | - | - | - | + | + | + |
| AbsoluteMajority | -** | -** | -** | -*** | -*** | -*** | - | - | - |
| PoliticalParty | +*** | +*** | +*** | +*** | +*** | +*** | +*** | +*** | +*** |
| **Legal/Economic Environment variables** | | | | | | | | | |
| CorruptionPerceptionIndex | -*** | -*** | -*** | -*** | -*** | -*** | -** | -* | - |
| Hdi | | + | | | | +* | | | + |
| HealthIndex | | | +*** | | +** | | | + | |
| Schooling | +*** | + | + | +*** | +* | + | + | - | - |
| Constant | -* | -* | -*** | -* | -*** | -** | - | - | - |

# VI. CONCLUSIONS

The first PPP project in Europe started in the UK around 1990, in a form of Private Finance Initiative. Since then, countries have been creating different kinds of projects in the form of a PPP, covering different sectors, such as the transportation sector and health care. As the PPP market has been developing over the years, different questions have arisen regarding its viability and its impacts. Furthermore, an important question that needs an urgent answer concerns which are the economic determinants in order to create and develop PPP's. This article tries to find an answer to two very important questions: (1) *In which way does the economic environment and development impact the choice of PPP's, (2) How does budgetary constraints impact the choice of PPP's.*

In order to find a relationship between these economic indicators and the development of the PPP market, this study performed 3 different models.

The 3 different dependent variables were: *PPPInvestment*, *NumberofPPP*, and *LogofInvestment*. We divided the independent variables into three different areas (fiscal, political and legal/economic environment) in order to grasp a more accurate idea of the factors that can contribute to an increase in the number and in the investment of PPP's. The 14 independent variables consisted of: *DebtGDP*, *PrimaryBalanceGDP, GDPGrowthPerCapita, Intervenedcountries, RightWingGov, ElectionYear, ElectionYearLagT1, ElectionYearLeadT1, AbsoluteMajority* and *PoliticalParty, CorruptionPerceptionIndex, Hdi, HealthIndex* and *Schooling.* This analysis comprises 3 different tests due to the existence of multicollinearity between two of the variables.

The regressions conveyed that when the Primary Balance of a specific country increases, it fosters the creation of PPP's, contrary to previous studies. This is explained by the accounting gap that PPP's allows, since the total costs of a given project are divided during the project lifetime and it can take up to 30 years. Another interesting and analogue fact is that when the Debt in percentage to a given country's GDP decreases, the number of PPP's created increase. The delay represents the start of a project and the occurrence where its costs are computed

explains partially this negative coefficient. Normally, PPP projects tend to have long life times and it would then be interesting to analyse the relationship between the debt levels of a given country upon the completion of a specific project. The GDP growth *per capita* also contradicts our predictions, since it showed a negative coefficient. As a matter of fact, this reflects the infrastructure need that poorer countries suffer and most of the times the optimal way to satisfy them is for a government to align with the private sector due to lack of sufficient funds and to boost efficiency.

In terms of political environment, we also reached some relevant conclusions. First, it is beneficial for the development of the PPP market the fact of having only one party in the government, instead of a coalition. In this case, the party has more power in the government and projects are adopted and implemented at a faster rate than in the case of a coalition, where the atmosphere is generally more tumultuous. Besides, in years where there has been an absolute majority in legislative elections, the investment in PPP's and the number of projects decreases. A possible reason for this fact is that during the pre-elections period, politicians indulge in several projects in order to attract the populations' approval but seemingly PPP's are not included. Finally, it was observed that most of the investment in PPP's occurs when countries are governed by political parties that are inclined to the left. This can be because of their ideology of providing social equality to a set population, which is often translated into the creation of infrastructures It must be taken into account that in theory, parties with this ideology would not align with the private sector to pursue their projects. However, in this case, budgetary constraints are stronger than ideological principles and therefore they create PPP's.

When it comes to the legal and economic environment of a country, we concluded that less corrupted countries tend to invest more and pursue a higher number of PPP's. There is the need of a certain stable and strong legal framework, as well as low levels of corruption, in order to provide a secure atmosphere in which PPP's can be undertaken. The variables *Hdi* and *HealthIndex* indicate that increasing a certain population's life standards,

knowledge and health, account for an increase in investment and in quantity of PPP's.

As we can conclude, there are certain factors that can contribute to a rise in investment and in PPP projects that can range from the political environment to fiscal indicators. Conclusively, the question about whether or not to pursue the PPP *route* can be partially answered if these aforementioned conditions are met, since they tend to spur the development of the PPP market.

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# EXHIBIT I

Descriptive statistics of the variables

| Variables | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| **Fiscal Variables** | | | | |
| DebtGDP | .5314024 | .2869365 | 0 | 1.502 |
| PrimaryBalance | .3850585 | 3.395305 | -12.222 | 9.635 |
| GDPGrowthPerCapita | .044561 | .1164703 | -.175 | 1.07 |
| IntervenedCountries | .1512195 | .3587004 | 0 | 1 |
| **Political Variables** | | | | |
| RightWingGov | .5243902 | .5000149 | 0 | 1 |
| ElectionYear | .2609756 | .4397032 | 0 | 1 |
| ElectionYearLagT1 | .2609756 | .4397032 | 0 | 1 |
| ElectionYearLeadT1 | .2658537 | .4423265 | 0 | 1 |
| AbsoluteMajority | .0268293 | .1617816 | 0 | 1 |
| PoliticalParty | .1926829 | .394888 | 0 | 1 |
| **Legal/Economic Environment variables** | | | | |
| CorruptionPerceptionIndex | 1.819512 | 1.090797 | 0 | 5 |
| Hdi | .824322 | .058298 | .699 | .921 |
| HealthIndex | .8858951 | .0537329 | .772 | 1 |
| Schooling | 14.80341 | 1.716563 | 11.1 | 18.9 |