Public finances and Public Private Partnerships in the European Union

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2020

Public finances and Public Private Partnerships in the European Union

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Abstract

We analyse the Public Private Partnerships (PPPs) in order to account for their uneven distribution among the European Union countries and to identify the motivations of the public actor in selecting PPPs. We focus on the fiscal incentives to overcome budget and borrowing constraints, taking also into account of the political features and institutional frameworks of the countries. Using IMF data over the years 1990-2015, we confirm that the state of public finances impacts on the government's choice of PPPs: financially constrained governments find the PPP option more attractive due to the possibility of off-balance accounting, while high-debt countries reduce the private investors' interest in PPP. Fiscal rules increased the PPP bias in the pre-crisis period, while the post-crisis reforms and the increased surveillance seem to better discipline PPP employment. PPPs are, also, confirmed to be under the influence of political competition and government's preferences for current expenditures.

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1. Introduction

Public-Private Partnerships (PPPs) are special forms of public procurement that have emerged since the 1990s and in time have evolved into complex and sophisticated mechanisms, linking governments to the business sector, but, at the same time, challenging decision-making processes and increasing fiscal risks in the long run. A large literature has focused on the factors that determine the success or failure of PPP projects, and their determinants have been extensively examined for developing and emerging countries (Jensen and Blanc-Brude, 2005; Hammami, 2006; Checherita, 2009; Mengistu, 2013; Percoco, 2014; Kasri and Wibowo, 2015; Reyes-Tagle and Garbacik, 2016; Moszoro et al., 2017; Fleta-Asin et al., 2019; Quélin et al., 2019). However, quantitative analyses at the European Union (EU) level is lagging behind. Antellini Russo and Zampino (2012), Buso et al. (2017) and Mazzola et al. (2019) provide for some econometric evidence for French and Italian municipal PPPs, while only Mota and Moreira (2015) examine both financial and non-financial determinants of PPPs in 17 EU countries. As Verhoest et al. (2015) observe, there is still need for comparative analyses that account for the differences in the development of PPP projects at national level and in the uptake of PPPs across the EU countries.

Indeed, even if the EU states share a general regulatory framework - the EU directives have established a very favourable uniform legislation for PPPs and imposed binding norms aimed at granting fair competition -, PPPs are very unevenly distributed. The PPP market is concentrated in a few countries – the United Kingdom, Spain, Portugal, Greece, Ireland -, while the others have either a PPP policy but few projects - France and Germany – or proved sceptical of both PPP policy and its implementation – the Nordic countries and some new accession countries. This means that the EU member states have responded differently to the PPP trend that has invested public management.

The perspective of this study is to consider the motivations of the public actor in selecting PPPs, in particular, the fiscal incentive to overcome budget and borrowing constraints, and connect them to the country's political and institutional frameworks. In presence of restrictions on the financial

resources, PPPs allow spreading public sector payments through time and relax governments' budget constraints in the short term. If the funding constraints are not recognised, PPPs create the illusion of being much less expensive than traditional public investments. Indeed, when governments are given the possibility to record PPP investments off the balance sheet, fiscal illusion and debt-hiding motivations may create an unwarranted bias in favour of the partnerships (Välilä, 2005).

These features may be differently appealing to the EU governments. We, therefore, situate the PPP choice in the countries' political and institutional context, focusing on the factors that can mitigate the logic of fiscal illusion. In particular, we consider the role of the institutional provisions that increase policy stability and reduce the discretionary power of the public actor, namely the presence of fiscal rules and check and balances. The role of checks and balances in the choice of PPPs has been investigated for developing countries (Bertelli, 2019; Bertelli et al., 2020), while the impact of fiscal rules has so far been neglected.

Our analysis considers the EU countries[1] and, drawing from the IMF database on PPPs investments, estimates a fixed-effects regression with Driscoll and Kraay (1998) standard errors over the years 1990- 2015 without sector limitations. The paper is organised as follows. Section 2 presents the development of PPP in the EU countries. Section 3 reviews the main literature on PPP determinants. Section 4 presents the research method and Section 5 discusses the main results. Section 6 concludes.

2. PPPs in the EU countries

Investments in PPPs at the EU level have grown in absolute value since the 1990s with two waves of increase and a downturn due to the last crisis (Figure 1). Among investment projects, PPPs have been the most affected by the recession - PPP investment fell from € 30 bn. in 2005 to € 8.7 bn. in 2017 – and have experienced a shift from large projects in the years preceding the crisis towards smaller deals since 2009 (Kappeler and Nemoz, 2010). After the crisis the PPP market did not completely

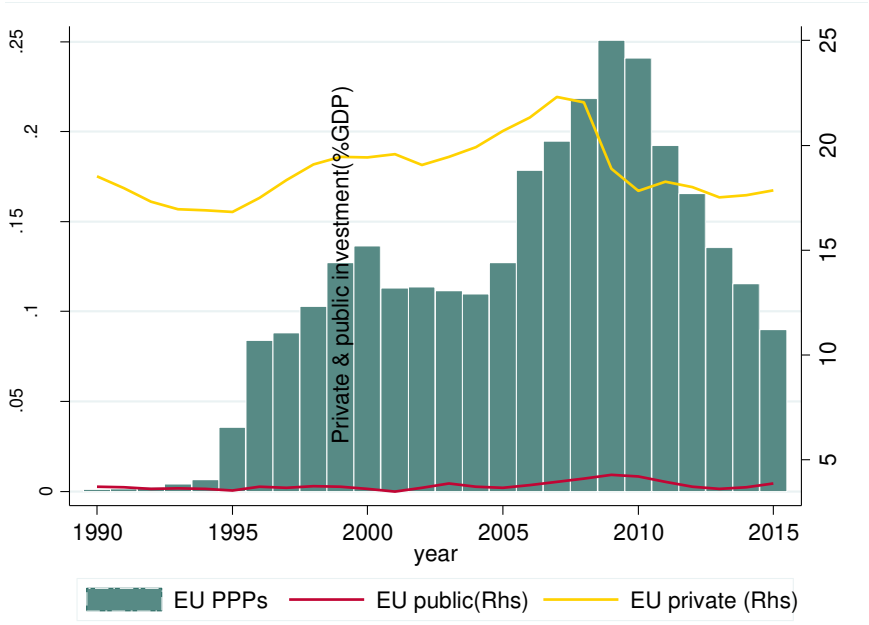
[1] Malta, Romania and Estonia are not considered because of missing data.

collapse (EPEC, 2009), but proceeded at a much slower pace. This trend is largely explained by the emergence of a very cautious political attitude, also fed by mixed evidence on PPP performance.

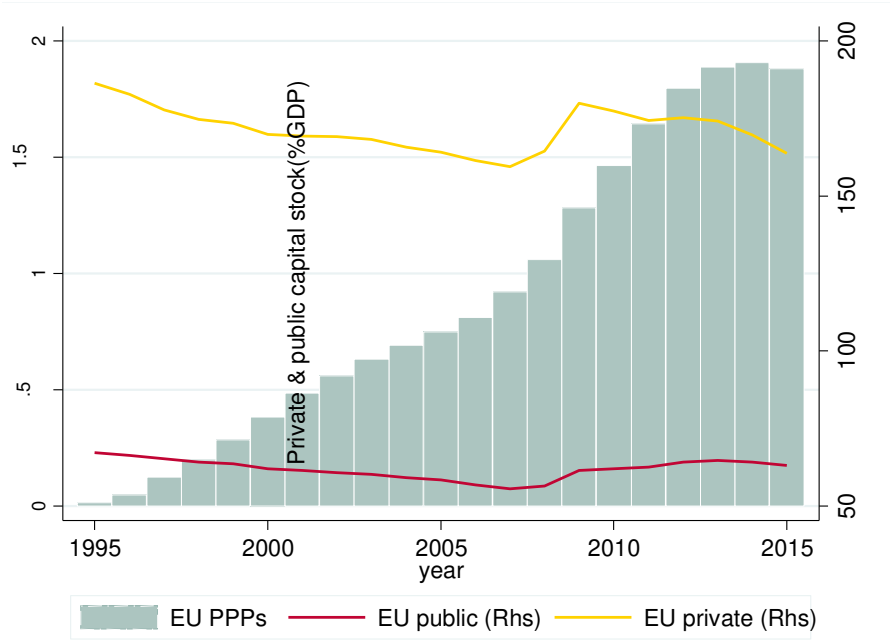
In some instances, PPPs have allowed countries to speed up infrastructure construction, procure large-scale infrastructure plans through a reduced number of tender procedures, delivered better on-time and on-budget performance compared with traditional infrastructure delivery (MacDonald, 2002, NAO, 2003). However, in other cases PPPs have revealed disappointing failures: poorly designed projects, over-optimism regarding the use and demand of the planned infrastructure, too high remuneration rates on the private partner's risk capital, delays and cost increases, or, at least no better performance than traditional procurement. Some countries complain that PPPs create long-term contractual rights to public resources and risk to crowd out other items of expenditure. Besides, during the crisis several failed PPPs in the EU periphery countries called for expensive governments' bailouts. While enhanced capital constraints have limited the banks' exposure to infrastructure financing or made them more selective, previously active international players have become more orientated to their domestic markets.

Figure 1. PPPs evolution in EU (1990-2015)

a) flow



b) Capital stock

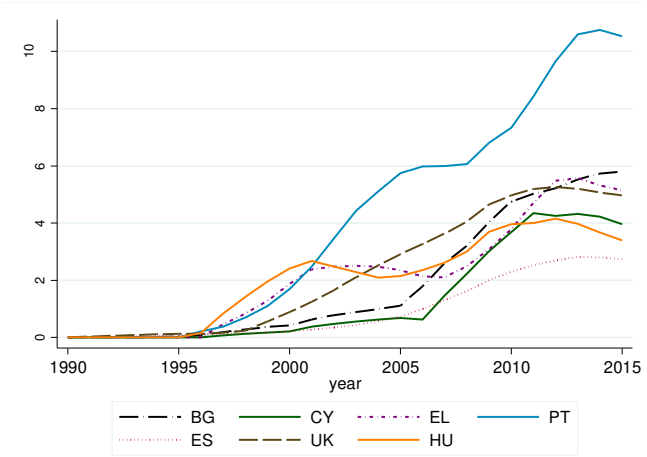


Source: own elaboration on IMF data

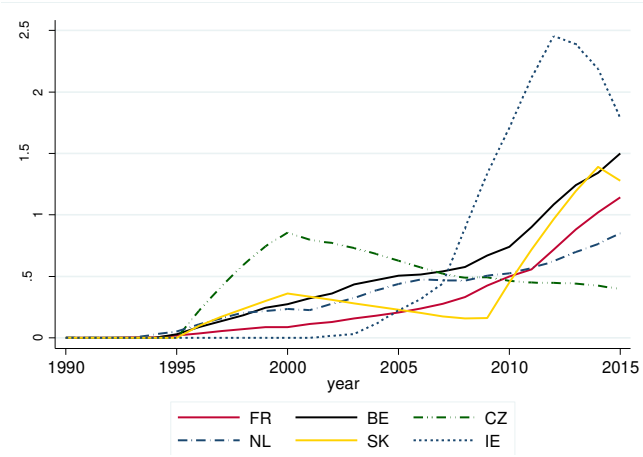
The European Commission and Eurostat have fostered uniformity of PPPs policies in member states by setting codes and regulations that have especially influenced the procurement stage. However, very different levels of PPPs take-up can be observed. The capital stock arising from PPPs diverges strongly across countries (Figure 2), with Portugal, the United Kingdom and Greece distinguishing as those with the highest percentage of PPPs-related capital, while Croatia and Luxembourg show the lowest figures.

Figure 2 - Countries distribution according to PPP volumes

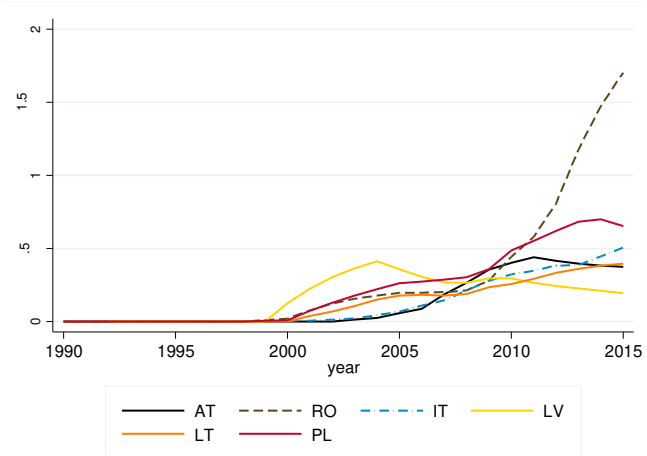
a) Fourth quartile



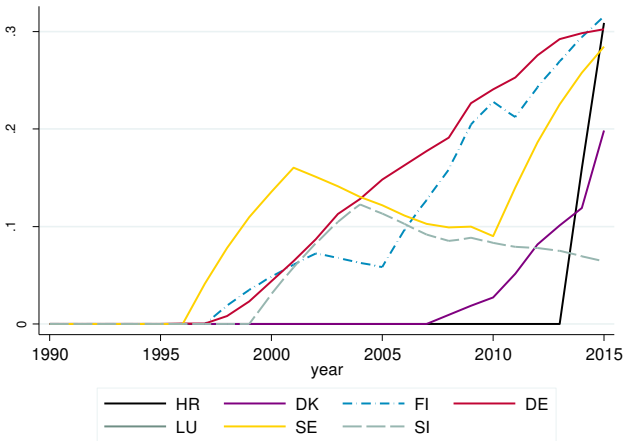
b) third quartile



c) Second quartile



d) First quartile



Source: own elaboration on IMF data

3. Literature background

Public finance factors have been included among the drivers of public investments (Mehrorta and Välilä, 2006; Gali and Perotti, 2003) and also of PPPs in studies relating the PPP option to the governments' strategy of avoiding excessive public borrowing (Benito et al., 2008; McQuaid and Scherrer, 2008; Vecchi et al., 2010; Cruz and Marques, 2011; Fernandes et al., 2015; Reeves, 2015; Bergere, 2016; Albalate et al., 2015; van den Hurk, 2018). Among the quantitative analyses for the EU countries, econometric evidence for French and Italian municipal PPPs (Antellini Russo and Zampino, 2012; De Marco et al., 2012; Buso et al., 2017) shows a significant relationship between PPP tenders and local government's budgetary results. While van den Hurk et al. (2016) argue that budgetary reasons were essential for the choice of PPPs in Southern EU member states, Petersen (2010) find that where the fiscal constraints were less compelling, countries (e.g. Denmark and Sweden) have been less eager to opt for PPPs. Only Mota and Moreira (2015) find a negative relationship between the budget deficit and the value of PPPs.

The EU accounting rules are deemed to have contributed to the preference for PPPs, because, under certain conditions, they allow for the partnerships registration as off-balance-sheet items and for the share of PPP-related debt not being considered for the Stability and Growth Pact (SGP) compliance (Benito et al., 2008; Cruz and Marques, 2011; Reeves, 2015; Bergere, 2016)[2]. The off-balance sheet motive may also shape the characteristics of the PPP policy (Fernandes et al., 2015; van den Hurk, 2018), determine distortions, delays, and cancellation of some public investment decisions (Reeves, 2015). In some cases, it may prime over the project's merit or value for money (Acerete et al., 2019) and may be responsible for low quality and fiscally costly projects (Engel et al., 2014) or for pushing public authorities in sectors where PPP do not add value (Riess, 2005). Buso et al. (2017) conclude

[2] PPP-related assets are classified off the balance sheet of the government if: (1) the private partner bears the construction risk (e.g., late delivery or additional costs), (2) the private partner bears either availability (volume and quality of output) or demand risk (variability of demand), and (3) the risks are not incurred by the government through other means (e.g., government guarantees or early redemption clauses). Therefore, when enough risk is transferred to the private partners, the PPP-related investment does not show on the government balance sheet.

that, for French municipalities, the debt-hiding motivation was relevant, but not sufficient to explain the PPP choice.

The choice of PPPs to circumvent the fiscal constraints may expose the public sector to higher than expected costs (Jensen and Dowlatabadi, 2018), and to running contingent liabilities, which are related to the presence of guarantees that may be triggered by a future event and are difficult to evaluate in amounts and timing (Cebotari et al., 2009). These guarantees transfer the financial risk to taxpayers and, when called, they may cause large sudden outlays for the public sector (IMF, 2012). Their off-balance accounting treatment implies an underestimation of the future burden on taxpayers (Stafford et al., 2010; Fernandes et al., 2015).

The fiscal motivations may combine with the politicians' incentive to opt for PPPs to increase their political consensus in a context of curtailed budgets, especially during periods of fiscal distress (Cappellaro and Longo, 2011; Reeves, 2015). In many instances, political convenience has led governments to employ PPPs, claiming that there was no other viable alternative, and, thus, dismissing the need to show their value for money (Hall, 2008). The political convenience of PPPs is, however, multi-dimensional (Coghill and Woodward,2005): PPPs not only help pleasing the electorate by providing services and avoiding upfront costs, but they also free revenues to be used for other targets and help governments gain the recognition of good management.

As PPP adoption is different according to national institutional settings, the role of institutional factors has attracted the attention of the literature. The presence of institutional actors that control the public investment process can stabilize the environment for PPP decision-making (Savitch, 1998). Bertelli (2019) and Bertelli et al. (2020) argue that the political risk to which PPPs are exposed can be reduced by increasing the number of veto points that make the political environment more predictable and restrain politicians from intervening in the project.

4. Methodological approach

As the Chow test confirms the existence of a structural break in 2008, in correspondence of the great recession, we estimate two models based on the years before (1990-2008) and after (2008- 2015) the break point respectively. According to the Mundlak (1978) approach [3] (given the presence of heteroscedasticity), both subsamples are better fitted with a fixed-effects estimator. As standard error estimates are severely biased, if not appropriately accounted for, we verify the presence/absence of cross-section independence (Pesaran, Breusch and Pagan test[4]) and contemporaneous correlation[5] (Inoue and Solon test and Wooldridge –Drukker WD test). The results of the cross-sectional dependence tests point to different conclusions[6], while those on contemporaneous correlations are not reliable for an order superior to one. Therefore, we prefer an estimator that contemporarily addresses both departures from the canonical assumptions. Then, we estimate a fixed effect model with Driscoll and Kraay (1998) standard errors (eq.1) for the EU countries:

$$ppp_{it} = \beta_0 + \beta_1 econ_{it} + \beta_2 fiscal_{it} + \beta_3 pol_{it} + \beta_4 instit_{it} + \varepsilon_{it} \quad (1)$$

where, the subscript *i* denotes the country and the subscript *t* denotes the year. The disturbance term is given by two error components, $\varepsilon_{it} = \alpha_i + u_{it}$ with α_i representing the country effect, which we assume to be a fixed effect, including cultural and historic aspects, by assumption correlated with the regressors. The term $u_{it}$is the stochastic error. Time dummies are not included as the corresponding test has been rejected.

[3] See Pinzon (2015) for a practical description.
[4] See, for a general overview, De Hoyos and Sarafidis (2006), while for the specific used tests: Pesaran (2004) and Breusch and Pagan (1980)
[5] See for a general overview Wursten (2018), while for the specific used tests: Inoue and Solon (2006), Drukker (2003) and Wooldridge (2010)
[6] While Pesaran's test confirms the existence of cross-section independence (p value: 1.6 and 1.5 for the samples before and after the crisis), the Breusch and Pagan's test rejects such hypothesis.

Previous studies (Mazzola et al., 2019; Checherita, 2009 and Hammami et al., 2006) address the particular nature of PPPs investment series (high incidence of zeroes) by estimating a Tobit model. As there is no theoretical reason to use this estimator because the zeros correspond to real observations, we follow the strand of the literature that employs linear models (Mota and Moreira, 2015; Kasri and Wibowo, 2015; Moszoro et al., 2015 and Mengistu, 2013). As a robustness check, in order to address the zeros issue, we also present a conditional fixed-effect model (Wooldridge, 1999).

Our dependent variable (pp) is the PPPs investment (billions, constant international dollars) from the IMF database[7]. Real GDP and financial variable sare expressed in logarithm and lagged[8] (Table 1). Thus, regressors are predetermined with respect to the dependent variable and reverse causality should be excluded. No collinearity issues pertain to the model. The VIF and tolerance are below/above critical thresholds.

We employ different fiscal variables to test the relevance of the budgetary constraints that make infrastructure assets recording out of the government's book particularly appealing. Employing the General Government net lending/borrowing (*budget balance)*,we test the hypothesis that stronger public finances make the off-balance sheet motive less relevant and the choice of PPP less necessary or attractive. Hence, we expect a negative sign for the budget balance, which has also been the main variable of interest for the surveillance under the EU fiscal rules until the 2011 SGP reform. For the debt variable (*debt*), we put forward the hypothesis that, rather than motivating creative accounting practices, high levels of debt increase the perception of the country risk and undermine the investors' confidence and their interest in PPPs. We therefore expect a negative sign for the debt variable.

[7] The IMF database includes total PPP projects commitments taken from the European Investment Bank (EIB) for European countries and the World Bank Private Participation in Infrastructure database for low- and middle-income countries. EIB includes long-time PPP projects above 5 million Euros planned by central governments and records them at the time of financial close (Kappeler and Nemoz,2010).

[8] The variable *eufund* and the index of fiscal rules are only lagged.

Table 1. Determinants of PPP investment

Variables	Description	Source	Expected coefficient
Public finance			
budget balance	General Government net lending (+)/borrowing (-)	AMECO	-
debt	General Government gross debt	AMECO	-
totrev	Tax revenues	AMECO	+/-
*Eufundub_*	EU funding	ECB	+/-
gov_ cons	Share of consumption expenditure (% GDP)	AMECO	+
Institutions			
rules	Fiscal rule index (normalized)	IMF	+/-
pub_corr	Public Sector corruption index	QoG	+/-
checks	Number of veto players	QoG	-
Economic structure			
realgdp	Real GDP	IMF	+
int_rate	Real long-term interest rate	AMECO	-
exp	No. of years of experience with PPPs	IMF/EIB	+
Political features			
right/left/centre	Left/right centre-wing governments	CPDS	+/-
fragm	Political fragmentation	QoG	-

To complete the public finance framework, we include also the revenue and expenditure sides of the budget. On the one hand, high taxes generally correspond to high levels of recurring expenditures, which have to be financed leaving little room for discretionary spending, investments included (Reyes-Tagle and Garbacik, 2016). On the other hand, the availability of large tax revenues would reduce the need for alternative sources investment financing (Rosell and Saz-Carranza, 2019; Albalate et al., 2015). We employ the ratio of total tax revenues to GDP (*totrev*) and do not form any prior on the sign of the coefficient. The expenditure side of the budget is proxied by the share of government consumption in GDP terms (*gov_cons*). The variable accounts for the level of public services whose provision may absorb the available public resources, leaving little room for investments, which would have to search for alternative forms of public procurement - including PPPs: hence, we would expect a positive coefficient.

Finally, as the recourse to PPPs should increase when supplemented by other financing sources, we also introduce data for EU funding (*eufund*). By blending EU funds in PPPs, the public sector can make a project more affordable. However, EU funding entails the respect of additional requirements, and, especially in presence of weak administrative capacity, this may discourage the PPP use.

We, then, proceed by accounting for the role of institutions to control fiscal illusion. First, we investigate the role of fiscal rules. The empirical literature supports the idea that well-designed rules promote better fiscal performances, but also increase the risk of governments' shifting from overt to hidden forms of borrowing and employing opportunistic behaviours (increased implicit liabilities, creative accounting practices, optimistic fiscal forecasts).

The EU fiscal rules have undergone several changes since the original Maastricht Treaty targets. Until the crisis, the EU rules were focused on deficit targets and the corrective arm, but their implementation was less than satisfactory (Morris et al., 2006). The preventive arm, fiscal surveillance in the European semester, an expenditure rule and a specific debt rule were operationalised only after the 2011 reform. No explicit Golden rule was introduced, but a smoothing of the investments[9] and an investment allowance[10] have been put in place since 2011.

To consolidate public finances and reassure investors after the crisis, domestic fiscal rules in the EU countries have grown in number (from less than 60 to 113 in 2017) and stringency. They mainly target the budget balance, even if debt, expenditure and revenue rules are also increasingly present.

[9] In the computation of the expenditure growth to be compared with the country specific expenditure benchmark, the current level of investment is replaced with the average over the previous four years in order to support investment and avoid that, especially for small countries, peaks in investment in specific years could cause non-compliance with the expenditure rule.

[10] This has the effect of relaxing the medium-term objective convergence obligation and can be asked for by countries which satisfy strict conditions: 1) economic growth is negative or well below its potential; 2) the deviation does not lead to a breach of the 3% deficit ceiling and the debt rule is respected; 3) the deviation is linked to national expenditures on projects cofounded by the EU.

Only Germany (1969-2010) and the United Kingdom (1997-2008) introduced a Golden rule that limited government borrowing at the level of investments[11].

We build an index of fiscal rules strength[12] and advance the hypothesis that, absent a Golden rule and adequate surveillance, supranational and domestic rules increase the deliverance of infrastructures out of the balance sheet. However, more stringent rules, investment protection clauses and stricter surveillance should deliver the opposite result. To the best of our knowledge, no previous studies have checked for this aspect.

As political institutions may discipline the political potential of PPP, we test for the role of checks and balances, which increase political stability, reduce the political risk faced by businesses, and influence the investment decisions of public managers. We expect that their presence reduces the employment of PPPs, as it impacts on the fiscal illusion logic by limiting the possibility for politicians to employ PPPs to undertake pork-barrel projects at the benefit of their constituencies (Maskin and Tirole, 2008). The variable employed is *checks* from the QOG database.

On the contrary, the political potential of PPPs may be enhanced by the vulnerability of the administrative environment, namely by the presence of corruption, given that PPP projects have specific characteristics - the value of the assets, the interaction between public and private subjects - that make them particularly vulnerable (Rosell and Saz-Carranza, 2019). We employ the Quality of Government (QoG) measure of the corruption in the public sector (*pub_corr*). A more controlled environment and institutional limits to the actions of the policymaker are expected to discipline PPP investments and increase the private sector's confidence, while higher levels of public corruption

[11] In Germany the rule allowed for a transgression of the limit, if the government declared a macroeconomic disequilibrium. In the United Kingdom, the rule was applied over the economic cycle and complemented by a sustainable investment rule to keep public sector net debt at a stable and prudent level over the cycle (40% GDP).

[12] We use the IMF Fiscal Rules Dataset 2016, which collects four types of rules (budget balance rules, debt rules, expenditure rules, and revenue rules), their characteristics (coverage, monitoring procedures, enforcement procedures, and institutional supporting features) by government's level (national and supranational) of adoption. Following Schaechter et al. (2012) methodology, we compute a normalized overall index, by summing up the sub-indices by level of government. Each sub-index is also built as a simple sum of its five or six characteristics scores and it is normalized in order to run between 0 and 1.

reduce the attractiveness of PPPs for private investors (Galilea and Medda, 2010). However, it could also be possible that higher corruption produces an inflated expenditure in PPPs. Tanzi and Davoodi (1998) and Haque and Kneller (2008) observe this effect on public capital projects.. Corruption stakes go together with project complexity, that is higher for large infrastructure, like those that employ PPP financing (Iossa et al., 2013). Hence, we do not form any prior on the expected sign of the corruption index.

Finally, we include country-level controls to account for the domestic economic structure and the business environment. A large number of potential consumers and bigger markets are an incentive for private party's participation in PPPs. In particular, we consider the real GDP (*realgdp)*, as a proxy of the private sector market power. Given that considerable administrative capability is necessary for the implementation of PPP projects, previous experience represents either a reputational capital (Galilea and Medda, 2010) or a catalyst of future successes (Ng et al, 2012). We consider the number of years with positive investment in PPPs as representative of the level of expertise (*exp*) and expect a positive sign, given that countries are more likely to implement larger PPPs investment the more experienced they are with such programs. Finally, we consider the lending interest rate (*int_rate*), which is representative of the discount rate used to decide on PPPs investment decision.

At the end, we test for the relevance of political factors and consider the government's political orientation, which is captured by the relative power position (*right/left/centre*) of the parties in government measured by their seat share in the parliament. According to Savitch (1998), in the UK the propensity for PPPs seems to be associated to left parties, which support a larger provision of public services. However, Li (2003) finds that PPPs have become the trend in the UK, independently from the party to power. Seemingly, Collin (1998) finds no difference between left- and right-wing party policies in supporting PPPs in Sweden. Albalate et al. (2015) confirm the pragmatic—rather than the ideological— origins of the private participation decision in the US. Given the not conclusive evidence of the literature, we form no prior on the expected sign of the coefficients.

To analytically account for political competition we employ the government's fractionalization index (*fragm*) from the QOG database. The more fragmented the government, the more heterogeneous the preferences and the political attempts to satisfy these conflicting demands by means of private sector resources. However, fragmentation can also imply a *status quo* politics and the impossibility to decide on complex projects such as infrastructure. Accordingly, we expect a negative coefficient for the variable.

5. Results and discussion

Our results (Table 2) confirm a significant impact of some fiscal variables and significantly explain the different uptake of PPPs across European countries and their distribution. The positive coefficient for GDP, although not always significant, confirms the existence of a relation between PPP policies and the country's market size only after 2008. The coefficient for GDP is, instead, negative for the 1990-2008 period, when – except for the United Kingdom – the countries employing PPPs were mostly small economies. The real interest rate has no impact on PPP investment.

The hypothesis on the past experience with PPPs is confirmed by the positive and significant coefficient of the *exp* variable. Although we employ a different variable, this result is in line with Mota and Moreira (2015). Indeed, public agencies need time and skills to build the necessary institutional arrangements and the capacity to handle PPPs projects - for example through the creation of PPPs units or agencies, standardised contracts or procedures for evaluation and implementation (Hodge et al., 2018; Verhoest et al., 2015).

Table 2 - Fixed effect model with Driscoll and Kraay (1998) standard errors

	Sub-periods					
	1990-2008			2008-2015		
GDP	-2.5* (-2.79)	-3.2*** (-4.49)	-3.8* (-2.55)	0.91 -0.98	1.00 -0.83	2.9* -2.17
int_rate	0.07 -0.84	0.05 -0.69	0.09 -1.10	0.00 -0.26	0.00 (-0.56)	0.01 -0.46
exp	0.1*** -6.23	0.1*** -5.76	0.1*** -4.94	0.02 -1.91	0.03** -3.54	0.04*** -6.13
rules	7.7** -3.72	7.9*** -4.29	8.4** -3.35	-1.6** (-3.04)	-1.6* (-2.81)	-1.8* (-2.29)
totrev	19.17*** -7.37	19.71*** -8.61	20.02*** -6.34	7.378* -2.72	7.738* -2.80	8.618** -2.96
debt	-5.657*** (-6.99)	-5.864*** (-8.89)	-6.065*** (-6.11)	-0.849*** (-7.93)	-0.771*** (-6.84)	-0.618* (-2.38)
budget balance	-13.8*** (-7.71)	-13.0*** (-6.46)	-12.4*** (-4.02)	-7.9*** (-5.66)	-7.6*** (-5.27)	-6.1*** (-5.30)
eufund	-44.5 (-1.70)	-48.4 (-1.75)	-41.7 (-1.64)	3.1 -0.31	-3.2 (-0.40)	-16.1** (-3.35)
gov_cons	7.0*** -8.24	7.2*** -10.66	7.3*** -7.45	-2.7*** (-4.30)	-2.56*** (-4.26)	-1.9** (-3.20)
pub_corr	3.94 (-1.02)	4.73 (-1.08)	1.35 (-0.46)	0.45 (-0.53)	0.23 (-0.39)	0.84 (-2.08)
fragm	-0.67 (-1.81)	-0.75 (-1.93)	-0.9** (-3.83)	-3.24** (-3.72)	-4.6*** (-4.23)	-5.4** (-3.68)
checks	-0.12 (-0.96)	-0.16 (-1.06)	-0.08 (-0.59)	-0.137* (-2.47)	-0.07 (-1.71)	-0.02 (-0.60)
left	0.007* (-2.64)			0.01*** (-4.70)		
right		-0.01 (-1.64)			-0.007*** (-4.72)	
cent			0.00 (-1.21)			0.00 (-1.82)
_cons	244.20 (-2.03)	262.40 (-2.05)	231.80 (-1.98)	-9.10 (-0.16)	17.84 (-0.37)	56.47 (-1.85)
N	182	182	182	130	130	130

As expected, the relationship between PPPs and the budget balance is particularly significant in both periods: a worsening in the budget position and the shortage of government funding encourage the use of PPPs. This result is in line with the econometric results in Albalate et al. (2015) for the US states, in Buso et al. (2017) and in Antellini Russo and Zampini (2012) for Italian and French municipalities respectively. Still they are in line with a large literature based on surveys and case studies (Benito et al., 2008; McQuaid and Scherrer, 2008; Vecchi et al., 2010; Cruz and Marques, 2011; Fernandes et al., 2015; Reeves, 2015; Bergere, 2016; Albalate et al., 2015; van den Hurk, 2018). These results are at odds only with Mota and Moreira (2015), who find a positive relationship that is rationalised as the effect of government's credibility (due to public finance consolidation) on business confidence. From the relevance of the fiscal motive follows the need to develop appropriate accounting rules to avoid that the possibility of off-balance sheet registration has a distorting effect on PPP investment decision and that the distribution of risks in the project is influenced more by the PPP statistical treatment rather than by the principles of optimal risk assignment.

The negative coefficient of the debt variable for the whole period confirms that high public debt hampers PPP investments. The debt target of the Maastricht rules, relevant for the Euro Area membership, was not operationalised until 2011 by establishing the debt-reduction benchmark. However, debt levels had an impact on the country risk perception by private investors: high levels of public debt reduce the government's credibility, discourage private investors and refrain them from participating in PPP projects. The impact of public debt on PPPs is higher for the pre-crisis period and much lower after. This result complements the empirical evidence in Bacchiocchi et al. (2011) who point to high levels of public debt distorting the allocation of public expenditure and hampering public investment.

The positive and significant coefficient of tax revenues points to the fact that governments with a high tax burden are more eager to resort to PPPs. The coefficient for the pre-crisis period nearly doubles that for the post-crisis years. The share of government consumption positively and

significantly affects PPPs investments from 1990 to 2008, signifying that, when the level of public services is high, the involvement of private partners is an alternative with respect to more traditional types of financing to deliver and operate infrastructure. After 2008, fiscal consolidation and the need to preserve the levels of some essential services implied a general withdrawal from investments, PPP included: this explains the negative and significant coefficient of the *gov_cons* variable.

The variable for the EU funding contribution has the expected negative sign confirming the disincentive of the high requirements imposed by the EU grant application process. However, it is not always significant.

The negative sign of the coefficient for the number of checks and balances confirms – as in Bertelli et al. (2020) - the expectation of a positive role of institutional veto points *(checks)* to control the investment decisions of public sector officials, reduce the 'political' risk and the risk of accruing unsustainable fiscal liabilities. The result, however, is in most cases not significant.

A very interesting result is found for fiscal rules, which display a positive and significant coefficient before 2008 -when the SGP was weakly stringent and domestic fiscal rules were not widespread. PPPs have been a preferred option for financially constrained governments to help them meeting the fiscal target – mostly on the budget balance - established in national and supranational rules. On the contrary, after 2008 the new version of the SGP, the stricter EU surveillance, and the increased number and strength of domestic fiscal rules seem to reduce the scope for the PPP option. However, in this case the coefficient is much smaller and less significant. This result is interesting because there is no previous evidence of a clear relationship between public investment and fiscal rules[13].

The vulnerability of institutions, in the form of corruption in the public sector is positively related to PPPs investments: however, the coefficient is not significant. This is in line with Rosell and Saz-

[13] Galì and Perotti (2003) argue against the relevance of the SGP on public investments. Bacchiocchi et al. (2011) do not find evidence of a role for the SGP in EU high-debt countries and stress the role of debt sustainability concerns. EMU membership seems to matter, instead, at low level of debt. Mehrotra and Välilä (2006) also find that SGP does not have a systemic impact on public investment.

Carranza (2019), who associate corruption only to emergent countries, and Mota and Moreira (2015) who do not find any significant effect of corruption perception on PPPs in the EU countries.

When turning to the political drivers, we find that political fragmentation decreases the use of PPPs, especially after 2008: conflicting demands do not allow complex investment decisions and imply gridlocks. In terms of political orientation left-wing governments are confirmed to be more supportive of PPPs (as in Mota and Moreira, 2015) than right and centre governments that display negative coefficients.

Robustness checks are provided in Table A.1 in Annex. We estimate a conditional fixed effect model on the same subsamples. The checks confirm almost all the findings with the exception of the variable for the government consumption share. In this case a stable and negative relation over the two sub-periods is observable.

6. Conclusions

In a time of questions how to increase, renew and improve infrastructure, we investigate the EU countries choices in terms of PPP adoption and the reasons for the PPP market distribution. Our focus is on the fiscal, political and institutional setting. Our overarching result is that both before and after the crisis, public finance conditions have been highly relevant. First, there has been an incentive to adopt PPP to finance investments by those EU countries that were constrained by the state of their public finances, in particular their budget balance. This result is due to the possibility of off-balance sheet registration of the PPP projects and calls for attention because, if PPPs are employed to avoid financial constraints in the short term, in the medium/long term they can create unsustainable fiscal liabilities, unless adequate controls and safeguards are implemented. Indeed, as Engel et al. (2014) demonstrate, PPPs' impact on the government intertemporal budget is similar to that of public provision and PPPs should be accordingly recorded. Transparency principles should be applied also to recording PPP-related contingent liabilities, which expose governments to the risk of severe fiscal

problems. On-balance-sheet recording, at least in internal documentation—as in France—could be a first important step for all EU countries. Other complementary provisions to mitigate the fiscal illusion logic could be employed, such as spending caps to public officials (Maskin and Tirole, 2008), ceilings for the stock of PPP-related contingent liabilities, maximum annual payment amounts for PPPs, or independent agencies giving advice on PPP contracts and performance.

High levels of debt create sustainability concerns that increase the countries financial vulnerability and undermine the investors' confidence and their interest in PPPs. This result complements previous empirical evidence (Bacchiocchi et al., 2011, in particular) that points to high levels of public debt distorting public expenditure allocation and hampering public investment. The consequence is that the decline of public investments in high-debt countries cannot be countered by resorting PPPs, unless progress is made in debt reduction so to win the investors' confidence.

At the same time, we find that institutional provisions – check and balances, in particular – do not provide sufficient control of the PPP bias and that PPPs in the EU countries are under the influence of political competition and government's preferences for current expenditures. However, SGP and domestic fiscal rules are relevant for PPPs adoption. During the pre-crisis period, the presence of fiscal rules proves to be an incentive to opt for PPPs to facilitate meeting the budget targets. After the crisis, more numerous and stricter domestic rules, the reformed SGP (with an increased number of constraints and a limited flexibility on investments) and EU surveillance, seem to have reduced the scope for a biased employment of PPP contracts to carry out investment projects.

These empirical findings should contribute to the understanding of the distribution of PPPs in the EU countries. Besides, in presence of infrastructure quality decline and new investment challenges, we highlight the need to carefully consider the role played by public finance factors to evaluate the possibility that PPPs may be employed in addition or as an alternative to traditional public investment.

Annex

Table A.1 – Conditional fixed-effects model

	Sub-periods					
	1990-2008			2008-2015		
GDP	-3.5* (-2.46)	-3.9* (-2.50)	-3.6* (-2.39)	3.4 (-1.58)	3.8 (-1.84)	4.0 (-1.95)
int_rate	0.009 (-0.31)	0.009 (-0.28)	0.01 (-0.37)	-0.004 (-0.09)	0.003 (-0.08)	0.006 (-0.18)
exp	0.2*** (-3.65)	0.2*** (-3.71)	0.2*** (-3.65)	0.1*** (-3.62)	0.2*** (-3.7)	0.1*** (-3.51)
rules	1.874* (-1.99)	2.051* (-2.1)	1.646 (-1.22)	-1.6*** (-4.48)	-1.5*** (-3.38)	-1.4** (-3.25)
totrev	0.301 (-0.23)	0.558 (-0.37)	0.507 (-0.43)	4.969*** (-6.65)	5.514*** (-3.99)	6.118*** (-4.02)
debt	-3.038*** (-4.22)	-3.138*** (-4.44)	-3.001*** (-5.55)	-1.017* (-1.99)	-1.268* (-2.48)	-1.198* (-2.13)
budget balance	1.3 (-0.69)	1.2 (-0.53)	1.0 (-0.49)	-8.7*** (-3.46)	-8.7*** (-3.42)	-8.9*** (-3.50)
eufund	82.3*** (-8.14)	78.5*** (-6.34)	80.3*** (-8.92)	-35.2** (-3.10)	-44.3** (-3.14)	-47.8*** (-3.69)
gov_cons	-0.59 (-0.55)	-0.557 (-0.50)	-0.661 (-0.57)	-2.0* (-2.22)	-1.893 (-1.95)	-1.839 (-1.78)
pub_corr	5.589 (-1.239	5.24 (-1.13)	4.587 (-0.97)	3.752* (-2.26)	3.771* (-2.04)	3.870* (-2.01)
fracgm	-0.2 (-0.25)	-0.21 (-0.29)	0.01 -0.02	-0.02 (-0.05)	-0.7 (-1.15)	-1.0* (-2.41)
checks	-0.324* (-2.46)	-0.329* (-2.43)	-0.355* (-2.45)	-0.0427 (-0.98)	0.0135 -0.36	-0.0194 (-0.31)
left	0.0004 (-0.24)			0.003* (-2.42)		
right		0.0005 (-0.25)			-0.0008 (-0.54)	
cent			-0.002 (-1.14)			-0.002 (-0.69)
N	179	179	179	118	118	118

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