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Evidence from Toll Road Concession Contracts

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Abstract: Transport concession contracts are commonly said to be standardized and too rigid. They would not allow public authorities to adapt them to evolving context and circumstances. This paper aims at challenging this view and, more particularly, the view that contractual rigidity for transport concessions is exogenous. Using a transaction cost framework, we disentangle between three main determinants of contractual rigidity: traffic uncertainty; connivance between contracting parties; quality of the institutional environment. Using an original database of toll road concession contracts, we observe a great variety of provisions for toll adjustment. We find that these exogenous determinants significantly influence contractual choices.

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1.0 Introduction

We know that infrastructure levels and quality significantly matter for economic growth and poverty alleviation. The "infrastructure gap" in Europe (European Economic Commission's statement, July 2015[1]) has been recognized for many years and its negative impact on economic growth, job creation and social cohesion is felt across every country within the region. Within infrastructure services, the transport sector, and above all the roads subsector, is one of the most concerned by the involvement of the private sector: public private partnerships (PPPs hereafter) in most of European countries are dominated by road projects (PriceWaterhouseCoopers (2004)) and take the form of concession contracts. In these contracts, concessionaires undertake the design, building, financing and operation of the relevant facility and their main source of revenue are the tolls that they can charge to users for the whole length of the concession. They are very long-term contracts (often over 30 years) involving large upfront specific investments. These features make them particularly prone to opportunistic behaviors and lead contracting parties to design rigid contracts (Williamson 1985, Spiller 2013). However, there has been some negative feedback, following experiences in Latin American (Guasch (2004), Estache (2006)) and developed countries (Chong *et al.* (2006), Engel *et al.* (2006)). Significant contractual costs, together with difficulties in designing and adapting contractual agreements during the contract between public authorities and private operators, are often posited to explain this mixed scenario (Spiller (2009), Athias (2009), and Athias (2013)). It has often been noted that many agreements are standardized, and that "A key concern with long-term PPP contracts is the level of flexibility that they offer to authorities to make changes, either to the use of assets, or to the level and type of services offered" (PriceWaterhouseCoopers (2005)). One example is given by the conflict that occurred in 2014 between the French government and motorway operators. The socialist

[1] See http://ec.europa.eu/transport/themes/infrastructure/news/2015-07-22-cef-delegation-agreement-signed_en.htm.

government wanted to revise contracts with motorway operators, privatized under the previous administration, which it regards as too generous and plans to create a new regulator to oversee highway tolls. However, the government's room for maneuver was limited as operators were protected by agreements stipulating they must be compensated for any change in contracts, which in some cases do not expire until 2035.[2]

This paper challenges the view that transport concession contracts are standardized and too rigid. We show that such contracts exhibit a large diversity and we argue that this diversity can be related to exogenous factors. More precisely, toll road concession contracts are characterized by a degree of uncertainty that is much greater than in most ordinary contracts. Traffic forecasts are notoriously imprecise, making toll road concessions very risky (Trujillo, Quinet, and Estache (2002); Flyvbjerg, Bruzelius, and Rothengatter (2003); Vassallo (2006); Athias and Nunez (2008, 2015)). This aspect of toll road concession contracts should call for contractual flexibility so as to adapt the contract once uncertainty unfolds, even though contractual flexibility could favor the occurrence of opportunistic behaviors. Thus, the design of such contracts is affected by the challenge of including the appropriate level of flexibility: too much, and undesirable opportunistic renegotiations are likely to occur; too little, and opportunities for welfare-enhancing renegotiations will be lost. In this paper, we estimate whether the uncertainty associated with toll road concessions is balanced against the standard fear of occurrence of opportunistic behaviors associated with long-term incomplete contracts involving specific investments.

While our paper is mostly empirical, we frame it around a transaction cost economics approach of contractual choices. We disentangle between three main determinants of contractual rigidity: projects specific uncertainty (for example future traffic uncertainty),

[2] See Reuters, December 16, 2014: http://www.reuters.com/article/2014/12/16/us-france-tollroads-idUSKBN0JU0W520141216.

contracting parties' characteristics (for example connivance between the contracting parties) and the quality of the institutional environment (for example government's capacity to commit and quality of governance) characterizing the country in which the project is developed. In particular, we highlight that the impact of the institutional environment is ambiguous.[3] A strong institutional environment might on the one hand increase *ex ante* commitment (the *commitment effect*, leading to more rigid contracts), and on the other hand it might increase the ability of contracting parties to renegotiate contracts without prohibitive transaction costs (the *governance effect*, leading to more flexible contracts). This leads to one of the empirical questions that we address in this paper.

Using an original database consisting of 71 toll road concession contracts from around the world, we observe a great variety of provisions for toll adjustment, from extremely rigid (such as firm-fixed price provisions in which tolls are fixed for the entire length of the concession) to very flexible ones (for example contracts that contain provisions for renegotiation that determine *ex ante* any periodic *ex post* negotiations of the initial toll adjustment provision). Such variety came as a surprise for contracts that are commonly considered as being too rigid. Our results indicate that the flexibility of price provision increases with the uncertainty associated with future demand; this suggests that when uncertainty is high, parties prefer to sign flexible contracts and adapt their future behavior *ex post* through renegotiation rather than anticipating it *ex ante* in the contractual provisions. In addition, we show that there are political drivers involved in the design of toll road concession contracts. In particular, those contracts devised with left-leaning procuring authorities are likely to be more rigid. This finding strengthens the importance to consider political concerns

[3] Obviously, the institutional framework is given on the short run. The quality of the institutional environment plays nevertheless a role in the trade-off at stake in contractual choices (Henisz and Willamson 1999). Because we are using data coming from different countries, we observe variability in institutions and we can assess their impact on contractual choices.

in the design of PPP contracts. Finally, while the role of institutions on contractual choices is often discussed but rarely tested in the literature, our results suggest that contractual choices are affected by the quality of the relevant regulatory regime: the better the regulatory regime, the more flexible the contracts. Thus, contrary to common beliefs, we find, overall, that economic incentives related to exogenous factors (either related to projects, or contracting parties, or institutional characteristics) largely influence contractual choices for toll road concession contracts. They are not these -- commonly acknowledged -- standardized and too rigid contracts.

Our paper follows the strands of the literature that focus on the determinants of contractual choices. One strand uses agency theory with moral hazard and the main contention of this literature is that efficient contractual choices balance the incentives of a party against the inefficient risk borne by that party (Tirole (1988), Iossa and Martimort (2015)). Higher incentives tend to be assigned to the party that is least risk-averse and has the higher marginal productivity in relation to effort. The trade-off generally manifests itself in a choice between price cap and cost-plus-oriented contracts. This paper shows that if these considerations might be important in the design of toll road concession contracts, other considerations related to exogenous factors of contractual incompleteness also matter. This paper is then in the same vein as the strand of the literature that analyzes the question of contractual choices building on transaction cost economics. But this literature has received so far limited empirical evidence (main papers are Crocker and Masten (1991); Crocker and Reynolds (1993); Saussier (2000)) and has not considered this specific case of PPP contracts between a public authority and a private operator that raises new concerns. This paper is an attempt at filling this gap.

Our paper leads to a set of managerial and policy recommendations for contracting officers. If infrastructure contracts usually involve specific investments, rigidifying contracts

is not an efficient way to secure such investments. As soon as uncertainty around the transaction is important, our results suggest that crafting more flexible contracts is more efficient. Furthermore, the institutional framework appears to be important too, as more secure institutional frameworks allow contracting parties to design more flexible contracts. This might explain why we observe in some countries the decision to make independent regulatory agencies in charge of the regulation of toll road concession contracts.

The remainder of this paper is organized as follows: In Section 2, we describe the peculiarities of transport concession contracts that influence their contractual design, and state our present set of theoretical propositions. In Section 3, we describe the contractual toll adjustment processes observed in our data set. In Section 4, we present the original data used in the empirical section. Section 5 describes our empirical methodology, together with the econometric results obtained. In Section 6, we describe our checks on robustness. Finally, in Section 7, we present our conclusions.

2.0 Economic Issues in Contractual Design of Transport Concession Contracts

2.1 Peculiarities of Transport Concession Contracts

To develop their infrastructure, public authorities (central or local authorities) may decide to resort either to traditional procurement contracts or to PPPs. The key difference between PPPs and traditional procurement contracts is that under PPPs, the private sector delivers not only assets but also services for the duration of the contract. Therefore, they are responsible for the delivery of assets, as well as for the overall project management and its implementation, and its successful operation until the end of the contract. PPPs are thus complex long-term projects that involve non-verifiable investments, usually for the delivery of complex services, or at least services for which the degree of uncertainty is high. As a consequence, contractually unanticipated adaptations of the service provision very often occur

after the contract is signed. These observations suggest that the PPP problem is primarily one of *ex post* adaptations rather than *ex ante* screening.

The incompleteness of PPP contracts, as described above, also leads to an important strand of literature that covers the issue of renegotiation of contracts in less developed countries (Guasch (2004), Laffont (2005), Guasch and Straub (2006), Guasch *et al.* (2008), Engel *et al.* (2009)), as well as in developed countries (Engel *et al.* (2006), Spiller (2009), (Engel *et al.* (2011); Estache and Saussier (2014)). For example, in a study of more than a thousand concession contracts awarded in Latin America during the 1990s, Guasch (2004) found that the terms were changed substantially in over 60 per cent of the contracts within three years of commencement. In an updated study over the period 2004-2014, Guasch *et al.* (2014) found that 78 per cent of the contracts are renegotiated very soon after their signature. Furthermore, in a study of 50 Chilean concession contracts signed between 1993 and 2007 (mostly road contracts), Engel *et al.* (2009) revealed that these generated a total of 147 cases of unanticipated renegotiations. This strand of the literature identifies the different causes of renegotiation, such as adverse selection and lack of commitment (Guasch and Straub, 2006), corruption issues (Guasch *et al.* (2008)), political issues (Guasch and Straub (2006), Engel *et al.* (2009)) as well as third party and accountability issues (Spiller,(2009), Athias (2013)). These studies also highlight the effect of contractual choices (such as price cap vs. cost-plus) on the probability that renegotiation will be required. In particular, these studies show that price cap contracts, which are considered to be rigid contracts, are more likely to result in renegotiation (Guasch (2004), Guasch *et al.* (2008)). This is consistent with recent reports from the United Kingdom that suggest that English PFIs are renegotiated extensively because the initial agreements were too rigid (House of Commons' Seventeenth Report Session (2010-2012)). However, previous studies on private contracting (*e.g.* Joskow (1987) on long-term coal contracts; Bajari and Tadelis (2001) on procurement) found that designing rigid

contracts is an effective way of reducing the likelihood of renegotiation. Such contrasting findings suggest that one specificity of transport concession contracts is that more rigid contracts do not impede renegotiations and that contractual completeness and contractual rigidity are different, the latter not leading systematically to lower renegotiations. This dimension is of high importance when deciding on the level of flexibility or rigidity of transport concession contracts.

In fact, the design of the process of contractual compensation in infrastructure concession contracts is not regulated, *i.e.* there are no rules that determine the set of allowable toll adjustment processes. Concession contracts are most often awarded under an open bidding procedure, usually in two stages. In the first stage, private consortiums submit their technical qualifications, following the rules defined by the public authority concerned. In the second stage, the qualifying consortiums, *i.e.* those consortiums selected at the end of the first stage, are allowed to bid for the concession. The concession is then awarded to the consortium with the best bid (sometimes there is an additional stage between the second stage and the selection of the best bid, in which the two best bidders are asked to submit their Best and Final Offers in a final stage). Most toll road concession contracts are awarded via lowest-bid auctions, with adjudication criteria that include the lowest toll, the lowest public subvention requirement, and the shortest concession. When the best offer has been selected, there is then the so-called "preferred bidder phase", during which the public authority negotiates the final terms of the contract with the preferred bidder. During this phase, the public authority and the private operator have the opportunity to make the contract more rigid or more flexible through negotiation. This feature of the award process for toll infrastructure concessions introduces

reputational considerations into the determination of contractual terms, making the study of such contracts of particular interest[4].

2.2 Propositions

Considering the above mentioned peculiarities of transport concession contracts, we herein adopt a transaction cost perspective to explain how contracting parties design price provisions in such contracts (Williamson (1985)). This theoretical framework recognizes that contractual agreements are inherently incomplete (because of bounded rationality issues) and that renegotiation is always an issue, whatever the efforts of the contracting parties to rigidify the contract.

We postulate that to realize the transaction, the contracting parties may sign two types of incomplete contract:

- A rigid contract, in which contracting parties attempt to specify the means of coordination according to future states of nature. In other words, in such a contract, the parties try to prevent renegotiation, essentially by deciding the price to be charged by the private operator for the entire duration of the contract. However, in line with evidence provided in the previous section, we believe that the contracting parties cannot commit not to renegotiate, even if the contracts are rigid.

- A flexible contract, in which the parties do not try to avoid renegotiation, so they plan to renegotiate price once any uncertainty unfolds.

[4] Reputation is not a perfect guarantee. A firm that is well reputed at the date of contract signature may be completely different within a few years. However, the probability for this to happen is lower compared to the situation in which the contract is signed with a bad reputation firm. Good reputation firms have more to lose in behaving opportunistically during renegotiations and might procure a better service quality compared to other firms (Spagnolo (2012)).

The literature on transaction costs suggests that the contracting parties are less likely to design rigid contracts when the level of uncertainty is high (Crocker and Masten (1991), Crocker and Reynolds (1993)). The contention is that maladaptation costs are a function of uncertainty, so as uncertainty increases, it is more likely that the rigid contract would be poorly specified.

A further set of predictions that emerges from this theoretical framework concerns the magnitude of the renegotiation costs. The theory suggests that the higher the renegotiation costs, the more likely the contracts are to be rigid. The straightforward empirical implications involve differences in the contracting parties' characteristics, as well as differences in institutional environments. In fact, the costs of *ex post* adaptation are a function of the willingness (or lack thereof) of the contracting parties to enter into conflict, haggling and friction. Thus, when the parties decide to devise a flexible contract, each party must account for the likely behavior of the other, because some renegotiation will inevitably be necessary later on. Therefore, reputation, as it is perceived at the date of signature, is an important factor in reducing the probability of high *ex post* renegotiation costs. Furthermore, differences in political ideology (whether public authorities are left- or right-wing) may affect the contractual choices. Left-wing public authorities tend to be more skeptical than their right-wing counterparts when delegating public services to private operators, and they therefore may be less cooperative. Lastly, the institutional framework may affect the renegotiation costs. Indeed, the existence of weak institutional frameworks, in which the probability of successful opportunistic behavior is high, implies the possibility of higher renegotiation costs, which lead to rigid contracts (Spiller (2009)). Conversely, strong institutions may frame *ex post* renegotiations, and reduce their costs; this is termed the *governance effect* of institutions. However, institutional frameworks also have an impact on the probability of renegotiating a rigid contract (Laffont (2005), Guasch *et al.* (2008), Estache and Saussier (2014)). The

contention is that weak institutional frameworks are more likely to lead to flexible contracts (such as when the reliability of contract enforcement is weak) because a rigid contract may be effective only when the contracting parties perceive a relatively high probability of enforcement. There is no point in signing a rigid contract if it is obvious that it will be renegotiated; this is termed the *commitment effect* of institutions. The overall impact of the institutional environment on contractual rigidity is therefore unclear. A strong institutional environment might, on the one hand, increase *ex ante* commitment (the *commitment effect,* leading to more rigid contracts); and on the other hand, it might increase the ability of the contracting parties to renegotiate contracts without prohibitive transaction costs by providing an efficient structure of governance for renegotiations (the *governance effect,* leading to more flexible contracts). This leads to an empirical question that is addressed later on in this paper. This investigation is possible because our data set is not limited to one country but instead includes contracts signed within different institutional environnements.

3.0 Toll Adjustment Processes in Infrastructure Concession Contracts

In order to investigate toll adjustment provision choices in toll road concession contracts, we compiled a dataset that consisted of 71 toll road concession contracts (highways, bridges, tunnels). These 71 contracts included 45 original contracts and 26 renegotiated contracts, referred to as "supplemental agreements". These supplemental agreements correspond to non-anticipated, agreed modifications to the original contracts concerned, and the fact that these entailed the creation of new and different arrangements between the parties make it possible to consider them as new contracts (See Crocker and Reynolds (1993) for a similar methodology). The majority of projects in the sample (76 per cent) are French, with the remainder being contracts in Greece, the United Kingdom, Canada, Portugal, Benin, Chile and Thailand. The contracts were devised with a range of different operators. The oldest contracts in the sample were implemented in 1970, and the latest in 2005.

3.1 Toll Adjustment Types

We now turn our attention to the detail of the toll adjustment processes used in our sample as summarized in Table 1. We argue that toll – or price – adjustment processes can broadly be divided into two categories, rigid and flexible ones, according to whether the price for the whole length of the concession is the result of pre-specified compensation formulas or the result of future negotiations between the private operator and the public authority.

3.11 Rigid Adjustment Processes

Among the rigid adjustment processes, the most stringent is the "firm-fixed price" contract (FFP), in which price is specified to be independent of future events. FFP contracts are rarely used in infrastructure concessions, however, as a result of the high degree of uncertainty involved in them. More common are the automatic provisions that adjust tolls periodically, according to a predefined formula. The most extreme, rigid form in this category is a definite escalator (DE), that adjusts tolls according to an explicit, predefined schedule, increasing tolls, for example, at a specified rate. Some parties have also devised DE contracts that provide greater flexibility, by allowing the concessionaire a predefined margin around the adjusted price (DE/MARG). In contrast, fixed-price with economic price adjustment (EPA) contracts attempt to relate contract tolls to market conditions as they unfold. The process of compensation is formulaic, and the equation used ties the tolls to market data such as the consumer price index or specific indices of labor or materials. In practice, the flexibility of such a contract depends upon the number and importance of the indexed categories. For this reason, we have distinguished between those contracts that use fixed-price with partial economic price adjustment, which use the consumer price index to determine tolls according to an agreed compensation formula (FP/CPI), and those that use a fixed-price with economic price adjustment, which use cost indices (FP/COST). In both cases, implementation remains

straightforward, while the tolls become more flexible. However, as mentionned above, the requirement that the contingencies and compensation formulas be explicitly pre-specified constrains the flexibility of such contracts. The possibility for the concessionaire to be guaranteed a fixed minimum increase in price using a predefined escalator (FP/EPA/DE), or to have a predefined margin around the adjusted price (FP/EPA/MARG), or a traffic variation indexation (FP/EPA/TRAFFIC) in the compensation formula, does not eliminate these drawbacks, even if it provides greater flexibility. These first eight price adjustment processes are sufficiently rigid to work without any external intervention. They are clearly rigid toll adjustments that take account of maladaptation costs in order to avoid *ex post* renegotiation.

3.12 Flexible Adjustment Processes

Some parties have also devised adjustment provisions such as not-to-exceed price (NTEP). NTEP is specified at the outset and the concessionaire must negotiate with the public authority the determination of a firm price at or below this ceiling. NTEP contracts are thus not purely automatic adjustment processes, in that the final price is the result of negotiation, but neither do they contain renegotiation provisions in that the contracting parties do not specify *ex ante* the periodic negotiation of the toll adjustment process. In addition, in all the contracts that resort to this NTEP adjustment, the toll ceiling is loosened by indexing the tolls to the consumer price index (NTEP/CPI) or to pre-specified cost indices (NTEP/COST). Parties have also devised contracts that have a not-to-exceed-price with economic price adjustment – CPI or COST or both – that either ensure the concessionaire a fixed minimum increase of the NTEP through a predefined escalator (NTEP/DE/EPA), or an indexation to traffic variation (NTEP/TRAFFIC/EPA), or a margin of prices (NTEP/EPA/MARG). The most flexible option in this category affords the concessionaire the total freedom to determine and impose tolls over a ten-year period, and then establishes a NTEP with adjustment via indexation to cost indices for the remainder of the concession (FREE/NTEP/COST). Some

parties in our sample have also devised renegotiation provisions (RENEG) that consist in determining *ex ante* periodic *ex post* negotiations of the initial adjustment process. The parties thus periodically take into account the full range of relevant information before reaching agreement on the toll. These provisions therefore afford the transaction a considerable degree of flexibility. Nevertheless, the parties may structure the negotiation process by, for example, defining in the contract the sequence of offers and acceptances, or specifying the defaults if agreement cannot be reached.

These last seven adjustment processes explicitly pave the way for *ex post* negotiation and the final agreed price is then the result of negotiation between the private operator and the public authority. They are all clearly flexible toll adjustments.

The toll adjustment processes are summarized in Table 1. Such a wide range of price provisions is somewhat surprising in view of the fact that in the literature it is often claimed that one of the main drawbacks of concession contracts is their rigidity (PriceWaterhouseCoopers (2005)).

3.2 Toll Adjustment Types and Contractual Rigidity

The description of the toll adjustment processes found in our sample of contracts suggests that it is possible to rank toll adjustment provisions not only according to two broad categories (rigid vs. flexible) but also according to a more continuous qualitative index of rigidity. The most rigid contract in this regard is clearly the FFP, which permits no toll adjustment at all. When escalated by a predefined adjustment or by an economic price adjustment tied to the consumer price index, or to the realized costs of important inputs, the contract is less rigid, although still more rigid than NTEP contracts, and the different variations on these, which afford the concessionaire a greater degree of flexibility in determining tolls according to the actual context, but also provide substantial scope for opportunism. Nevertheless, the upper bound restrains the most opportunistic redistributive

strategies, in contrast to renegotiation adjustments, which nevertheless do permit the parties to take full advantage of the most up-to-date information.

The tables (Table 2) indicate then the ranking of the price adjustment processes used in the empirical part of our study, where lower numerical values correspond to less rigid contracts. We have decided to classify our contracts in three different ways. In the first classification, we consider that toll adjustment processes are either rigid or flexible (binary variable), according to whether the price for the whole length of the concession is the result of pre-specified compensation formulas or the result of future negotiation between the private operator and the public authority. Table 3 indicates that 53% of our contracts are rigid. In the second classification, we consider that toll adjustment provisions can be classified according to an increasing index of 5 types of rigidity. In the third classification, we consider an increasing index of 11 types of rigidity. Using these three classifications, the robustness of our results may be demonstrated according to the way the adjustments are classified.[5]

4.0 Determinants of the Toll Adjustment Processes

In this section, we present our explanatory variables and discuss how these are related to our propositions. The definition of our variables is presented in Table 3.

4.1 Project Characteristics

The existence of uncertainty may affect contractual choices, especially through its impact on the expected maladaptation costs. One of the primary sources of uncertainty that face contracting parties during negotiations over a road concession contract is the difficulty of forecasting future traffic flows with any confidence. This uncertainty about future demand may be more or less important depending on the context of the project. In order to quantify this uncertainty in traffic flow, we surveyed a set of managers of a French private

[5] Types 1 & 2 contracts of Table 2 are never renegotiated in our data set; type 3 are 50% renegotiated; type 4 are 60% renegotiated and type 5 are 62.5% renegotiated. This reinforces us in the quality of our ranking in 5 classes of rigidity.

concessionaire, asking them to rate the uncertainty surrounding the traffic flows for each project. We interviewed these managers only in relation to the contracts in which their own companies were involved (in France and outside France), either because the company won the contract or because it participated in the bid. It is also important to note that the interviewees all had more than 15 years of experience and were well able to remember how they assessed the uncertainty surrounding traffic flows in the project before the project was launched (some old records of their traffic forecasts still exist for each project). In fact, when negotiating a contract, the parties have expectations about the degree of uncertainty in these forecasts likely to be experienced during the course of the exploitation phase. We capture this uncertainty in the explanatory variable TRAFFIC, which corresponds to the average rating (between 1 and 5) given by the managers to the uncertainty of predicted traffic flows in every contract. We checked that the respondents gave consistent answers to all the questions, and undertook further probing if there was any inconsistency. The hypothesis is that increasing uncertainty in traffic flows, as reflected by an increase in the rating given by the managers interviewed, should lead to more flexible contractual arrangements.

Another important source of uncertainty stems from the difficulty of predicting future economic conditions with any confidence. We capture the increasing uncertainty associated with long time horizons in the variable DURATION, which is defined as the number of months between the completion of the infrastructure and the end of the concession. The hypothesis is that a longer duration increases the uncertainty and hence the costs of implementing more rigid contracts, leading to more flexible arrangements.

4.2 Characteristics of Contracting Parties

In relation to the magnitude of the renegotiation costs, those cases where contracting parties previously worked together on other projects may give an indication of reputational as well as learning effects (Gil and Marion (2013)). Repeated contracting helps partners to

develop specific procedures and common frameworks that may help to adapt and renegotiate contracts over time, with less argument about what must be done when the environment is subject to change. We capture this effect in the variable REPEATED CONTRACT, which accounts for the number of former interactions between the concessionaire and the public authority in question.

In addition, differences in political ideology (that is left- or right-leaning public authorities) may affect contractual choices. Left-leaning public authorities are generally more skeptical than right-leaning ones about the delegation of public services to private operators. This means that private concessionaires may have a better reputation among right-wing public authorities. At the same time, private operators anticipate that they may be more likely be expropriated when the procuring authority is left-leaning. We may therefore expect that contracts negotiated with left-wing authorities are likely to be more rigid. We capture this effect in the dummy variable LEFT.

4.3 Institutional Environment

In recent years, international institutions have developed numerous aggregate indicators of governance. To capture the reliability of contract enforcement, we used the aggregate indicator REGULATORY QUALITY, developed by the World Bank[6]. This indicator measures the capacity of the government to formulate and implement policies. More precisely, it includes measures of the incidence of policies that are market-unfriendly, such as price controls or inadequate bank supervision, as well as perceptions of the enforceability of contracts and the burdens imposed by excessive regulation in areas such as business development. This variable might then reflect not only the probability of seeing the contract enforced (the *commitment effect*) but also the fact that renegotiation is less costly (the

[6] We carried out regressions using all the six indicators developed by Kaufmann, *et al.* (2004) and all the results were similar.

governance effect), all other things being equal. Therefore, as we already discussed, the expected sign may be positive or negative, depending on which of these effects dominates.

4.4 Control Variables

In addition, we include several control variables in the regressions. Firstly, in our sample of contracts, we have 71 contracts that include 45 original contracts and 26 renegotiated contracts, referred to here as "supplemental agreements". As pointed out previously, we consider these supplemental agreements to be new contracts (following Crocker and Reynolds (1993)). We allow for the possibility that these contracts are specific by using the dichotomous variable SUP AGREEMENT.

The ability of the procuring authority to negotiate price provisions depends also on the number of bidders. The hypothesis is that the availability of alternative suppliers increases the negotiating power of the public authority during the preferred bidder phase, leading to the adoption of more rigid contracts. Thus, we include the explanatory variable NUMBER OF BIDDERS.

Furthermore, in our sample of contracts, there are private and semi-public concessionaires. We therefore use the binary variable SEMI PUBLIC as an additional control variable.

Because our dataset consists mainly of French contracts, we deal with a possible specific 'French' effect using the dummy variable FRENCH in our specifications.

Finally, we incorporate the variable LEARNING, defined as the number of former contracts of the public authority with private concessionaires (data collected from the scientific and professional press), to capture a learning effect of public authorities. We also introduce a trend variable (TREND), corresponding to the year of signature of the contract, to capture a potential evolution over time of practices, as well as two binary variables in order to capture an effect due to the type of public authority (national vs. local authority - LOCAL

AUTHORITY) and a potential operator fixed effect for contracts managed by the operator that is the most represented in our dataset (OPERATOR)[7]. The variables used in our regressions are summarized in Table 3.

5.0 Empirical Methodology and Results

5.1 Methodology

We herein use the following probit model, which estimates the probability of choosing a flexible contract:

$$F_i = 1[F_i^* = x_i\,\alpha_1 + z_i\alpha_2 + T_i\alpha_3 + e_i < 0]$$

where 1 is the indicator function, which takes a value of 1 whenever the statement in brackets is true, and 0 otherwise; F_i is the binary variable that indicates whether concession *i* is controlled through a flexible contract or through a rigid one; F_i^* is a latent variable; x_i is a vector of characteristics of the project, of the contracting parties and of the institutional environment; T_i is the year of signature of concession *i*, z_i is a vector of additional control variables; e_i is the error term; and α_1, α_2, and α_3 are the vectors of the parameters that correspond to x_i, z_i, and T_i respectively.

Because we believe that it is also of interest to consider contracts as devices that lie on a continuum between being totally rigid and totally flexible, we also performed ordered logit estimates taking into account the fact that contracts can be ranked from very rigid to very flexible, using our classifications in 5 and 11 groups (see Table 2)[8].

[7] We have several operators involved in our data set of contracts. One of them accounts for 66% of our contracts.

[8] In this case, it is not possible to use an ordinary least squares model because it imposes cardinality on the ordinal variables TYPEADJUST5 and TYPEADJUST11. Using an ordered probit model, we consider the relationship $F_i^* = x_i\alpha_1 + z_i\alpha_2 + T_i\alpha_3 + e_i$ with $(i = 1,2,\dots,n)$, where F_i^* is an unobserved latent variable, (x, z, T) is a set of explanatory variables and e is a random disturbance. If we consider that F_i^* is in our case the price provision rigidity level of concession i, we cannot observe F_i^* directly, but we can observe a category j, if $\mu_{j-1} \leq F_i^* \leq \mu_j$. The use of an ordered probit model results in estimates of the thresholds as well as of the

5.2 Results

The results are shown in Table 4. We report fewer observations than there are in our whole dataset because data on the number of bidders were not available for two of the contracts and data on duration were not available for concession contracts awarded through Present-Value-of-Revenue auctions[9].

Model (1) represents our probit model (Rigid vs. Flexible). We present the results with all the independent variables we can include in the regression[10]. The second set of estimates is based on our classification of toll adjustment types in 5 and 11 groups, using an ordered probit (Models (2), (3), (4) and (5)). Firstly, we present results using the same set of explanatory variables as Model (1) (in Models (2) and (3)). We then present results using the whole set of explanatory variables (Models (4) and (5)). We also add for each classification (Models 6 and 7) the results we would have obtained if our dependent variable had been continuous rather than discrete - to check the robustness of our results - using OLS (See footnote 7).

Our results suggest that the uncertainty of traffic flow is clearly an important variable for all the models (at the 1 percent significance levels), and drives the choice of toll adjustment type. More specifically, the higher the traffic uncertainty, the more flexible the toll adjustment provision. This result confirms that the higher the probability of a rigid contract being maladapted *ex post*, the higher the probability that a flexible contract will be used.

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distance between them. The use of an OLS model exogenously assigns both. Nevertheless, we provide the two types of estimates to check the robustness of our results.

[9] These auctions differ from auction mechanisms where the public authority sets a fixed concession term and firms bid using toll values. Indeed, under a Present-Value-of-Revenue auction, bidders compete on the present value of the toll revenue they require to finance the project. The concession ends when the present value of the toll revenue is equal to the concessionaire's bid. Thus the concession term is undefined. For a precise description of such an auction mechanism, see Engel *et al.* (1997).

[10] It was not possible to add all our explanatory variables, especially some of our control variables, because of empty cell problems - *i.e.* some of our control variables predict our model perfectly.

Regarding the characteristics of the contracting parties, our variable LEFT is significant regardless of the specification chosen, and is positively correlated with the use of rigid contracts. This may reflect the fact that left-leaning authorities are generally rather reluctant to enter into a contract with private operators for public services, leading them to try to secure everything *ex ante* by signing rigid contracts. This finding runs counter to a recent study by Levin and Tadelis (2010), in which the authors find that there is little correlation between voters' broader political preferences and the contracting practices used, and recommend further investigation of the political drivers involved.

We also find a significant correlation between the rigidity of the toll adjustment provision and the institutional environment. In particular, our measure of the reliability of contract enforcement is negatively correlated with the rigidity of the contract concerned. In other words, the stronger the institutional environment, the more flexible the toll adjustment provisions. As previously discussed, efficient institutions may reduce the probability of seeing the contract renegotiated (hence providing an incentive to the parties to devise rigid contracts), but it may also be responsible for reducing the cost of renegotiations (hence providing incentives to the parties to devise flexible contracts). Our results suggest that it is the latter effect that prevails, *i.e.* strong institutions constitute an important impediment to the opportunism of contracting parties during renegotiation phases, thereby leading to flexible contracts.

Finally, turning now to our control variables, we observe that the number of bidders impacts positively and significantly on the probability of adopting a rigid contract. The availability of alternative suppliers increases the rigidity of the contractual agreements used. The results also show that we may observe an impact from the type of the concessionaire, *i.e.* private or semi-public, on the toll adjustment provision selected. The fact that the concessionaire is a semi-public company appears to make the contract more rigid. A simple

explanation in our case is that semi-public concessionaires do not try to negotiate more flexible contractual terms, because they have the same interests as the public authority. The identity of the private partner concerned may also be important. Our variable OPERATOR, which takes a value of 1 when the private operator concerned is the most represented in our dataset, suggests that some operators might be more associated with rigid forms of contract than others. The fact that this variable is positive and significant might indicate that the most represented operator is sufficiently important to partially impose his view, pushing for more rigid contracts compared to other operators.

The results that relate to the other explanatory variables are less significant, depending on the specification selected. Thus, the REPEATED CONTRACT variable is not always significant, depending on the specification used. Nevertheless, the sign is consistently negative, which suggests that any increase in the number of former interactions between the contracting parties will decrease the rigidity of the selected toll adjustment provision. As previously discussed, this result may reflect the fact that past interactions between the same partners may be characterized by their experience and ability to communicate with each other, and hence to adapt through renegotiation without conflict. In some specifications, we observe a learning effect that leads to the adoption of more rigid contracts. In other words, the more public authorities are used to contract out public services, the more they rely on rigid contracts. This might reflect the fact that (1) they have learned how to contract and hence their contracting costs are lower and (2) they have learned where future maladaptation costs may originate, thereby encouraging them to adopt rigid contracts. Furthermore, supplemental agreements do not seem to represent specific agreements, because the dichotomous variable SUPAGREE is not always significant, and may have a different sign depending on the specifications used. This is partly consistent with the results obtained by Crocker and Reynolds (1993). Finally, French contracts, which are over-represented in our dataset, seem to

be characterized by a fixed effect since our FRENCH variable is significant in some of our estimates. We explore this in details in what follows.

Our other control variables do not seem to help to explain contractual choices. In particular, our TREND variable, the aim of which is to capture the temporal evolution of contractual practices, is not significant.

Overall, our main results are twofold. First, we show that contract flexibility is increasing with uncertainty associated with future demand. Second, our results highlight the fact that contractual choices are impacted by the quality of the regulatory regime. More precisely, the inability to commit leads to more rigid contracts, implying that the *governance effect* of a strong institutional environment prevails over its *commitment effect*.

6.0 Robustness Checks

For a variety of reasons, our results remain subject to limitations. One of the limits of our previous regressions is that the contract duration may be endogenous. Indeed, there is a potential correlation between DURATION and the error term, caused by the omission of two types of variables: the characteristics of the contracting parties (operators' characteristics), and those of the contracts themselves (regional characteristics other than political ones). The regional unobserved factors are technological or political in nature, while the operator-specific ones relate in particular to his renegotiating skills, and so on. Although we have already allowed for fixed effects related to the region and the operator, we go a step further by devising two instruments, both of which are correlated with the decision to sign a long-term contract, but not with the type of toll adjustment used. These instruments are the average contract duration observed with the same operator in different regions (instrument 1), and the average contract duration in different regions (instrument 2). They are valid because the correlation between the choice of contract duration for a project with a particular operator in a given region is correlated with instrument 1 through certain aspects that by virtue of its

construction, are independent of particular regional aspects. In a similar way, the choice of contract duration is only correlated to instrument 2 through aspects that by virtue of its construction are independent of effects specific to both the region and the operator. We obtained an OLS estimate of the variable DURATION, which we wished to instrument for. Note that these preliminary estimates are fairly satisfactory (see Model (8) in Table 5). We test for the exogeneity of the contract duration under scrutiny in our Models (1) to (7) (in Table 4), using the Rivers and Vuong (1988) approach, which simply consists in running the standard probit estimation augmented by the residuals of the first stage estimates (see also Wooldridge (2002)). The test largely fails to reject the exogeneity of duration, suggesting that endogeneity is not an issue in this case[11]. The p-values for the Rivers-Vuong test are in the last row of Table 4.

Another issue that arises from our previous results is the fact that our dataset is mainly comprised of French contracts. We have dealt with a possible specific French effect using the dummy variable FRENCH in our previous specifications. Nevertheless, in order to go a step further, we present estimates based on a subsample of French contracts (Models (9) to (11) in Table 5). As with the previous estimates, we performed a Rivers-Vuong test for each specification. When the exogeneity of the contract duration can be rejected (Model (9)), we estimate the equations using the above instrumented variables in two stages. Because we performed the two stages separately, we needed to adjust the standard errors in the second stage. We present the bootstrapped standard errors for the instrumental variables (IV) estimations (Model (10)). The results of the robustness checks are presented in Table 5.

[11] We ran two-stage least squares regressions using the instrumented variable DURATION. This had no effect on the results given in Table 5. The results are not provided in this paper but are available on request.

The results are mainly confirmed, lending a degree of confidence to our results, although we do note minor differences specific to the French subsample[12].

7.0 Conclusion

Herein, we have studied the contractual design of toll adjustment provisions in road concessions. Adopting a transaction cost economics approach, we have presented the most important trade-offs between contractual flexibility and rigidity for such contracts. We indicate that contractual design varies mainly according to the relative magnitude of the maladaptation and renegotiation costs and the probability of contract renegotiation, highlighting the fact that no single type of contractual design is always dominant.

Our empirical work provided evidence that the provisions of toll adjustment in infrastructure concession contracts show significant diversity, a finding that has not been previously demonstrated. This really does call into question the common belief that PPPs are only ever rigid contracts. In addition, our empirical results lend a significant degree of support to our main predictions. We found that contracts that are characterized by a high degree of uncertainty in the traffic flow forecasts are likely to be less rigid, and we also provided evidence that the characteristics of the contracting parties affect the design of the contract. In particular, those contracts devised with left-leaning procuring authorities are likely to be more rigid. Those results are in line with previous literature studying contractual complexity (Crocker and Masten, 1991; Crocker and Reynolds, 1993; Masten and Saussier, 2000; Saussier, 2000). However, previous studies are not that many and did not study the specific case of contracts between a public authority and a private operator that raises new concerns. More importantly, we provided strong evidence that the quality of the institutional environment has an effect on the design of the contract, which has never been tested to our knowledge.

[12] Our regulatory quality variable is no longer significant because we are focusing on the French subsample with little variance over the period considered.

Those results suggest managerial and policy recommendations. When uncertainty is high, instead of making efforts during negotiations to rigidify the contract in order to secure specific investments that have been made, contracting parties should invest in crafting flexible contract anticipating future renegotiations. Furthermore, when operating in different countries, private operator should adapt their contractual practices to the institutional environment the contract will be embedded in. In terms of policy, our results suggest that the existence of a stable and efficient regulatory framework might reduce transaction costs for contracting parties, leading them to adopt more flexible contracts with less fear of opportunistic behaviors during renegotiations. This might explain why in some countries, such as France, governments have decided that toll road concession contracts henceforth will be regulated by an independent regulatory agency.[13] Those recommendations are not specific to toll road concessions but can be extended to every concession or public private partnership that needs large specific investment to be made. Future work on the role of the institutional framework on contractual choices would be useful to better understand its influence.

[13] The Macron Law, voted on July 9th 2015 —named after its chief architect, French Economy Minister Emmanuel Macron—is designed to peel away layers of red tape that have strangled the country's economic growth and will extend the objectives of the ARAF agency (agency regulating transport by rail) to the control of highways concession contracts (ARAF will then change its name to ARAFER).

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Table 1: Toll Adjustment Types

Type	Negotiated *Ex Ante*	Negotiated *Ex Post*
Firm-fixed price (FFP)	Price	No negotiation *ex post*
Definite escalator (DE)	Price, escalator	Only adjustment to price according to an explicit predefined schedule
Definite escalator with a margin (DE/MARG)	Price, escalator, margin	Only adjustment to price according to an explicit predefined schedule with the flexibility afforded by a predefined margin
Fixed price with partial economic price adjustment (FP/CPI)	Price, Economic price adjustment formula based on the consumer price index	Only formulaic adjustment to price as specified *ex ante*
Fixed price with economic price adjustment (FP/COST)	Price, Economic price adjustment formula based on specific labor or materials indices	Only formulaic adjustment to price as specified *ex ante*
Fixed price with EPA and with a definite escalator (FP/EPA/DE)	Price, Economic price adjustment formula, definite escalator	Only formulaic adjustment to price as specified *ex ante* and according to an explicit predefined schedule
Fixed price with EPA and with a margin (FP/EPA/MARG)	Price, Economic price adjustment formula, margin	Only formulaic adjustment to price as specified *ex ante* with the flexibility afforded by a predefined margin
Fixed price with EPA and with traffic variation indexation (FP/EPA/TRAFFIC)	Price, Economic price adjustment formula, traffic indexation	Only formulaic adjustment to price as specified *ex ante* and to traffic variation
Not-to-exceed price with partial economic price adjustment (NTEP/CPI)	Ceiling price, Economic price adjustment formula based on the consumer price index	A firm price at or below the ceiling
Not-to-exceed price with economic price adjustment (NTEP/COST)	Ceiling price, Economic price adjustment formula based on specific labor or materials indices	A firm price at or below the ceiling
Not-to-exceed price with a predefined escalator and an economic price adjustment (NTEP/DE/EPA)	Ceiling price, definite escalator, Economic price adjustment formula	A firm price at or below the ceiling
Not-to-exceed price with a traffic variation indexation and an economic	Ceiling price, Traffic variation indexation, Economic price	A firm price at or below the ceiling

price adjustment (NTEP/TRAFFIC/EPA)	adjustment formula	
Not-to-exceed price with economic price adjustment and with a margin (NTEP/EPA/MARG)	Ceiling price, Economic price adjustment formula, Margin	A firm price at or below the ceiling
Freedom during ten years and then NTEP/COST (FREE/NTEP/COST)	Ceiling price, Economic price adjustment formula based on specific labor or materials indices	A firm price at or below the ceiling after ten years
Renegotiation Adjustments (RENEG)	Initial automatic adjustment process, Frequency of renegotiation	A firm price

Table 2 : Dependent Variables (11 groups & 5 groups)

TYPE	Freq.	Mean
1 if RENEG	3	6,28
2 if FREE/NTEP/COST	10	
3 if NTEP/EPA/MARG	10	
4 if NTEP/TRAFFIC//EPA	3	
5 if NTEP/DE/EPA	3	
6 if NTEP/COST or NTEP/CPI	4	
7 if FP/EPA/MARG	10	
8 if FP/EPA/DE	2	
9 if FP/EPA/DE	12	
10 if FP/COST or FP/CPI	6	
11 if DE or DE/MARG or FFP	8	

TYPE	Freq.	Mean
1 if RENEG	3	3,42
2 if FREE/NTEP/COST	10	
3 if NTEP	20	
4 if FP	30	
5 if DE or FFP	8	

Table 3: Variables Definition and Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max	Definition
RIGID	71	0.53	0.50	0	1	1 if the contract belongs to groups 7 to 11 (See Table 2)
TYPE OF ADJUSTEMENT (5 GROUPS)	71	3.42	1.01	1	5	Ranking of toll adjustment types in 5 groups (See Table 2)
TYPE OF ADJUSTEMENT (11 GROUPS)	71	6.28	3.28	1	11	Ranking of toll adjustment types in 11 groups (See Table 2)
TRAFFIC	71	2.39	1.14	1	5	Average rating on uncertainty of traffic flow
LEFT	71	0.31	.46	0	1	1 if the procuring authority is a left-wing authority; 0 otherwise
REPEATED CONTRACT	71	5.27	4.21	0	11	Number of former interactions between the concessionaire and the public authority
LEARNING	71	6.78	4.59	0	16	Number of former contracts of the public authority with private concessionnaires
DURATION	68	396.44	183.07	60	1164	Number of months between the completion of the infrastructure construction and the end of the concession
REGULATORY QUALITY	71	1.03	0.31	-0.48	1.82	Rating obtained by the country in question regarding this governance dimension (Source: World Bank)
SEMI PUBLIC	71	0.21	0.41	0	1	1 if the concessionaire is a semi public company; 0 otherwise
SUPAGREE	71	0.46	0.50	0	1	1 if the contract is a supplemental agreement; 0 otherwise
NUMBER OF BIDDERS	69	1.67	1.24	1	5	Number of bidders for the contract
LOCAL AUTHORITY	71	0.29	0.45	0	1	1 if the concedant is a local authority
OPERATOR	71	0.66	0.47	0	1	1 if the concessionnaire is the operator that is the most frequent in our database

Table 4 : Estimation Results

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. Variable	RIGID	5 GROUPS	11 GROUPS	5 GROUPS	11 GROUPS	5 GROUPS	11 GROUPS
Sample	Whole	Whole	Whole	Whole	Whole	Whole	Whole
Estimator	Probit	Ord. Probit	Ord. Probit	Ord. Probit	Ord. Probit	OLS	OLS
TRAFFIC	-6.801***	-1.272***	-1.063***	-1.380***	-1.183***	-0.414***	-1.386***
	(2.559)	(0.326)	(0.225)	(0.359)	(0.248)	(0.124)	(0.413)
REPEATED	-0.948**	-0.104	-0.124*	-0.069	-0.119	-0.012	-0.179*
CONTRACT	(0.375)	(0.078)	(0.068)	(0.094)	(0.074)	(0.034)	(0.103)
DURATION	-0.013***	-0.002**	-0.002*	-0.001	-0.001	-0.000	-0.002
	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
LEFT	1.848**	1.340***	1.293***	1.425***	1.374***	0.435**	1.475**
	(0.894)	(0.508)	(0.405)	(0.518)	(0.433)	(0.172)	(0.583)
REGULATORY	-3.471***	-3.284***	-1.975**	-5.389***	-3.784***	-1.659***	-3.863***
QUALITY	(1.322)	(1.146)	(0.918)	(1.368)	(1.082)	(0.331)	(0.930)
FRENCH	0.922	-3.470**	-3.514**	-3.538*	-3.523	-1.243*	-2.856
	(1.430)	(1.617)	(1.713)	(1.926)	(2.176)	(0.685)	(1.881)
SUPAGREE	-1.447**	0.340	-0.309	1.045***	0.345	0.283**	-0.014
	(0.618)	(0.330)	(0.305)	(0.398)	(0.325)	(0.136)	(0.387)
LEARNING	0.451**	0.338*	0.300	0.327*	0.268	0.115*	0.355**
	(0.180)	(0.182)	(0.186)	(0.173)	(0.173)	(0.060)	(0.169)
TREND	0.025	-0.066	-0.029	-0.099	-0.054	-0.033	-0.073
	(0.056)	(0.051)	(0.049)	(0.065)	(0.063)	(0.024)	(0.077)
NBBIDDERS				0.792**	0.781***	0.258**	0.771**
				(0.345)	(0.295)	(0.112)	(0.356)
SEMI PUBLIC				3.604***	3.424***	0.978**	4.468***
				(1.072)	(0.966)	(0.366)	(1.332)
OPERATOR				2.168***	1.879**	0.645*	1.887
				(0.782)	(0.810)	(0.356)	(1.199)
LOCAL				0.083	0.061	0.017	1.733
AUTHORITY				(1.631)	(1.613)	(0.510)	(1.561)
INTERCEPT	-22.350					71.189	157.628
	(110.297)					(47.673)	(155.192)
r2/pseudo r2	0.84	0.58	0.36	0.66	0.42	0.86	0.87
N	68	68	68	66	66	66	66
Rivers-Vuong Test: p-value	0.22	0.87	0.70	0.35	0.61	0.58	0.61

Significance levels: * 0.10 ** 0.05 *** 0.01; Robust standard errors in parentheses

Table 5 : Results of Robustness Checks

Model	(8)	(9)	(10)	(11)
Dependent Variable	DURATION	GROUP 5	GROUP 5	GROUP 11
Sample / Estimator	Whole / OLS	French / Ord. Probit	French / Ord. Probit	French / Ord. Probit
TRAFFIC	20.948	-1.268**	-1.082**	-1.060***
	(32.106)	(0.559)	(0.535)	(0.348)
REPEATED CONTRACT	0.746	-0.353**	-0.261**	-0.144
	(10.326)	(0.175)	(0.123)	(0.132)
DURATION		-0.001*		-0.001
		(0.001)		(0.003)
DURATION (IV)			-0.005	
			(0.042)	
LEFT	17.329	2.314***	2.539***	1.619***
	(50.080)	(0.720)	(0.939)	(0.565)
REGULATORY QUALITY	33.825	-3.442	-3.775	-4.297*
	(105.036)	(2.457)	(2.360)	(2.209)
SUPAGREE	-30.394	2.419***	2.471**	0.655*
	(54.495)	(0.740)	(1.019)	(0.363)
LEARNING	1.814	0.130	0.090	0.034
	(16.757)	(0.299)	(0.309)	(0.270)
TREND	3.746	-0.080	-0.067	-0.042
	(6.613)	(0.089)	(0.083)	(0.086)
NBBIDDERS	60.240*	-0.016	0.799	0.510
	(25.788)	(0.640)	(0.619)	(0.635)
SEMI PUBLIC	-343.737***	10.050***	8.859***	4.032***
	(94.637)	(1.691)	(1.432)	(1.053)
OPERATOR		2.795***	1.760***	1.965*
		(1.065)	(0.665)	(1.098)
LOCAL AUTHORITY	-272.641*	-1.804	-3.704	-1.088
	(139.648)	(2.170)	(2.880)	(1.833)
INSTRUMENT1	0.284***			
	(0.099)			
INSTRUMENT2	5.658			
	(4.271)			
INTERCEPT	-9518.197			
	(13277.188)			
r2	0.55	0.67		0.47
N	66	53	53	53
Rivers-Vuong Test: p-value		0.025		0.52

Significance levels: * 0.10 ** 0.05 *** 0.01; Robust standard errors in parentheses