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Three Empirical Essays on the Impact of Discretion on Public Procurement Performance

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Forewords

This Ph.D. dissertation, entitled "*Three Empirical Essays on the Impact of Discretion on Public Procurement Performance*", consists of three chapters in the fields of Public Economics. The objective of this dissertation is to identify the benefits and limitations of the use of discretion in public procurement. The General Introduction describes the different research questions addressed in these chapters, as well as the connections that can be established between them. The Summary of Findings and Contributions section summarizes the results and their implications for public policies and future work. Nevertheless, each chapter can be read separately. This implies the presence of redundant information across chapters, notably concerning the related literature and the institutional context.

Abstract

This Ph.D dissertation empirically investigates the effects of public buyers' discretionary power over organizational and contractual choices in public procurement. A public body is granted such a power if he is allowed to take decisions that are suitable given the circumstances without having to get permission and with some room for manoeuvre. However, the degree of discretionary power should be the result of a careful balance between its benefits and its drawbacks. One the one hand, its main benefits are the limitation of the administrative burden, and a better adaptation to specific circumstances. On the other hand, one main issue associated with discretion is that it may be detrimentally used against the efficiency of public procurement. Indeed, it may facilitate corruptive behaviors, and ease decision making that is dictated by considerations other than economic ones (e.g. political and ideological). Discretionary power could be used at different stage of procurement. This dissertation focuses on two phases of it, namely the organizational choice and the award procedure.

First, regarding the provision of public services (water, transport,etc...), a municipality should, in a first step, choose between providing the good itself (in-house provision) or through a private operator. A wide range of the economic literature explain this choice by the intensity of transaction costs. As illustrated by Coase [1937], economic activities may either be organized within an organisation under the supervision of managers or through the markets using a price-mechanism. However, he points out that, at that time, none of the existing literature has attempted to explain why an economic activity would take place in an organisation rather than

in markets: "Yet, having regard to the fact that if production is regulated by price movements, production could be carried on without any organisation at all, well might we ask, why is there any organisation?".[1] Therefore, transaction costs refer to the cost of using the price mechanism. This transaction costs issue has then been extensively studied by Oliver Williamson [1975, 1979, 1981, 1985]. The literature related to this issue identifies transaction attributes that may lead to "transactional failures" (Gibbons [2010]). In particular, transactions may involve complexity as soon as they are characterized by (i) a high degree of asset specificity and (ii) contractual complexity and incompleteness.[2] Both theoretical and empirical studies confirm that in-house provision is recommended in case of transactions involving high asset specificity and contractual complexity because it helps reducing the risk of opportunistic behaviors leading to costly renegociations (Williamson [1975], Hart et al. [1997], Levin and Tadelis [2010]).

Chapter 1 of this dissertion focuses on the decision to switch from one to another mode of provision of a public service. Specifically, it is dedicated to the analysis of the determinants of both remunicipalization (a switch from private to in-house provision of a public service) and privatization (a switch from public to private provision) for the water distribution services. These determinants are tested using a set of propositions that are empirically tested. Since the transaction cost economics advocates an efficient mode of governance, we should therefore observe no variation across municipalities and no switch in a municipality across time for a public service with identical characteristics. However, this is not empirically observed, and the literature identifies two main reasons for this. On the one hand, transaction costs may vary across municipalities for an identical service. On the other hand, transaction costs do not appear to be the only factor explaining the choice of gover-

[1] page 388.

[2] On the one hand, asset specificity describes the conditions where the assets cannot be redeployed to alternative users or uses without loss of productive value (Williamson [1985], Klein et al. [1978]). Situations where asset specificity is strong may lead one of the parties being locked in this contractual scheme. On the other hand, contractual complexity refers to the contract completeness. Contractual complexity is made of two main dimensions: the measurability of ex-post performances and the need for flexibility leading to high contractual costs if privatization is chosen.

nance. Therefore, we analyse the determinants of these switches through the lense of the most common class of factors used by the economic literature namely, the economic efficiency, politics, and fiscal stress. Fiscal stress is usually expected to positively influence the likelihood of privatization (López-de Silanes et al. [1997], Brown and Potoski [2003], and Hebdon and Jalette [2008]). Also, the ideology is expected to influence the choice made by a public entity (López-de Silanes et al. [1997], Picazo-Tadeo et al. [2012], Sundell and Lapuente [2012]). Finally, in-house provision is more likely as asset specificity and contractual complexity get stronger (Brown and Potoski [2003], Levin and Tadelis [2010]). Therefore, the discretionary power a public entity is entitled with when deciding the mode of provision of a public service might not only depend on a pure economic dimension.

Second, Chapter 2 and Chapter 3 of this dissertation concentrates on public buyer's discretionary power towards the award mechanism when the contract is privately provided. Public demand for goods and services in Europe and in the U.S. is typically procured through a competitive procedure that usually consists of open auctions. This award mechanism is known to foster transparency and competition (Bulow and Klemperer [1996]). However, open auctions might not be the best option when contracts are particularly complex and are hence subject to unexpected events (Goldberg [1977]), when quality dimensions are not easily contractible (Manelli and Vincent [1995]) or to sustain reputational mechanisms and long-term relationships (Kim [1998], Spagnolo [2012]). In these cases, discretion could yield a better outcome. One of the most typical form of discretion a public entity is entitled with when awarding a contract is negotiation. Although discretion has many benefits, its efficiency may severely be hampered by corruption.Therefore, the choice of award mechanism is likely to be subject to a trade-off between transparency as well as lower ex-ante price, and ex-post performance. An optimal award procedure should be the result of a balance between the costs of corruption and the benefits of discretion. To balance between the risk of corruption and the benefit from using discretion, the EU sets a contract value threshold below which the Member States should determine the

most suitable procedure and rules for awarding a contract. Below this threshold, in France, public buyer have the possibility (not the obligation) to use an award procedure (*procédure adaptée*) where he is entitled with a wide discretionary power (e.g. possibility to negotiate and to restrict competition, no minimum deadline for submitting an offer). The public buyer is not compelled to use such a procedure, and may use an open auctions instead.

Chapters 2 and 3 take advantage of this discretion between an award procedure where an important degree of discretionary power is allowed (*procédure adaptée*), and an open auction with no discretionary power, when contracts are below the European threshold. The second chapter analyzes the impact of investigation for corruption over the degree of buyer's discretion used. We show that investigations do not trigger any change in the way a contract is awarded within investigated municipalities. However, we observe that neighbors of investigated municipalities that are eventually found guilty do change their behavior by diminishing their use of procedure with discretionary power. We also find that municipalities that are eventually found guilty improve their competitive environment when they are under investigation by increasing competition in their tenders, and by reducing localism. The third chapter assesses whether the use of an award mechanism that allows for more discretionary power makes the selection of an efficient firm more likely. As a matter of fact, the results indicate that procedures with discretionary power reduces the likelihood to select an efficient firm. Then, the analysis is extented to explain the mechanism that boils down to our results. We conclude that the selection of less productive firms in adapted procedure is explained by a misuse of discretionary power when screening bids. If the selection of more productive firms is more likely to lead to lower costs and/or better quality outcomes, discretion is then in contradiction with the primary objective of public procurement, which is to get the best outcome at the lowest price. The other implication of the result is that discretion is also in contradiction with one potential secondary objective of public procurement, which would be to promote productivity.

Résumé

Cette thèse de Doctorat étudie de manière empirique les liens entre le pouvoir discrétionnaire d'un acheteur public et les choix qu'il effectue dans le contexte de la commande publique. Un acheteur public est doté d'un tel pouvoir lorsqu'il est autorisé à prendre des décisions qui sont adaptées aux circonstances sans pour autant avoir besoin avoir besoin d'une permission, le tout avec une certaine marge de manoeuvre. L'acheteur public peut faire usage d'un pouvoir discrétionnaire à différentes étapes de la commande publique. Cette thèse se concentre sur deux étapes, à savoir les choix organisationnels (la délégation à un opérateur ou la réalisation du service en interne dans le cadre d'une régie) et les procédures d'attribution. Le chapitre 1 de cette thèse se concentre sur la dimension des choix organisationnels tandis que les chapitres 2 et 3 se focalisent sur les choix des procédures d'attribution.

Chapitre 1: Méfiez-vous de l'eau qui dort: remunicipalisations et privatisations, quand les municipalités perturbent le statu quo.

L'économie des coûts de transaction (ECT) permet de délimiter les frontières des entreprises en tant que réponse à l'existence de coûts de transaction (Bresnahan and Levin [2012]; Lafontaine and Slade [2007]). Par extension, cette théorie permet de fournir des prédictions sur les problèmes liés au choix du mode de gouvernance pour la mise à fourniture de services publics. En particulier, l'ECT démontre l'existence d'une relation entre les attributs d'une transaction et les choix organisationnels. Ainsi, la complexité contractuelle, traditionnellement définie par le degré d'actifs spécifiques et la difficulté à rédiger un contrat le plus complet possible, est une

considération centrales (Levin and Tadelis [2010]). Certains services sont donc traditionnellement fournis à travers une forme organisationnelle qui reste identique. Puisque la littérature théorique et empirique confirme que la fourniture d'un service public en régie est préférable lorsque la transaction implique une forte spécificité des actifs et de la complexité contractuelle, aucune variation dans les modes de gouvernance ne devrait être observé parmi les municipalités, mais aussi au sein même d'une municipalité à travers le temps pour des services à caractéristiques identiques.

Cependant, il est possible que les entités publiques perturbent le statu-quo en changeant leur mode de fourniture. La littérature économique a identifié deux principales raisons à ces changements. Tout d'abord, les coûts de transactions peuvent varier d'une municipalité à l'autre pour un même service. Ensuite, les coûts de transactions ne peuvent pas à eux seuls expliquer les choix de gouvernance. La littérature a ainsi tenté d'expliquer les déterminants de la privatisation, autre que ceux liés aux coûts de transaction (clientélisme et pression fiscale). Cependant, il n'y pas de consensus clair dans la littérature à propos de l'importance de ces facteurs sur les choix de gouvernance. De plus, peu d'études se sont uniquement consacrées à l'analyse simulatanée des passages d'une gestion déléguée à une gestion en régie et inversement. Dans cet article nous qualifions de remunicipalisation un passage d'une gestion déléguée à une gestion en régie. A contrario, un passage d'une gestion en régie à une gestion déléguée est désignée par le terme de privatisation.

Un nombre croissant de remunicipalisations a été observé dans les pays industrialisés. Aux Etats-Unis, Hefetz and Warner [2004] ont montré que les remunicipalisations sont passées d'une part totale des fournitures de services publics de 12% entre 1992 et 1997 à 18% entre 1997 à 2002. Le phénomène est en particulier prégnant dans le secteur de l'eau, comme l'illustrent en Europe les cas de la ville de Berlin, Paris et Hambourg, mais aussi de la ville d'Atlanta aux Etats-Unis. Entre 2000 et 2015, Kishimoto et al. [2015] ont dénombré dans ce secteur plus de 200 cas de remunicipalisations au sein de 37 pays. Leur nombre a même doublé durant la période 2010-2015 comparé à la période 2000-2010. Ces chiffres illustrent donc une tendance à la remunicipalisation dans le secteur de l'eau. Bien que de nombreux travaux théoriques ont

analysé les facteurs déterminant des privatisations, peu d'entre eux se sont attardés sur le cas des remunicipalisations. Puisque le passage d'une délégation de service public à une régie n'implique potentiellement pas les mêmes coûts et la même complexité que le passage d'une régie à une gestion privée, il est important de pouvoir déterminer dans quelle mesure les déterminants des privatisations sont différents de ceux des remunicipalisations.

Le cas français est particulièrement intéressant. Pendant plus d'un siècle, la gestion déléguée du service de l'eau a été la règle plus que l'exception (plus de 70% de la population française est desservie par une gestion déléguée de l'eau). Cependant, on observe une nouvelle tendance à la remunicipalisation, comme l'illustre le cas de la ville de Paris en 2009. Comme le mentionnent Kishimoto et al. [2015], près de 50% des cas observés de remunicipalisation à travers le monde ont eu lieu en France. Il est alors intéressant d'examiner les raisons pour lesquelles la délégation de service public, qui fut un mode historique de fourniture, semble aujourd'hui être remis en question. De manière plus spécifique, l'objectif de cet article est de déterminer quels sont les facteurs décisifs dans la décision de privatiser et de remunicipaliser.

Cette nouvelle tendance à la remunicipalisation peut s'expliquer par différents facteurs tirés de la littérature. Cependant, les conclusions vont parfois dans des directions opposées. De manière générale, les travaux empiriques se basent sur trois classes de facteurs qui expliquent potentiellement les privatisations, à savoir les restrictions fiscales, l'efficacité économique, et les intérêts politiques et idéologiques (Bel and Fageda [2008]). Traditionnellement, les restrictions fiscales sont supposées avoir une influence positive sur la probabilité de privatiser un service public. Cependant, tandis que López-de Silanes et al. [1997], Brown and Potoski [2003], et Hebdon and Jalette [2008] démontrent empiriquement que cette supposition est correcte, Miralles [2009] et Bel and Fageda [2008] ne concluent pas à un effet significatif des restrictions fiscales. De même, la littérature a considérablement analysé l'influence des facteurs politiques et idéologiques sur la décision de privatiser. De même, il n'y a pas de consensus clair sur l'impact de ces variables de décision. Tandis que les résultats convergent sur l'effet des groupes d'intérêts (Levin and Tadelis [2010]; Miralles

[2009]), ceux sur l'effet de l'idéologie sont plus nuancés (Bel and Miralles [2003], Bel and Fageda [2008],Picazo-Tadeo et al. [2012], Sundell and Lapuente [2012], Beuve and Le Squeren [2016]). Enfin, les facteurs expliquant les privatisations à travers l'approche de l'efficacité économique sont traditionnellement liés à des enjeux de réduction de coûts. En théorie, lorsqu'une municipalité doit choisir entre une fourniture en régie ou en délégation de service public (DSP), celle-ci doit prendre en compte deux dimensions de la théorie des coûts de transaction à savoir, la présence d'actifs spécifiques et la complexité contractuelle (Williamson [1985], Levin and Tadelis [2010]). D'une part, las actifs sont qualifiés de spécifiques lorsque ceux-ci ne peuvent pas être redéployés à des usages alternatifs ou du moins, sans perte de valeur productive (Williamson [1985], Klein et al. [1978]). Dans le cas d'un fort degré de spécificité, l'une des partie contractantes peut être alors "enfermée" dans la relation contractuelle. D'autre part, la complexité contractuelle est en relation avec la complétude du contrat. Celle-ci comporte deux importantes dimensions à savoir, la capacité à mesurer les performances ex-post et le besoin d'un certain degré de flexibilité, ce qui conduit à des coûts de contractualisation importants si le service public fait l'objet d'une DSP. Ainsi, il est plus probable d'observer une gestion en régie dès lors que les degrés de spécificité et de complexité contractuelle deviennent plus importants (Brown and Potoski [2003], Levin and Tadelis [2010]). Des dimensions supplémentaires, telles que la sensibilité à la qualité, doivent elles aussi être prises en compte. Comme le démontrent Hart et al. [1997] dans le cas des DSP, l'opérateur privé a en général de trop fortes incitations à réduire les coûts. En conséquence, ceci peut être au détriment de la qualité du service. De plus, le l'autorité publique dois alors engager une procédure de négotiations avec l'opérateur si ce premier souhaite améliorer la qualité du service. Ainsi, Hart et al. [1997] recommendent d'opter pour une DSP dès lors que des réductions de coûts non contractualisables peuvent détériorer la qualité du service, et lorsque les innovations en termes de qualité ne sont pas une dimension importante du service. A cet égard, le secteur de la distribution d'eau potable n'apparaît pas comme étant relativement sujet à des coûts de transaction. Comme l'explique Chong et al. [2015], le service de l'eau est fait de standards de qualité.footnoteAu sein de l'Union Européenne, les standards

de qualité de l'eau potable sont fixés par la Directive 98/83/CE. Celle-ci défini 64 paramètres de qualité qui fixent des seuils de tolérance pour la présence de bactéries et de produits chimiques. Il est estimé que 96% des foyers français ont accès à une eau potable qui est conforme à ces standards. Ainsi mesurer et contrôler la qualité de l'eau potable est relativement peu complexe. La gestion en DPS de ce service peut tout de même faire l'objet d'un problème de hold-up. Bien que les actifs physiques restent la propriété du gouvernement en cas de privatisation,celle-ci peut potentiellement générer un effet de verrouillage ("lock-in") en raison de la durée des contrats, qui est en moyenne de 12 ans en France. Cette durée moyenne s'explique par la spécificité et la valeur importante des actifs utilisés. Pour cette raison, passer d'une gestion privée à une gestion en régie du service de distribution d'eau potable pourrait générer certains coûts de transaction. Un faible nombre de remunicipalisations devrait donc être observé (Masten [2002]), et cela uniquement dans la cas où les inefficacités sont si importantes qu'il est alors valable de s'exposer à des coûts de transaction. Il s'agit du cas en France, où seules 300 remunicipalisations ont eut lieu sur un total de 15,000 services de distribution d'eau. Nous nous attendons donc à observer une importance plus forte des facteurs économiques dans le cas des remunicipalisations puisqu'elles peuvent être une source plus importante de coûts de transaction comparé aux privatisations.

Dans ce chapitre, nous considérons la question des remunicipalisations, et de manière plus large, à la question des changements dans les modes de fourniture d'un service public. Pour cela, nous avons collecté des données indiquant le mode de fourniture du service de distribution d'eau de près de 4,200 municipalités françaises entre 1998 et 2015. Nous nous concentrons en particulier sur les périodes de renouvellement de contrats et identifions près de 200 cas de remunicipalisation. Dans le but d'identifier les raisons pour lesquelles une municipalité décide de passer d'un mode de gestion à un autre, nous utilisons des indicateurs d'efficacité économique (c'est à dire le prix et le taux de fuite) mais aussi d'autres facteurs pouvant potentiellement expliquer les remunicipalisations et les privatisations autres que des raisons pures d'efficacité économique (par exemple, l'idéologie, l'endettement de la municipalité, le taux de

chômage local, des comportements de mimétisme, etc..). Nos indicateurs d'efficacité économique consistent à mesurer l'importance d'un sur-prix et de sur-fuites. Ces deux variables sont calculées en tant que la différence entre le prix (*resp.* les fuites) observé au sein d'une municipalité et celui qui prévaudrait si le service serait géré sous un autre mode organisationnel. Nous utilisons alors un modèle dit *endogenous switching regression* au sein d'une estimation probit en deux étape. Cette procédure nous permet de pouvoir faire face à un potentiel problème d'endogénéité. Le travail empirique le plus proche du nôtre est sans nul doute celui de Chong et al. [2015]. Ces derniers utilisent des données françaises sur la distribution d'eau potable entre 1998 et 2008. Dans un premier temps, ils identifient la différence moyenne de prix et de qualité de l'eau entre la gestion privée et publique, tout en différenciant les petites des grandes municipalités. Dans un second temps, ils analysent si lors l'expiration d'un contrat, une municipalité décide de ne pas renouveler l'opérateur en charge du service, ou bien si elle décide de remunicipaliser. Leur résultats indiquent que les prix de l'eau sont légèrement plus élevés dans le cas d'une DSP, mais cet effet est observé uniquement au sein des petites municipalités (c'est-à-dire moins de 10,000 habitants). Aussi, Chong et al. [2015] concluent que les considérations en termes d'efficacité économique expliquent en partie la décision de remunicipaliser pour les municipalités de grande taille. Ce résultat suggère que ce type d'enjeux est important pour les grandes mais pas pour les petites municipalités. Cependant, le Chapitre 1 de cete thèse élargit la définition de l'efficacité économique en ajoutant à la dimension du prix une dimension de qualité. Cette dernière est approximée par le taux de fuite. En effectuant cela, nous ajoutons aussi la possible existence d'un effet de balancier entre prix et fuites. Plus précisément, Chong et al. [2015] mentionnent qu'une municipalité peut décider de gérer son service à travers une DSP de façon erronée en raison de prix trop élevés. En effet, le prix d'un mètre-cube d'eau potable en France est en moyenne de 0.12 euro moins cher en régie qu'en DSP, tandis que le taux de fuite est en moyenne 3.8 points de pourcentage plus élevé en régie qu'en DSP. Il est alors possible que le choix d'un mode de fourniture se fasse au détriment d'une des deux dimensions de l'efficacité économique que nous avons sélectionnées. Enfin, contrairement à Chong et al. [2015], nous ne limitons pas notre

analyse aux remunicipalisations puisque nous nous penchons aussi sur les motifs des privatisations. La période d'analyse est aussi élargie à 1998-2015. Enfin, la stratégie empirique de ce chapitre prend en compte une source potentielle d'endogéneité entre les choix organisationnels et les variables en relation avec l'efficacité économique.

Nos résultats suggèrent que la décision de remunicipaliser le service de distribution d'eau est liée à une attente de meilleure efficacité économique en termes de prix (surprix), excepté pour les petites municipalités. Notre seconde mesure d'efficacité, le niveau de sur-fuites a aussi un effet sur la probabilité de remunicipaliser. Cette dimension est d'autant plus importante que les villes sont de grandes tailles. Le nombre de remunicipalisations ayant eu lieu dans un proche voisinage a un impact positif sur la probabilité de remunicipaliser, suggérant ainsi l'existence de comportements mimétiques. Il est à noter que cet effet est présent uniquement pour les villes de petite taille. Ce résultat suggère que les municipalités qui ne sont pas assez compétentes pour anticiper les conséquences de leur choix sur le prix et le taux de fuite se fient aux comportements des voisines. Les déterminants des privatisations sont assez similaires à ceux des remunicipalisations. En effet, les privatisation sont plus probables lorsque les surprix deviennent plus importants, bien que cet effet est plus faible en magnitude que pour la décision de remunicipaliser. Les sur-fuites ont elles aussi un impact significatif et positif, bien que nous n'observons pas d'effet supplémentaire lorsque la taille de la ville devient plus importante. Enfin, la prévalence des privatisations dans les communes voisines a un impact positif, mais aucun effet additionnel n'est observé dès lors que la commune est plus grande. Il est à noté que l'effet marginal de la prévalence des privatisations est très faible comparé à celui des remunicipalisations.

De manière générale, nous observons que l'importance du surprix et des sur-fuites est plus grande dans la décision de remunicipaliser que de privatiser. Ce résultat est cohérent avec le fait que les remunicipalisations peuvent potentiellement générer plus de coûts de transaction que les privatisations. En conséquent, il est plus probable d'observer des remunicipalisations lorsque les coûts de transaction sont compensés par une réduction des prix et/ou du taux de fuites lors du changement de mode de

fourniture. Cependant, nous n'observons pas l'effet de balancier attendu par lequel une municipalité décide de remunicipaliser afin d'obtenir un prix plus bas, mais cela au détriment d'un taux de fuite plus élevé (puisque les communes en régie ont en moyenne un taux de fuite plus élevé assorti d'un prix plus bas que les DSP) et inversement.

Chapitre 2: Un pour tous et tous pour un! De quelle manière les enquêtes pour fait de corruption affectent les comportements dans les marchés publics ?

Les marchés publics sont un terrain fertile pour la corruption. Près de 57% des cas de corruption au sein des pays de l'OCDE sont en lien avec les marchés publics (OECD [2011a]). En Europe, environ 38% des entreprises estiment que la corruption dans leur pays est un problème dans le domaine des affaires (European Commission [2017b]). Tandis que la plupart des pays nordiques ont des chiffres en deçà de la moyenne européenne, la corruption semble tout de même être un problème significatif dans de nombreux pays européens, y compris les plus développés économiquement (par exemple, 52% des entreprises françaises interrogées estiment que la corruption est un problème pour leurs affaires). Etant donné que la commance publique représente entre 15 à 25% du PIB dans les pays de l'OCDE, combattre la corruption a des enjeux cruciaux. De plus, la qualité des services publics dépend des bonne pratiques sur les marchés publics. En effet, plus forte est la corruption, plus coûteux et moins efficaces seront les services publics (Djankov et al. [2017]). La corruption dans les marchés publics est source d'inefficacité, surtout en raison d'une mauvaise allocation des contrats, de prix plus élévés, et d'une distorsion de l'environnement compétitif.

En Europe et aux Etats-Unis, la commande publique de biens et de services est traditionnellement fournie à travers l'usage d'enchères ouvertes. D'une part, limiter le pouvoir discrétionnaire des acheteurs à travers les enchères permet de promouvoir la transparence et la concurrence (Bulow and Klemperer [1996]). D'autre part, l'usage de la discrétion peut permettre de faciliter le dialogue entre les par-

ties contractantes afin de rédiger des contrats les plus complets possible (Bajari and Tadelis [2001], Bajari et al. [2014]). Les phases de dialogue et de négociation sont particulièrement valorisées lorsqu'il est difficile de clairement spécifier toutes les dimensions et contingence d'une transaction dans un contrat. Réduire les incomplétudes contractuelles est parfois une dimension décisive de la commande publique afin de diminuer les risques ex-post de comportements opportunistes. L'usage de la discrétion facilite la mise en place de contrats relationnels (Kim [1998], Spagnolo [2012], Coviello et al. [2017]).En effet, les entreprises participant aux marchés publics peuvent être incitées à développer et entretenir une bonne réputation afin d'accroître leur chance d'être à nouveau sélectionnées dans le futur. Utiliser de la discrétion peut alors résulter en une meilleure utilisation des deniers publics et un coût d'organisation de l'appel d'offres moindre. Cependant, la discrétion peut être utilisée à tort dans le but de favoriser une entreprise en particulier et en tirer des bénéfices à titre personnel. La corruption est possible dans la mesure où une marge discrétionnaire est offerte. A travers l'analyse d'un livre comptable officieux détaillant les pots-de-vin versés par une entreprise asiatique, Tran [2011] démontre que les procédures d'attribution ayant un degré de discrétion plus important sont plus susceptibles de favoriser les comportements corruptifs. Comme le montrent Baltrunaite et al. [2018] à travers des données de marchés publics Italiens, les procédures d'attribution dans lesquelles l'acheteur à un plus grand pouvoir discrétionnaire sont plus susceptibles de sélectionner des entreprises ayant des connections politiques avec l'acheteur. D'une manière similaire, Palguta and Pertold [2017] utilisent des données de marchés publics tchèques. Ils observent que lorsque les acheteurs ont la possibilité de restreindre ex-ante le nombre de participants à l'appel d'offres en dessous d'une certaine valeur de contrat, la manipulation de ce seuil devient plus probable, de sorte que la valeur du contrat soit en dessous de celui-ci. Ils observent aussi que des entreprises dont l'identité du gérant est opaque ont plus de chance de remporter des contrats si la valeur du seuil est manipulée.

Une procédure d'attribution optimale doit alors être un compromis entre la limitation du risque de corruption d'un côté, et de promouvoir l'efficacité des marchés

publics de l'autre à travers l'usage de la discrétion. Bandiera et al. [2009] propose une distinction entre les gaspillages qualifiés d'"actifs" et ceux qualifiés de "passifs" au sein de la commande publique. D'un côté, les gaspillages actifs sont définis tels que "sa présence génère des bénéfices directs ou indirects pour le décideur public. En d'autres termes, la réduction de ce type de gaspillage réduirait l'utilité du décideur. L'exemple typique est la corruption dans les marchés publics."[3] D'un autre côté, les gaspillages passifs sont tels que "sa présence ne bénéficie pas au décideur public. En d'autre termes, réduire ce type de gaspillage augmenterait (faiblement) l'utilité du décideur. [...] Suite aux travaux de Kelman [1990, 2005], une autre source de gaspillage passif serait l'existence d'une régulation excessive qui rend l'organisation d'appels d'offres fastidieux et peut par la même occasion augmenter le prix moyen payé par le décideur dans les marchés publics."

En partant de ces définitions, il apparaît que le choix de la procédure d'attribution d'un marché public est habituellement guidée par un arbitrage entre doter un acheteur d'un pouvoir discrétionnaire afin de réduire le risque de gaspillage passif, et promouvoir la transparence et réduire les possibilités de gaspillage actif à travers l'usage d'enchères ouvertes. C'est pourquoi en Europe, le risque de gaspillage actif et celui de gaspillage passif sont compensés par la présence d'un seuil [4] en deça duquel les acheteurs publics sont dotés d'un pouvoir discrétionnaire. En effet, dès lors que la valeur d'un contrat est plus importante, la tentation et les gains associés aux pots-de-vin sont plus grands. En France, les acheteurs publics ont la possibilité d'utiliser une "procédure adaptée" en deçà de ce seuil. Comparé aux procédures rigides et formelles que sont les enchères ouvertes, cette procédure est adaptée . En effet, cette dernière doit être adaptée à la nature et aux caractéristiques du besoin à satisfaire, au nombre ou à la localisation des opérateur économiques susceptibles d'y répondre ainsi qu'aux circonstances de l'achat.[5]

[3]Traduit de l'anglais

[4]Ce seuil a été introduit en 2004 à travers la mise en place de la Directive 2004/218/EC sur les marchés publics. Ce seuil est réévalué tous les deux ans.

[5]Direction des Affaires Juridiques, Les marches a procedure adaptée, 2015

Ce chapitre se concentre sur une dimension particulière de la corruption à savoir le favoritisme. En manipulant ex-ante un appel d'offres, un acheteur public peut favoriser certain candidats, source in-fine de gaspillage actif. L'objectif de ce chapitre est alors d'évaluer l'impact de l'ouverture d'une enquête judiciaire pour faits de corruption sur les mécanismes d'attribution des marchés publics au sein des municipalités françaises. Dans un premier temps, le degré de pouvoir discrétionnaire adopté dans les attributions de marchés est comparé avant et après que l'ouverture de l'enquête soit rendue pbulique à travers la presse locale. La corruption est d'autant plus probable lorsqu'une entité publique est dotée d'un pouvoir discrétionnaire. Dans un second temps, l'impact de l'ouverture d'une enquête sur l'environnement concurrentiel (i.e. le nombre de participants à l'appel d'offres) et la localisation des firmes sélectionnées (i.e. le favoritisme local) dans le cadre de procédures adaptées sont analysés. L'ensemble de ces effets potentiels sont considérés à la fois pour les municipalités qui sont sous le coup d'une enquête mais aussi au sein des municipalités voisines, ces dernières n'étant sous enquête pour faits de corruption.

Nous disposons d'une base données collectant les attributions de marchés publics en France de 2006 à 2015. A travers la lecture de la presse locale, nous identifions les municipalités qui font l'objet d'une enquête pour corruption et reportons l'issue judicaire de ces cas . Nous avons collecté un total de 87 cas ayant eu lieu entre 2006 et 2015.

De par l'utilisation d'un modèle de doubles-différences, les resultats indique qu'une municipalité sous enquête ne réagit pas à l'ouverture de celle-ci en adoptant plus de procédures d'attributions formelles et rigides (enchères ouvertes). Une explication plausible serait que ces municipalités n'ont pas intérêt à changer leurs comportements tant que l'enquête est en cours. Dès lors qu'une municipalité est sous enquête, la probabiltié d'être jugée coupable ne dépend pas de ses choix actuels en termes d'attribution. De plus, puisque l'objectif des procédures adaptée est de pouvoir alléger le poids des procédures associées à l'organisation d'un appel d'offres, son utilisation peut alors se révéler être la procédure la plus efficace. Cependant, nous observons que les municipalités voisines à celle qui est sous enquête réagissent

en étant moins enclines à utiliser des procédures adaptées par lesquelles un plus grand pouvoir discrétionnaire leur est attribué. Nous identifions deux raisons pour lesquelles ces municipalités peuvent réagir. Tout d'abord, si elles ne sont pas corrompues mais craignent qu'un usage trop important de la procédure adaptée puisse être mal interprété, nos résultats montrent que l'ouverture d'une enquête génèrent du gaspillage passif en raison des objectifs principaux de la procédure adaptée. En effet, les municipalités voisines par peur d'être suspectées, vont renoncer à une procédure dont le but est de réduire les coûts liés à l'organisation de la commande publique. En revanche, si la municipalité voisine réagit car elle est en réalité corrompue et potentiellement impliquée dans le cas incriminé, les changements de comportements réduisent alors les gaspillages actifs par une potentielle réduction voir arrêt des comportements corruptifs. Dans le premier cas, les poursuites pour fait de corruption pourrait être à la source d'externalités négatives (augmentation du gaspillage passif) tandis que dans le second cas, cela génèrerait des externalités positives (une baisse du gaspillage actif). Afin de déterminer laquelle de ces explications semble la plus juste, nous différencions les municipalités dont le voisin a été jugées coupable *in-fine* de celles dont le voisin a été jugées non coupables. Nos résultats indiquent que seuls les voisins de municipalités jugées coupable réagissent. Ceci suggère que les municipalités voisines qui font évoluer leurs comportements sont potentiellement impliqués dans le cas de corruption sous enquête, même si ceci reste une pure supposition.

Bien que nos résultats indiquent que les municipalités sous enquête ne réagissent pas à l'ouverture de celle-ci en changeant leur mode d'attribution des marchés publics, elles pourraient cependant réduire leurs comportements corruptifs. En d'autres termes, bien que ces municipalités ne modifient par leur procédure d'attribution car celle qui prévaut est la plus efficace, elles peuvent cesser d'être corrompues puisque l'enquête peut accroître le degré de surveillance par des tierces parties. Si les municipalités suivent une telle stratégie, il est alors probable d'observer que la concurrence est accrue et que moins d'entreprises locales sont sélectionnées (le localisme est une dimension de la corruption dans les marchés publics).

Nous observons que seules les municipalités sous enquête et qui sont reconnues

comme coupable ont plus de participants à leurs procédures adaptées après ouverture de l'enquête. Le canal par lequel la concurrence est améliorée n'est pas totalement clair. Cela peut découler d'un changement dans le nombre de participants invités à participer à l'appel d'offres, ou bien cela peut être la conséquence de la présence plus grand nombre d'entreprises participantes. En effet, les municipalités sous enquêtes ont plus de chance d'être sous la surveillance accrue de la part de tierces parties et donc de cesser d'être corrompues. En conséquence, les entreprises peuvent recevoir un signal positif, à savoir une plus grande chance de remporter un appel d'offres. Nous observons aussi que les municipalités voisines à une qui a été jugée coupable ont un nombre croissant de participants après ouverture de l'enquête. Cet effet n'est pas valide pour les voisines à une municipalité qui jugée non coupable. Les explications avancées sont soit que la municipalité en question est elle aussi corrompue et cesse de l'être (par exemple en évitant de restreindre la concurrence), soit qu'elle réagit par peur d'être injustement suspectée. En effet, lorsqu'un acheteur public attribue un marché à travers l'usage d'une procédure adaptée, celui-ci a la possibilité de restreindre la compétition. Finalement, nous observons que les municipalités sous enquête sélectionnent des entreprises plus éloignées (c'est-à-dire moins locales) comparé à d'autre municipalités qui utilisent elles aussi une procédure adaptée. Cet effet s'explique surtout par les municipalités qui sont jugées coupables.

Ce chapitre contribue a une large frange de la littérature sur la corruption au sein des marchés publics. De manière plus spécifique, nous restreignons notre analyse à un cadre dans lequel l'acheteur public a la possibilité d'adopter un certain degré de pouvoir discrétionnaire dans ses procédures d'attribution. En raison de la dimension secrète de la corruption, peu de littérature empirique s'est dévouée à l'étude de ce sujet. De multiples aspects de la corruption dans les marchés publics ont été considérés, mais à notre connaissance, cette étude est la première à examiner les effets des enquêtes pour faits de corruption sur le degré de pouvoir discrétionnaire adopté.

Chapitre 3: Pouvoir discrétionnaire et sélection de firmes efficaces dans les marchés

publics.

La commande publique permet à des entités publiques d'effectuer des achats de biens et de services. Ils représentent à eux seuls en moyenne 12% du PIB et 29% des dépenses totales des gouvernements au sein des pays de l'OCDE et environ 14% du PIB de l'Union Européenne (OECD [2017b]). Etant donné l'importance de ce secteur, les marchés publics peuvent alors avoir le potentiel de poursuivre de larges objectifs de politique publique. Comme l'explique l'OCDE, *"Les gouvernements reconnaissent de plus en plus l'immense pouvoir des marchés publics pour résoudre des problèmes de société à l'échelle globale, améliorer la productivité et stimuler l'innovation, tout en garantissant un bon usage des deniers publics."*[6] Bien que la littérature économique a très largement évalué la capacité de la commande publique à résoudre des problèmes de politique publique, ses liens avec la productivité des entreprises a jusque-là été négligé. Cet aspect est d'autant plus important qu'il existe de multiples façons d'attribuer un contrat à une entreprise, pouvant ainsi potentiellement faire varier l'importance de ce lien.

Ce chapitre compare la productivité des entreprises dont les marchés ont été attribués à travers deux modes d'attribution différents. Le premier mode consiste en des enchères ouvertes. Cette procédure d'attribution impose d'importantes contraintes définies par des règles strictes qui encadrent la manière dont les marchés doivent être attribués. Le principal bénéfice de cette procédure est de favoriser la transparence et la concurrence (Bulow and Klemperer [1996]). En effet, dans ce cas, le marché doit être attribué à travers des critères très précis et sans négociation possible. Le second mode d'attribution est désigné par l'appellation "procédure adaptée". Il s'agit d'une procédure à travers laquelle l'acheteur public est doté d'un pouvoir discrétionnaire dans la phase d'attribution (par exemple, au niveau de la publicité et des échéances pour répondre à un appel d'offres). Les procédures adaptées sont caractérisées par deux aspects essentiels à savoir, la possibilité (mais non l'obligation) d'avoir recours à la négociation, mais aussi la possibilité de restreindre la concurrence à un certain nombre de participants. Cette potentielle restriction a

[6]Traduit de l'anglais.

pour but de réduire les coûts de sélection des offres. De la même manière, limiter la concurrence peut permettre à un certain type de firmes d'être plus enclines à participer aux marchés publics et de remporter des contrats (par exemple, les petites et moyennes entreprises ainsi que les entreprises locales). Enfin, bien que la procédure adaptée soit moins transparente que les enchères ouvertes, celle-ci permet de facilement s'adapter aux spécificités et aux circonstances du marché. Une large frange de la littérature s'est attardée sur la question de savoir quel type de procédure d'attribution est le plus à même de générer plus d'efficacité. Bien que les résultats ont été mesurés à travers différents aspects d'un appel d'offres tels que le prix, la qualité et la présence de renégociation, la productivité de l'entreprise sélectionnée à quant à elle été un aspect jusque-là négligé.

Dans ce chapitre, nous évaluons si une procédure d'attribution qui offre un certain degré de pouvoir discrétionnaire à un acheteur public est plus à même de sélectionner une entreprise productive qu'une procédure qui n'en accorde pas. Nous adressons donc la question de l'effet de la discrétion sur la probabilité de sélectionner une entreprise productive. Dans un premier temps, si l'attribution d'un marché à une firme plus productive peut accroître les chances d'obtenir un marché à plus bas coûts et/ou à meilleure qualité, il est censé en résulter un meilleur rapport qualité/prix, ce qui constitue l'objectif primaire de la commande publique. Dans un second temps, si la commande publique doit servir d'outil pour promouvoir la productivité et la croissance, il est alors important de déterminer dans quelle mesure une procédure d'attribution est plus à même qu'une autre à sélectionner des entreprises efficaces. Si l'usage de la commande publique à ces fins n'est pas efficace, une remise en question de l'usage de cet outil à cette fin doit être effectuée.

Nos principaux résultats indiquent que l'attribution d'un marché à travers une procédure adaptée réduit la probabilité de sélectionner une entreprise efficace, et cela pour toutes les spécifications de notre modèle. Ceci a pour conséquence de promouvoir une allocation des fonds publics envers des entreprises moins efficaces. Les contributions empiriques de ce chapitre sont, dans un premier lieu, d'un ordre de politique publique. En effet, l'usage d'une procédure adaptée est potentiellement en contradic-

tion avec l'objectif principal de la commande publique, à savoir l'utilisation optimale des deniers publics. Il et est aussi potentiellement en contradiction avec l'objectif plus large de promouvoir la productivité. En second lieu, nos données nous permettent de démontrer l'importance de certaines caractéristiques observées de l'acheteur public, du contrat ainsi que de l'environnement concurrentiel sur l'adoption d'un certain type de procédure d'attribution. Les résultats indiquent que l'expérience de l'acheteur, la complexité du contrat et la compétitivité augmentent la probabilité d'opter pour une enchère ouverte.

La littérature économique en lien avec l'organisation de la commande publique est abondante. Une importante frange est dédiée à l'identification des procédures d'attribution qui permettent d'obtenir le meilleur rapport qualité-prix. La théorie des enchères démontre que les enchères ouvertes constituent la procédure d'attribution la plus à même d'obtenir un coût ex-ante le plus bas (Bulow and Klemperer [1996], Cameron [2000]) et, de par sa transparence, de réduire la corruption et le favoritisme. Cependant, cette vision a été remise en question par la théorie des contrats, cette dernière prenant en compte d'autres aspects de la commande publique. En effet, il est démontré que les enchères ouvertes peuvent ne pas être la meilleure option dès lors que les contrats ont un certain degré de complexité (Bajari et al. [2009]), lorsqu'ils sont potentiellement sujets à des évènement imprévisibles (Goldberg [1977]), lorsque la dimension de la qualité n'est pas facilement contractualisable (Manelli and Vincent [1995]), ou bien lorsqu'il est souhaitable d'entretenir des mécanismes de réputation et de relations de long terme (Kim [1998], Spagnolo [2012]). Dans ces cas de figure, l'usage de la discrétion peut être bénéfique et générer de meilleurs résultats que les procédures à enchères ouvertes. La négociation est l'une des forme les plus typiques de la discrétion dans les marchés publics. Goldberg [1977] fut le premier à argumenter le fait qu'il est préférable d'attribuer un marché à travers une phase de négociation plutôt qu'à travers l'usage d'enchères ouvertes, et cela dès lors que les contrats sont complexes et sujet à des évènements imprévisibles. Cette vision est partagée par Manelli and Vincent [1995] puisqu'il démontre l'apport de la négociation dès lors qu'il existe des dimensions non contractualisables de la

qualité. En conséquence, le choix du type de procédure d'attribution est sujet à un arbitrage entre d'un côté, un certain degré de transparence et des coûts ex-ante plus bas, et d'un autre coté, des contrats potentiellement plus performants ex-post. De nombreux travaux, en particulier ceux de Bajari and Tadelis [2001] et Bajari et al. [2009], ont testé de manière empirique les effets de la complexité contractuelle sur le choix d'une procédure d'attribution. Leurs résultats démontrent que les transactions les plus complexes ont plus de chances d'être associées à des phases de négociation. Ces auteurs observent aussi qu'un niveau de compétition plus élevé rend l'usage des enchères ouvertes plus probable. De plus, Bajari et al. [2009] démontrent que les marchés avec une phase de négociation ont plus de chance d'être attribuées à une entreprise expérimentée et de renom. L'une des dimensions majeures à travers laquelle la discrétion peut offrir de meilleurs résultats que les enchères ouvertes est à travers la mise en place de contrats relationnels (des relations de long terme) et de mécanismes de réputation (Spagnolo [2012]). Coviello et al. [2017] ont analysé de manière plus spécifique les effets de la discrétion sur les résultats ex-ante mais aussi ex-post de l'attribution des marchés publics. Dans leur article, la discrétion réside dans la possibilité de pouvoir resteindre la concurrence en invitant uniquement des entreprises sélectionnées par l'acheteur public. Leurs résultats indiquent que l'usage de la discrétion est plus à même de réduire la durée totale des travaux, de sélectionner des entreprises de plus grande taille, et de réduire le nombre de firmes soumettant une offre (ceci permettant de réduire les coûts liés à l'analyse des candidatures). Cependant, l'usage de la discrétion n'a pas d'effet significatifs sur d'autres aspects tels que le montant des offres soumises, les dépassements de coûts, et la probabilité que le contrat soit attribué à une firme locale. Enfin, leurs résultats suggèrent que les titulaires d'un contrats ont, dans un premier temps, plus de chance d'être renouvelés s'ils ont eu de meilleurs résultats que la moyenne dans le passé (en termes de retard), et dans un second temps, leur renouvellement permet d'obtenir des résultats au-delà de la moyenne.

La contribution de chapitre est d'offrir un apport à la littérature économique à travers l'analyse de la capacité des procédures d'attribution, et plus spécifiquement

des procédures accordant un certain degré de pouvoir discrétionnaire, à sélectionner une entreprise plus productive, qui sera plus à même de fournir un coût plus bas et/ou une meilleure qualité. D'une manière similaire à Bajari et al. [2009], ce chapitre explore aussi les aspects déterminants la décision d'un acheteur d'opter pour un certain type d'attribution.

L'analyse empirique de ce chapitre se base sur une base de données unique dans lesquelles sont recensés les marchés publics français de 2005 et 2015. Nous exploitons une spécificité du code des marchés publics français par laquelle, depuis 2004, l'usage d'un pouvoir discrétionnaire est autorisé. Dans la plupart des pays, les règles encadrant les marchés publics ont pour objectif de promouvoir la transparence et l'efficacité de la commande publique. C'est dans cette perspective que l'Union Européenne fixe un seuil au-delà duquel il est obligatoire d'attribuer un marché à travers l'organisation d'enchères ouvertes. En deçà, les acheteurs publics ont le choix entre un système d'enchères ouvertes et une procédure adaptée, cette dernière offrant flexibilité et pouvoir discrétionnaire à l'acheteur. Cette procédure permet à ce dernier, entre autres, de bénéficier d'une plus grande liberté quant au support de publicité et à la conception des appels d'offres, mais aussi d'être plus libre dans sa manière de sélectionner une entreprise, avec en particulier, la possibilité d'avoir recours à une phase de négociation.

Nous associons deux bases de données, la première étant le recensement des appels d'offres et attributions de marchés en France de 2006 à 2015. Ces données comprennent l'exhaustivité des appels d'offres (environ 80 000 contrats par an) et contiennent diverses informations sur l'attribution des marchés, dont l'identité du gagnant, mais seulement sur un sous échantillons d'appels d'offres (environ 14 000 attributions de marchés par an). Ces données sont très diverses, aussi bien en termes de biens et services, qu'en termes de valeur de contrat. La seconde base de données, Amadeus, est un panel d'informations financières à l'échelle d'entreprises européennes. Cette base est utilisée dans le but de calculer la productivité du travail et la productivité totale des facteurs de chaque firme. Nous limitons notre échantillon d'analyse à des contrats dont la valeur est située en dessous du seuil mis en place par l'Union Eu-

ropéenne. Ainsi, nous pouvons examiner une situation dans laquelle l'acheteur a le choix entre deux types de procédures à savoir, une enchère ouverte et une procédure adaptée.

La stratégie économétrique mise en place doit prendre en compte l'endogénéité potentielle issue du choix du type de procédure d'attribution. En effet, il est attendu que certaines caractéristiques propres à chaque contrat et à chaque acheteur soient inobservées mais peuvent influencer à la fois le choix de la procédure et la sélection de l'entreprise. Cette omission de variables (par exemple, le degré de capture de l'acheteur et son degré de connaissance du marché) aurait donc pour conséquence la potentielle existence d'une corrélation entre le type de procédure choisi et le terme d'erreur. Afin de résoudre ce problème potentiel, nous instrumentons le choix de la procédure et utilisons une méthode des moindres carrés en deux étapes. Dans un premier temps, nous régressons le choix de la procédure adaptée sur un ensemble de variables explicatives et sur un instrument. Notre stratégie d'identification repose sur l'usage d'un instrument inspiré par les travaux de Guasch et al. [2007] et consiste à obtenir la prévalence des procédures adaptées parmi les acheteurs publics voisins (c'est à dire situés dans zone géographique proche) au moment de l'appel d'offres. Cet instrument est très corrélé avec le choix du type de procédure en raison de l'effet d'inertie dans l'adoption d'une nouvelle procédure mais aussi en raison d'un possible "effet de diffusion" (*spillover effetct*) émanant des voisins. De nombreuses études empiriques démontrent l'influence significative des comportements voisins dans les choix organisationnels. Christoffersen and Paldam [2003] analysent la fourniture de services publics au sein de municipalités danoises et démontrent l'existence d'un effet de diffusion des choix dans les modes de fourniture des municipalités voisines. Ces résultats ont été confirmés par Bel and Miralles [2003] et Miralles [2009]. Enfin, l'instrument sélectionné n'est pas susceptible d'avoir un impact sur la sélection d'une firme plus ou moins productive puisqu'il est indépendant des caractéristiques propres à l'acheteur public et au contrat considérés. Dans un second temps, nous sommes donc en mesure de régresser le niveau de productivité de la firme sélectionnée.

Nos principaux résultats indiquent que l'usage d'une procédure adaptée mène à une

allocation des fonds publics vers des entreprises moins efficace de par la sélection de firmes moins productives. L'ampleur de cet effet est large. A notre connaissance, il s'agit de la première étude où cet effet causal est démontré grâce à l'utilisation d'une telle stratégie d'identification. De plus, les tests de robustesse confirment la fiabilité de nos résultats.

Il existe deux principaux mécanismes par lesquels l'adoption d'une procédure adaptée est plus susceptibe de mener à la sélection de firmes moins efficaces. La première raison est que les entreprises peuvent potentiellement participer uniquement à un certain type de procédure. La seconde raison peut provenir d'un pur effet de la discrétion, c'est-à-dire par l'invitation d'un type spécifique d'entreprises. Dans le cas d'une procédure adaptée, si l'acheteur décide d'inviter uniquement des entreprises locales ou de petite taille, potentiellement moins productives, cela peut avoir pour conséquence d'impacter la concurrence. En effet, la discrimination envers un certain type de firmes peut influencer nos résultats. Ainsi, nous démontrons que le nombre de participants aux appels d'offres est en moyenne similaire entre les deux types de procédures. De plus, nous observons que l'usage d'une procédure adaptée ne conduit pas à la sélection d'entreprises plus petites, plus jeunes ou plus locales. Cela suggère que nos résultats ne s'expliquent pas par le fait que les acheteurs invitent uniquement un certain type de firmes à participer aux procédures adaptées. Enfin, nos résultats peuvent être expliqués par le fait que certaines entreprises ne participent pas à des appels d'offres dès lors qu'ils sont organisés à travers une procédure adaptée. Cependant, il n'apparait aucune raison claire pour laquelle une entreprise qui participe à des enchères ouvertes décide ne le pas le faire pour des procédures adaptées. Ceci est confirmé dans les travaux de Baltrunaite et al. [2018] dans lequel sont comparés des ensembles de participants dans des enchères ouvertes et des procédures adaptées. Ces auteurs observent que la composition de ces ensembles de participants ne varie pas selon la procédure choisie. En conséquence, nous pouvons conclure que nos résultats sont expliqués par un pur effet de la discrétion dans la sélection des firmes. Si l'ensemble des participants reste inchangé selon la procédure, l'usage d'une procédure adaptée peut plus facilement permettre de dis-

tordre la concurrence afin de sélectionner une firme en particulier, et cela parfois au détriment d'entreprises plus efficaces.

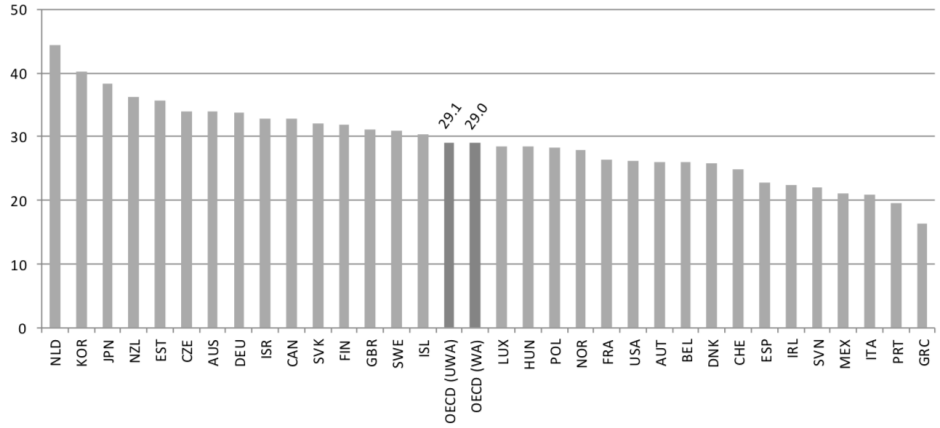
Contents

General Introduction

The stakes of public procurement

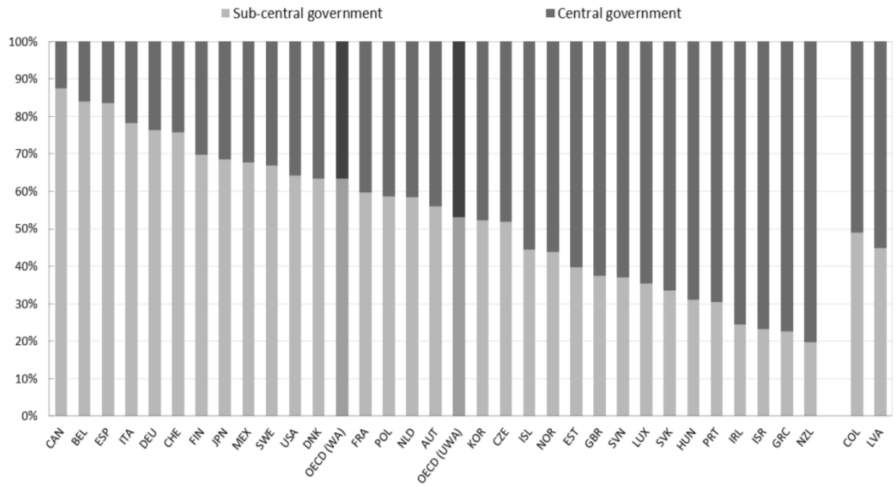
Public procurement consists of the purchase of goods, services and works by governments and state-owned enterprises. It helps governments to provide public services to their citizens. In the OECD countries, public procurement is estimated to represent about 29% of general government expeditures (Figure 1) as well as 12% of GDP, amounting to 4.2 trillion euros in 2013 (in the European Union, these figures amount to 2 trillion euros per year, representing 14% of EU GDP). It ranges from 16% in Greece to 45% of in the Netherlands. At subnational levels, public procurement represents an even bigger share of 63% of general government spending in the OECD countries (Figure 2). Whereas local authorities represent more than 80% of general government expeditures in Canada, Belgium and Spain, they only represent less than 20% in Israel, Greece and New-Zealand. The European Commission estimates that a 1% saving in public procurement efficiency gain could save 20 billions euros per year in the EU (European Commission [2017a]). The stakes for an efficient procurement process are therefore very high.

Figure 1: General government procurement as percentage of general government expenditure



Source: OECD [2016]

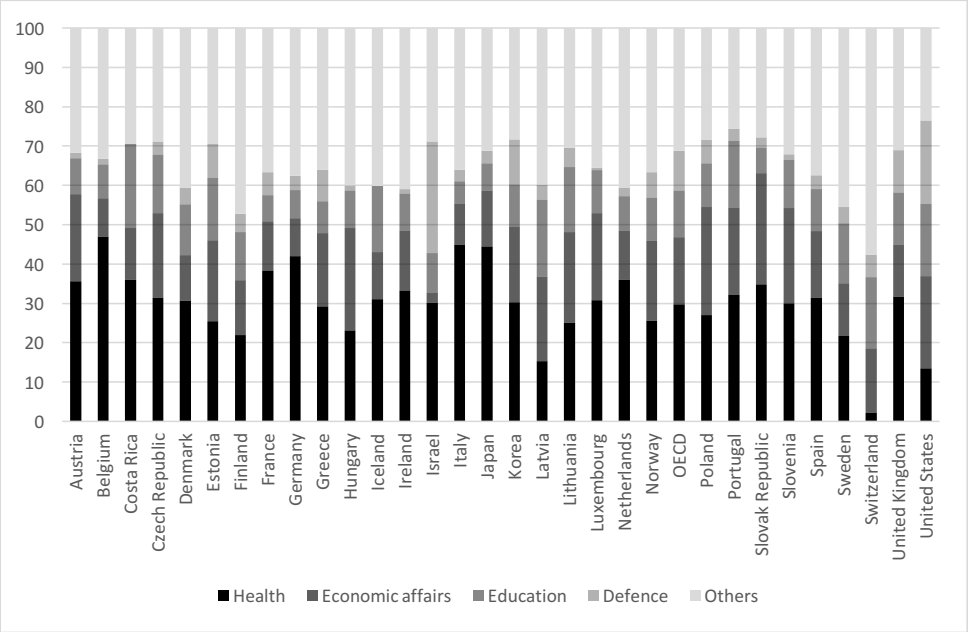
Figure 2: Share of general government procurement



Source: OECD [2016]

According to the OECD [2017b], the health sector represents the highest share of public procurement expenditures in the OECD countries with an average of 29% (See Figure 3). Together with the sectors of Economic affairs (17%), education (12%), and defence (10%), they represent a susbtantial share of public procurement expenditures within the OECD countries. We also observe huge variations of allo-

Figure 3: Structure of general government procurement spending by function (2015)



Source: OECD national accounts Statistics; Eurostat Government finance statistics

cation of expenditures across countries, reflecting the governments' orientation of public policies.

Public procurement could also be used as a tool to pursue secondary objectives. As stated by the OECD, *"governments are increasingly recognising the immense power of public procurement to solve global societal challenges, improve productivity and boost innovation, while ensuring value for money"*. Indeed, it may foster growth, productivity and investment. It could also be used to pursue wider objectives such as promoting entry of small and medium enterprises (SMEs), or even pursuing green and social objectives, such as the reinsertion of citizens excluded from the labor market. Howewer, using public procurement for achieving secondary objectives raises some concerns. As Saussier and Tirole [2015] point out, "[e]ntrusting the public procurement system with the task of achieving social, environmental and innovation-related objectives is ineffective". They explain that first, a public policy is effective if it is uniform and comprehensive, which is not the case in public procurement. Also, pursuing these secondary objectives adds more stringent selection

criteria, thereby reducing the competition on the market and facilitating favoritism.

As a matter of fact, the European Commission's current priorities for public procurement are: (i) ensuring a wider uptake of innovative, green, and social procurement; (ii) professionalising public buyers; (iii) increasing the access of SMEs to procurement markets; (iv) improving transparency, integrity and data; (v) boosting the digital transformation of procurement; (vi) cooperating to procure together.

Discretion in public procurement

A public authority is said to be entitled with discretionary power if she is allowed to take decisions that are suitable given the circumstances. More precisely, it is defined as "the quality of having or showing discernment or good judgment" and as the "ability to make responsible decisions".[7] In public procurement, discretionary power may be used for diffferent dimensions (e.g. supplier selection, award procedure, mode of organization). This PhD dissertation focuses on two aspects of it, namely discretion in organizational modes of provision of a public service, and discretion when awarding a contract to a private supplier.

First, when providing a public service, a public authority has to choose between providing the good itself (*in-house provision*) and contracting out, usually through a private operator (*private provision*). The economic literature identifies three classes of factors to explain the organizational choices namely, fiscal restrictions, economic efficiency, and political interests as well as ideological bias (Bel and Fageda [2008]).

Fiscal constraints (e.g. high level of outstanding debt) are usually expected to positively influence the likelihood of privatization (López-de Silanes et al. [1997], Brown and Potoski [2003], and Hebdon and Jalette [2008]). Indeed, this type of restrictions reduces the ability of governments to raise revenue, making it more likely to privatize to save costs. The literature has also extensively focused on political and ideological variables. A strand of the literature dedicated to public

[7] Merriam-Webster

choices usually affirms that left-wing governments be more reluctant to privatize a service. In the early 2000s, a prevailing strand in the literature was to contradict this statement. Indeed, as pointed-out by Sundell and Lapuente [2012], "the general consensus is that while political considerations may have played a role in contracting out in the 1980s, especially in the United States (Bel and Fageda [2009]), today's governments are guided more by pragmatic motivations; contracting out has become less politically controversial". However, those studies are cross-sectionnal and do not account for the ideology at the time the decision towards the mode of provision was taken. Therefore, many recent empirical papers have overcome this issue and demontrate the importance of ideology in the mode of governance decisions (Picazo-Tadeo et al. [2012]; Sundell and Lapuente [2012]; Gradus et al. [2014]; Beuve et al. [2018]). They show that left-wing municipalities are more likely to opt for a private provision of public services. Also, as Le Squeren and Moore [2016] show, public contracts are more often renegotiated around election time, and the political leaning of the municipalities is an important driver of the decision to provide a public service in-house or privately. Finally, factors explaining the decision to privatize through economic efficiency factors are usually related to cost reductions. In theory, when choosing between contracting in-house or privately, the municipality should account for the two main dimensions of the TCE, namely, asset specificity and contractual complexity (Williamson [1985], Levin and Tadelis [2010]). On the one hand, asset specificity describes the conditions where the assets cannot be redeployed to alternative users or uses without loss of productive value (Williamson [1985], Klein et al. [1978]). Situations where asset specificity is strong may lead one of the parties being locked in this contractual scheme. On the other hand, contractual complexity refers to the contract completeness. Contractual complexity is mainly made of two main dimensions: the measurability of ex-post performances and the need for flexibility leading to high contractual costs if privatization is chosen. Therefore, public ownership is more likely as asset specificity and contractual complexity get stronger (Brown and Potoski [2003], Levin and Tadelis [2010]). Other dimensions, such as sensitivity to quality, should be accounted for. As Hart et al. [1997] show, in the case of private provision, the contractor typically has too strong incentives

to reduce costs which consequently has an adverse effect over the quality. Also, the government needs to engage in negotiations with the private operator if he wants to improve the quality level. They advocate to use in-house provision when non-contractible cost reductions deteriorate quality, and when quality innovations are not an important dimension of the service.

On the other side, the use of discretion could help the authority to facilitate the dialogue between the parties to make the contracts as complete as possible (Bajari and Tadelis [2001], Bajari et al. [2014]). Dialogue and negotiation are particularly valuable when it is difficult to specifiy all dimensions and contingencies of a transaction in a contract. Specifically, reducing contractual incompleteness makes ex-post opportunistic behaviors less likely. Discretion also eases the implementation of relational contracts (Kim [1998], Spagnolo [2012], Coviello et al. [2017]). The procedure through which a public contract is awarded is typically subject to a strict legal framework. In Europe, public procurement is framed within strict rules (Directive 2014/24/EU) that make sure that the award procedure of a contract complies with the principles of transparency, equal treatment and non-discrimination. This is the reason why public demand for goods and services in many places such as Europe and the U.S. is typically procured through a competitive procedure which usually consists of open auctions. This award mechanism is known to foster transparency and competition (Bulow and Klemperer [1996]). However, the use of discretion could help to award a contract more efficiently.

The discretionnary power of public entities typically takes the form of negotiations. Goldberg [1977] was the first author to argue that for complex transactions that might be subject to unexpected events, awarding a contract through negotiation may be more desirable than auctions to avoid costly renegotiations. These findings are confirmed by Manelli and Vincent [1995] who demonstrates that when non-contractible quality dimensions of the procured good are important, open auctions on contractible dimensions appear less desirable than negotiation as they are less likely to provide a sufficient level of quality. As a consequence, the choice of award mechanism is likely to be subject to a trade-off between transparency as well as lower

ex-ante price, and ex-post performance. In seminal papers, Bajari and Tadelis [2001] and Bajari et al. [2014] test for the effect of contract complexity over the choice of award mechanism. Their results primarly show that complex transactions are more likely to be associated with the use of negotiations since the use of discretion could help the authority to facilitate the dialogue between the parties and make the contracts as complete as possible, thereby reducing the need for ex-post adaptations. Also, Bajari et al. [2014] show that negotiated projects are associated with a higher probability to be awarded to more reputable and experienced contractors. As highlighted in this paper, an important dimension through which discretion may yields highers benefits than open auctions is by setting relational contracts (long-term relationships) and reputational mechanisms. This aspect of discretion is discussed by Spagnolo [2012]:

> There are several reasons why complementing explicit contracts with reputational mechanisms based on ex-post evaluations of contractor performance may improve the governance of procurement transactions. These are linked to the inability of explicit contracts to describe or of the court system to verify important aspects of the procurement transactions at reasonable cost, but also to the high costs of enforcing explicit contracts through litigation.

More specifically, Coviello et al. [2017], analyze the effect of discretion - measured in terms of whether the buyer can decide who to invite to bid (a specificity of the Italian public procurement when contract value is below a defined threshold) - over ex-ante and ex-post procurement outcomes. They demonstrate that using an award mechanism involving discretionary power (the *Trattativa Privata*) is likely to reduce the total duration of works, to select larger firms and to reduce the number of firms submitting bids, thereby saving costs associated to bid screening. However, they find that in Italy, the use of discretion is found to have no significant effect over other outcomes such as the winning rebate, cost overrun and the probability that the project is awarded to a local firm. They also find that increased discretion makes an incumbent more likely to be awarded the contract when renewed. Finally, their

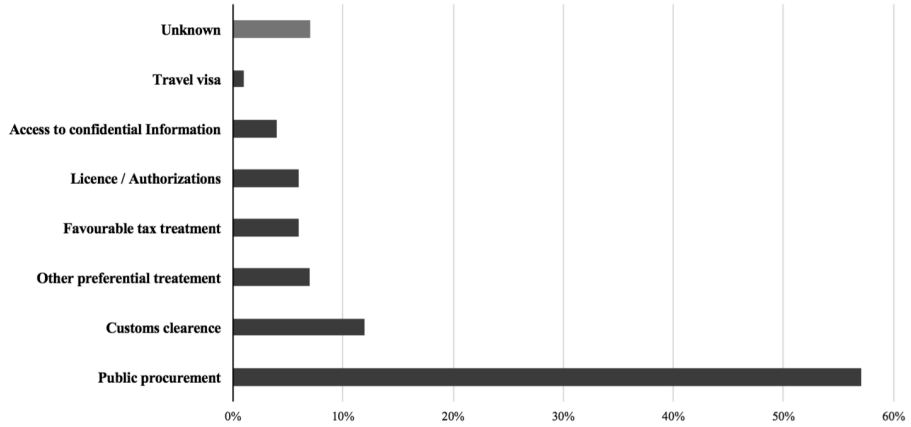
results suggest that incumbents are more likely to be renewed if they had better performance in the past than the average (defined in terms of delay), and that their selection yields better than average performance when renewed.

However, the use of discretion could hamper the efficiency of public procurement. First, even though discretion in the choice of organizational forms could be efficient because it helps to account for the specificity of each particular service (e.g. economies of scale, asset specificity), organizational choices may be influenced by other factors than purely economic ones (e.g. ideological and political). In this case, a public service may be provided in a way that is more guided by the private agenda of the public authority rather than by efficiency motives. Chapter 1 of this dissertation adresses this issue by investigating the determinants of both remunicipalizations (i.e. a switch for private to public provision of a public service) and privatizations (i.e. a switch from private to public provision). We analyse the extent to which changes in organizational forms are influenced by the search of an economic efficiency rather than factors that could be detrimental to it. To this end, we analyse the determinants of organizational switches through the lenses of economic efficiency, politics and ideology, and fiscal stress. Chapter 1 concludes on the finding that, overall, discretion in organizational forms is primarly used for economic efficiency motives. Organizational switches are also influenced by other factors, such as the tendency to switch from one regime to another one in neighboring municipalities and to a less extent by local unemployment. However, the polical dimension does not appear to be a significant determinant of such decisions.

One of the most important limitation of the use of discretion in public procurement is corruption. It can take many forms, of which a bidder's attempt bribe a public authority in order to obtain a public procurement contract for example. Corruption is estimated to cost about 120 billion euros per year, representing 1% of the European Union GDP (European Commission, 2014). To put this figure into perspective, it represents slightly less than the annual budget of the EU in 2014, which amounted to 143 billion euros. Globally, it is estimated to cost about $1.5 to $2 trillion per year, roughly representing 2% of global GDP (IMF [2016]). There are mulitple purpose of

bribes, but the major one appears to be for public procurement with 57% of known cases (Figure 4).

Figure 4: Purpose of the bribes

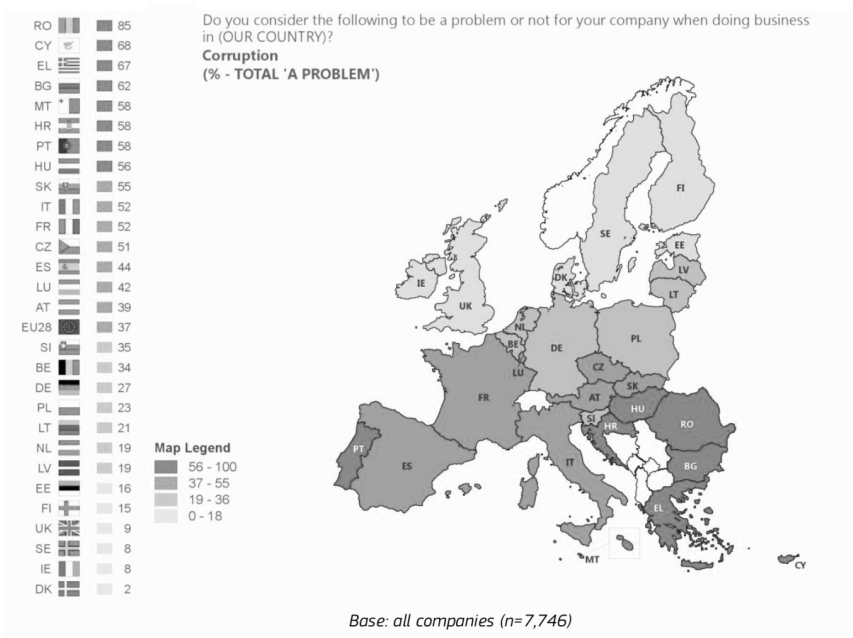


Source: OECD [2014]

Corruption in public procurement generates waste mainly due to a misallocation of the contract, higher price and/or lower quality, and a distorsion of competition. In the European Union, an average of 37% of firms consider corruption to be a problem for doing business in their countries (Figure 5). Whereas almost all Northern countries have results below the EU average, corruption seems to be a significant issue in many European countries, including the more developped ones (e.g. France).

Transparency is promoted to be a central instrument for fighting corruption in public procurement. At the award stage of public procurement, transparency is fostered through the limitation of discretion. Indeed, Burguet and Che [2004] show that a higher degree of discretion, through the use of award criteria, softens price-competition and results in higher procurement costs. On the empirical side, a strand of literature demontrates that discretion could be detrimentally used for the personal benefit of public buyers. Tran [2011] compared the impact of using first-price versus scoring auctions over the level of corruption, the latest form of auction granting more discretionary power to the public buyer. To this end, he was granted an access to

Figure 5: Country-level distribution of businesses perceiving corruption as a problem for doing business



Source: European Commission [2017b]

the internal records from a bribe-paying firm in Indochina. His results confirm that more discretion may easier grafts since the introduction of first-price auctions yield a significant decrease in the level of bribes, and deter allocative efficiency. More recently, in Italy, as Baltrunaite et al. [2018] show, tenders using negotiation are more likely to select "politically" connected firms, namely those having a local politicians among its administrators or shareholders. In the same vein, Palguta and Pertold [2017] use public procurement data from Czech Republic. They observe that the possibility of pre-selecting participants to a tenders under a particular threshold of contract value is likely to yield to a manipulation of procurement values so that the tender is below the threshold. They also observe that firms with a hidden owner are more likely to win the contract when the procurement value is manipulated.

An optimal award procedure should thereore be the result of a balance between the costs of corruption and the benefits of discretion (see Table 1 for a detailed presentation of the benefits and drawbacks of each award mechanisms). Bandiera et al. [2009]

proposes a distinction between active and passive waste in public procurement. On one side, active waste is defined as such that:

> Its presence entails direct or indirect benefit for the public decision maker. In other words, reducing waste would reduce the utility of the decision maker. The classical example is corruption in public procurement.

On the other side, passive waste is defined as such that:

> Its presence does not benefit the public decision maker. In other words, reducing waste would (weakly) increase the utility of the decision maker. [...] Another cause of passive waste, following Kelman [1990, 2005], is that excessive regulatory burden may make procurement cumbersome and increase the average price that the public body pays.

This author exploits the procurement price differences among Italian public authorities for identical goods. The results indicate that most of the observed price difference between the buyers is due to passive rather than active waste. It is noteworthy that the goods under consideration in this study are standard and do not involve a high degree of contractual complexity.

To balance between the risk of corruption and the benefit from using discretion, the EU sets a contract value threshold (hereafter the *EU threshold*) below which the Member States should determine the most suitable procedures and rules for awarding a contract, while complying with the fundamental principles of the EU public procurement (equal treatment, non-discrimination, and transparency). A contract falls below the EU threshold if its estimated value is below than the one set by the EU (Table 3.2). As soon as the value of the contract is high, the buyer shall not comply with national laws, but the EU ones instead.

In France, local authorities are allowed to abide by specific national laws when contracting below the EU threshold. In this procedure, "ways and means are freely chosen by the public buyer and should adapt to the nature and characteristics of the

Table 1: Decision matrix to support the choice of the procurement procedure

Procedures	Specific requirements for using the procedure	Stages	Minimum number of candidates	Level of competition	Workload for contracting authorities	Risk of complaints, remedies or irregularities	Incentive for innovative or tailored ideas/ products
Open	None. It can be used for all purchases.	1. Selection and evaluation	None. All interested candidates can submit a tender.	HIGH Unlimited number of tenders.	HIGH All compliant tenders must be examined by the CA and this can delay the award. Resource intensive for both the CA and the candidates who have to prepare a complete tender.	LOW Decision made with a straightforward focus on the award. Limited transparency risks as an open, transparent, competitive procedure	LOW
Restricted	None. It can be used for all purchases.	1. Prequalification 2. Selection and evaluation	All interested candidates can submit an expression of interest. At least 5 pre-selected candidates can submit a tender.	MEDIUM Limited number of candidates allowed to submit a tender. Possibility to restrict participation only to market operators with high level of specialisation.	MEDIUM Limited number of tenders to evaluate and therefore less resource intensive for the evaluation committee/ CA. Two-stage procedures might be longer in order to respect the required time limits.	MEDIUM Greater potential for collusion/corruption due to the increased exercise of discretion by the CA.	LOW
Competitive procedure with negotiation	Fulfil one or more of the following criteria: An open or restricted procedure has attracted only irregular or unacceptable tenders. The needs of the CA cannot be met without the adaptation of available solutions. The subject matter includes design or innovative solutions.	1. Prequalification 2. Negotiation and evaluation	All interested candidates may request participation in response to a contract notice. At least 3 pre-selected candidates can submit a tender	MEDIUM Limited number of candidates allowed to submit a tender. Possibility to restrict participation only to market operators with high level of specialisation.	HIGH The burden of proof for the circumstances allowing for the use of the procedure rests with the CA. The CA is highly involved in the negotiation/dialogue with tenderers. Limited number of tenders to evaluate and therefore less resource intensive for the evaluation committee/ CA. Two-stage or three-stage procedures might be longer in order to respect the required time limits.	MEDIUM Greater potential for collusion/corruption due to the increased exercise of discretion by the CA.	MEDIUM
Competitive dialogue	The technical specifications cannot be established with sufficient precision by the CA with reference to defined standards or technical requirements. The contract cannot be awarded without prior negotiations due to specific risks or circumstances related to the nature, complexity, or legal and financial matters.	1. Prequalification 2. Dialogue 3. Selection and evaluation				HIGH Greater potential for collusion/corruption due to the increased exercise of discretion by the CA. Transparency requirements are particularly challenging during the dialogue.	HIGH

Source: European Commission [2018]

Table 2: Public procurement thresholds for local contracting authorities (2006-2015)

	Supplies and services	Public works
2006-2007	€210 000	€5 270 000
2008-2009	€206 000	€5 150 000
2010-2011	€193 000	€4 485 000
2012-2013	€200 000	€5 000 000
2014-2015	€207 000	€5 186 000

needs, the number or location of firms that are likely to participate to the tender, and to the circumstances of the procurement".[8] The buyer is in particular free to define the advertising and competitive processes that are the most proportionate to the purpose, amount and circumstances of the purchase (see Table 3.1 for a detailed presentation of the characteristics of this procedure, as well as a comparison with the open auctions procedure).

The main benefits of this procedure are the possibility to directly negotiate, the possibility to adjust the deadlines to the constraints (nonexistence of a minimal number of days to submit an offer), the possibility of not specifying the weights associated to selection criteria ex ante, the possibility to choose the most appropriate publicity support, a freedom of choice regarding the contracting formalism, and the possibility to directly contact the firms to submit an offer. Also, public buyers have the possibility to select the contractor based on his experience. It is noteworthy that, in case of negotiation, the buyer has the possibility to restrict competition to a limited number of candidate firms. He is even advocated to do so since negotiating with too much candidates is a waste of time and thereby, a cost. It is admited that it is difficult for a small public buyer to directly negotiate with more than two or three candidates.[9] The restriction of competition to a pool of bidders should be notified in the call for tenders. This flexibility should lower the administrative burden of organizing a tender, thereby resulting in lower ex-ante procurement costs compared to the rigid open auctions procedure. The other ambition of this procedure is to facilitate the access of firms that are not able to participate to tenders above the formal thresholds, in particular new entrant and SMEs. Indeed, contracts above the formal threshold value require a three-year balance sheet of the firms, a document that new entrants are not able to provide. On the opposite, the adapted procedure accepts a simple official bank statement. Additionally, new entrants and SMEs are often not used to formal procedures, which results in disproportionally high costs for them. Finally, it is recommanded that the public buyer does not ask for an excessive

[8] Article 28 of the French Code for public procurement

[9] Direction des Affaires Juridiques (French Legal department), Les marchés à procédure adaptée, available at: https://www.economie.gouv.fr/files/directions_services/daj/marches_publics/conseil_acheteurs/fiches-techniques/mise-en-oeuvre-procedure/marches-procedures-adaptees.pdf

number of documents, in particular to SMEs. It is noteworthy that, under the formal thresholds, the authority is not compelled to use an adapted procedure. It has the possibility of using a formal one. In practice, below the European thresholds, French municipalities use both the adapted procedure and open auction. Ultimately, below the European thresholds, French municipalities might decide to use a very flexible award procedure in terms of degree of discretion (the adapted procedure) or a formal one (an open auction). As the adapted procedure is considered less costly for simple contracts, we should expect to observe only this type of award procedure below formal thresholds.

The Chapters 2 and 3 of this dissertation take advantage of the possibility of using an award mechanism where the public buyers is entitled with discretionnary (an adapted procedure) to adress two research questions.

First, Chapter 2 analyzes the impact of investigation for corruption over the degree of buyer's discretion used. As aforementioned, the main benefit of using discretion when awarding a contract is to reduce potential passive waste. However, room for discretion may be detrimentally used to generate active waste, which consists on corruption in this case. Therefore, we compare the degree of discretionary power in award procedures before and after a municipality is investigated for corruption. Results confirm that an investigated municipality has no interest in changing its behavior since it would not alter the outcome of the investigation and the benefits from discretionary power may still be too much valuable. Hower, one of the most important conclusion of Chapter 2 is that neighbors of investigated muncipalities do react as they appear to be less likely to use an adapted procedure, thereby giving discretionary power to the buyer, but only in cases where the neighbor is actually found guilty. This finding suggests that responsive neighbors to investigation might also be involved in the case under investigation.

Second, the Chapter 3 documents the causal effect of increasing buyer's discretion on the relative efficiency of the selected firm by combining a large database of public tenders in France with financial information on selected firms. It is assessed whether

more discretionary power make the selection of an efficient firm more likely. If the selection of more productive firms is more likely to lead to lower costs and/or better quality outcomes, then it should result in a better value for money of the contract, which is the primary objective of public procurement. Also, if public procurement is to be used has a tool to enhance productivity and growth, it is worth determining whether some type of procedure allow to select more efficient firms than others. The use of public procurement to foster productivity may be questionable if it is not cost-effective. The main result is that the adapted procedure leads to the selection of relatively less efficient firms than open auctions. As a consequence the use of a procedure with discretionnary power is likely to result in an inefficient allocation of public funds towards less efficient firms. In a second step, the analysis is extended to explain the mechanism that boils down to this finding. This chapter concludes that the selection of less productive firms in adapted procedure is explained by a misuse of discretionary power when screening bids. If the selection of more productive firms is more likely to lead to lower costs and/or better quality outcomes, discretion is then in contradiction with the main objective of public procurement, which is to get the best outcome at the lowest price. The other implication of the main result is that discretion is also in contradiction with another one potential objective of public procurement, which would be to promote productivity.

Summary of Chapters

The objective of this dissertation is to empirically investigate the use of discretion in public procurement. Public authorities may be given discretionary power for procuring goods and services in two main occasions.

First, the authority has a discretionary power when choosing between in-house or private provision. This organizational choice should be explained by transaction attributes (asset specificity, contractual complexity and incompleteness), but also by other factors such a ideology and economic efficiency. As detailed in this General Introduction, even though the literature has extensively attempted to analyze the de-

Table 3: Main characteristics of the adapted and the open auction procedures

	Adapted procedure (*procédure adaptée*)	**Open Auction**
EU Threshold	Below.	Below or above.
Is negotatiation possible ?	Yes (but not mandatory), over **all** aspects.	Not possible on any aspect.
Publicity	- If the value of the contract <90,000€: mandatory, but publication is not. Free choice of publicity support. - If the value of the contract >90,000€, should be published in an official journal.	Should always be published in an official journal.
Consultation documents	Could be limited to the main characteristics of the awarding mechanism, to the condition of the negotiation, and to the selection criteria of the submitted tenders. The redaction of technical specifications is not mandatory, but recommended.	Very detailed and specific.
Submission deadline	Free choice.	Minimum of 52 days.
Proof of the firm's financial capabalities	Not mandatory. The participation of new firms (less than 3 years) is possible since they can provide a bank statement rather than a three-year balance sheet.	At least the turnover from the past three years.
Candidates' experience	Can be requested.	Cannot be requested.
Weighting of awarding criteria	Not mandatory.	Mandatory.
Restricted pool of candidates	Possible.	Not possible.
Awarding commission	Not mandatory.	Mandatory.
Immediate notification to the rejected participants	Not mandatory.	Mandatory.
Standstill[1]	Not mandatory.	Minimimum of 16 days.
Publication of the award notice	Not mandatory.	Mandatory.

[1] The standstill is a suspensive deadline between the annoucement date of the awarding notice and the signature of the contract. It allows for the rejected candidates to contest the ways the awarding process was conducted.

Source: Legifrance, Circulaire du 29 décembre 2009 relative au Guide de bonnes pratiques en matière de marchés publics, 2009, available at: https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000021570204
Direction des Affaires Juridiques, Les marchés à procédure adaptée, 2015, available at: URLhttps://www.economie.gouv.fr/files/directions_services/daj/marches_publics/conseil_acheteurs/fiches-techniques/mise-en-oeuvre-procedure/marches-procedures-adaptees.pdf
EDT, Vade-Medum MAPA, 2010, available at: http://www.achatpublic.info/sites/default/files/document/documents/guide_MAPA_ETD_1.pdf?from=base-documentaire&page=228

terminants of privatization, a few studies has been exclusively devoted to explaining switches from one mode of governance to another. The first chapter of this dissertation is dedicated to the analysis of the determinants of both remunicipalization (a switch from private to in-house provision of a public service) and privatization (a switch from public to private provision) for the water distribution services through the lense of transaction-cost economics but also economic efficiency, politics, and fiscal stress.

Second, when public services are privately provided, public authorities may be entitled to use discretion for awarding a contract (the use of an "adapted procedure" in France). This is the case when the value of the contract is below the EU formal threshold. We take advantage of this discretion of choice between using an open-auctions mechanism and an adapted procedure in France in the second and third chapters of this dissertation. As discretion makes corruptive behaviors more likely, the second chapter assesses the impact of suspicion of corruption in public procurement on the choice of award mechanism, but also on the *ex-post* outcome of the tender when a higher degree of buyer discretioary power is allowed. Finally, the third chapter assesses whether discretionary power makes the selection of an productive firm more likely.

The rest of this dissertation is organised in the following way. We subsequently provide a concise summary of each chapter. The first chapter consists of assessing the determining factors in the decision to switch from one mode of governance to another one. The second chapter aims at investigating the impact of suspicion of corruption over the degree of buyer's discretionary power adopted in an award procedure. The third chapter analyzes whether discretionary power makes the selection of an productive firm more likely. A final section concludes with policy recommendations and discusses the limitation of this dissertation.

Chapter 1. Still waters run deep: remunicipalizations and privatizations, or when local governments disrupt the status quo.

Transaction cost economics (TCE), derive firm boundaries as an efficient response to market transaction costs (Bresnahan and Levin [2012]; Lafontaine and Slade [2007]). By extension, they give predictions on make-or-buy issues for public services. TCE predicts a relationship between the underlying features of transactions and the observed decision to make or to contract out. Considerations of asset specificity as well as contractual complexity are then central (Levin and Tadelis [2010]). As a result, some services are customarily provided in a way that usually remains the same. However, it could be the case that public entities decide to disrupt the statu-quo by swicthing to another mode of provision of a public service. The literature identifies two main reasons for this. First, transaction costs may vary across municipalities for an identical service. Second, they may not not appear to be the only factor explaining the choice of governance. We refer to the switch from a private to a public provision as a remunicipalization, whereas a switch from public to private is refered as a privatization.

In this chapter, we address the question of remunicipalization and more broadly the question of organizational switches using a new dataset on water services in France. By gathering information on the 1998-2015 period concerning the way that more than 4 200 French municipalities are organizing their water services, at contract renewal time, we identified nearly 300 remunicipalization cases. We also identified more than 200 cases of privatization.

We use an endogenous switching regression model in a two-stage probit estimation to obtain consistent estimators that account for the existence of potential endogeneity. Our efficiency indicators consist on measuring the extent of an *overprice* and an *overleak*, as calculated as the difference between the price (*resp.* leak) actually observed in a municipality and a counterfactual price (*resp.* leak) that would have prevailed under another mode of provision. Our results suggest that municipalities' decisions to remunicipalize a water service are connected to expectations concerning efficiency toward prices (the *overprice*), except for small municipalities. Our other measure of efficiency, the *overleak*, also has a positive effect over the probability to remunicipalize. We also find evidence of mimetic behaviors since we find a positive

and signficant effect of the number of remunicipalizations that took place in the neighborhood, but this positive effect disappear for medium and large municipalities. This suggests that municipalities that are uniformed or not skilled enough to anticipate the consequences of their choice on pricing and leakage may rely on the observed decisions of neighboring municipalities.The determinants of privatization are pretty similar to those we observe for remunicipalization. Indeed, privatization gets more likely as the *overprice* becomes larger, even though this effect is weaker in magnitude than for the decision to remunicipalize. The *overleak* has also a positive and significant effect, but we do not observe any additional effect as the municipality gets larger.

Chapter 2. All for One and One for All! How Do Corruption Investigations Affect Municipalities' Public Procurement Choices?

Corruption is a significant issue in the European public procurement. It is particulary costly since it generates inefficiencies mainly due to a misallocation of the contract, higher price and/or lower quality, and a distorsion of competition. To prevent corruption, but also in order to foster competition and fair prices, the economic litterature advocates the use of open auctions (Bulow and Klemperer [1996]). Indeed, corruption is possible to the extent that there is some room for discretion.

However, the choice of the award mechanism is usually guided by a trade-off between giving discretion to reduce excessive regulatory burden of public procurement, and promoting transparency through open auctions to reduce possibilities of corruption. This is the reason why, in Europe, the risk of passive and active waste is balanced with the introduction of a contract value threshold below which the public buyers have the possibility to use discretion. Indeed, as the value of the contract increases, the temptation and gains from bribes gets larger. In France, public buyers have the possibility to use of an "adapted procedure" (*procédure adaptée*) below this threshold. It offers a high degree of discretionary power to the public buyers.

The objective of this paper is to assess the impact of investigation of corruption,

as defined by the opening of a judicial investigation, on procurement award mechanisms in municipalities. First, we compare the degree of discretionary power used in award procedures before and after a investigation is publicly raised in the local press. Corruption is more likely when a public authority uses an award procedure that allows for discretionary power. Second, we assess whether investigation of corruption triggers any change in the competitive environment (i.e., the number of participants to the tender) and in the location of winning firms (i.e., the choice of a local firm) when discretion is involved. All these potential effects of investigation are considered for both the investigated municipalities but also for the neighboring municipalities, the latter being not under investigation. To this end we use a differences-in-differences strategy over a collection of procurement award notices of French municipalites between 2006 to 2015. We also collected cases of corruption in public procurement by scrapping the regional press. We ultimately consider 87 cases that took place between during this period.

Our results indicate than an investigated municipality does not react by opting for more formal and rigid award mechanism (open auctions). However, it appears that only neighbors of municipalities that are eventually found guilty change their behavior as they are less likely to use an adapted procedure, thereby giving discretionary power to the buyer. This finding suggests that responsive neighbors to investigation might be also involved in the case under investigation. Finally, when awarding a contract using adapted procedures, we observe that only investigated municipalities that are eventually found guilty do attract more participants as well as more distant (i.e. less local) bidders compared to other municipalities.

Chapter 3. Buyer's discretionary power and the selection of efficient firms in public procurement

As stated by the OECD, *"[G]overnments are increasingly recognising the immense power of public procurement to solve global societal challenges, improve productivity and boost innovation, while ensuring value for money"*. Whereas the economic liter-

ature has extensively assessed the capability of public procurement to solve societal issues and to be a tool for innovation, its relationship with the productivity has been neglected so far. In particular, since there is a multiplicity of ways to award a contract to a firm, it is plausible that this relationship differs accordingly.

By combining a large database of public tenders in France with financial information on firms, this paper compares the productivity of suppliers selected in competitive tenders organized by public buyers. We exploit the possibility for a public buyer to select between two types of award procedures below a contract value threshold. First, contracts could be awarded through open auctions, whereby buyers are highly constrained by accurate rules on how to organize the tender and select the supplier. Second, public buyer can use a procedure granting him discretionary power (e.g. possibility to negotiate and to restrict competition, flexibility on terms of publicity support), the "adapted procedure" (*procédure adaptée*).

We evaluate whether an award procedure that allows for discretionary power results in the selection of more or less productive firms than a selection procedure that does not. Using a two-step procedure to solve the potential endogeneity of the choice of the awarding mechanism, we assess whether the use of an adapted procedure makes the selection of a more productive firm more likely compared with an open auction. Our main result is that the adapted procedure leads to the selection of relatively less efficient firms than open auction. We extend our analysis to explain the mechanism that boils down to our results. We conclude that the selection of less productive firms in adapted procedure is explained by a misuse of discretionary power when screening bids. If the selection of more productive firms is more likely to lead to lower costs and/or better quality outcomes, discretion is then in contradiction with the primary objective of public procurement, which is to get the best outcome at the lowest price. The other implication of the result is that discretion is also in contradiction with one potential secondary objective of public procurement, which would be to promote productivity.

Table outline

In Tables 4 and 5, we summarize the research questions, the data and the methodology used as well as the main results from each chapter of this dissertation.

Table 4: Summary of chapters: Research Questions, Methodology and Main Results (Part 1)

Chapter	Methods and Data	Main results
Chapter 1: Still waters run deep: remunicipalizations and privatizations, or when local governments disrupt the status quo.	- Econometrics: Two-step estimation with endogenous switching model as a first step and probit model as a second step.	- Municipalities decisions to remunicipalize as well as to privatize a water service are connected to expectations concerning efficiency toward prices (the *overprice*) but also toward leaks (the *overleak*).
Research Question: What are the factors explaining switches of organizational modes (remunicipalization and privatization)?	- Dataset on the organization of distribution of water services for more than 4,200 French municipalities from 1998 to 2015.	- Decisions to switch from one regime to another are also determined by mimetic behaviors, but only for small municipalities.
	- Estimation of two efficiency indicators (*overprice* and *overleak*), calculated as the difference between the price (*resp.* leak) actually observed and a counterfactual price (*resp.* leak) that would have prevailed under another regime.	- Municipal-level variables (e.g. fiscal stress, unemployement, ideology) are not determinant.
	- Sources: French Environment Institute (IFEN-SOeS), French Agency for Water (ONEMA), French Health Ministry (DGS).	
Chapter 2: All for One and One for All! How Do Corruption Investigations Affect Municipalities' Public Procurement Choices?	- Econometrics: Differences-in-differences, logit, OLS, negative binomial regressions	- Investigated municipalities do not react by opting for more formal and rigid award mechanism (open auctions).
Research Question: What is the impact of investigation of corruption, as defined by the opening of a judicial investigation, on procurement award mechanisms in municipalities?	- 64,000 award notices of French municipalities from 2006 to 2015.	- Neighbors of investigated municipalities that are eventually found guilty do react by opting for more formal and rigid award mechanism (open auctions).
	- 86 cases of corruption in public procurement collected in the local press from 2006 and 2015.	- Only investigated municipalities that are eventually found guilty do attract more participants in their adapted procedures.
	- Sources: InfoPro Digital, Europresse.com	- Investigated municipalities do select more distant (i.e. less local) suppliers compared to other municipalities in adapted procedures. This effects is especially driven by municipalities that are eventually found guilty.

Table 5: Summary of chapters: Research Questions, Methodology and Main Results (Part 2)

Chapter	Methods and Data	Main results
Chapter 3: Buyer's discretionary power and the selection of efficient firms in public procurement.	- Econometrics: IV regression, logit	- The use of adapted procedure leads to an inefficient allocation of public money towards less efficient firms through the selection of less productive firms.
Research Question: Does the use an award procedure with discretionary power makes the selection of an efficient firm more likely?	- 64,000 award notices of French municipalities from 2006 to 2015. - Firm-level dataset containing financial information on European firms (Amadeus). - Sources: InfoPro Digital, Bureau van Dijk	- The selection of less productive firms in adapted procedures is explained by a misuse of discretionary power when screening bids.

CHAPTER 1

Still waters run deep: remunicipalizations and privatizations, or when local governments disrupt the status quo.*

1.1 Introduction

Contractual theories, and especially transaction cost economics (hereafter *TCE*), derive firm boundaries as an efficient response to market transaction costs (Bresnahan and Levin [2012]; Lafontaine and Slade [2007]). By extension, they give predictions on make-or-buy issues for public services. TCE predicts a relationship between the underlying features of transactions and the observed decision to make or to contract out. Considerations of asset specificity as well as contractual complexity are then central (Levin and Tadelis [2010]). As a result, some services are customarily provided in a way that usually remains the same. Since both theoretical and empirical studies confirm that in-house provision is recommended in case of transactions involving high asset specificity and contractual complexity, we should therefore ob-

*This Chapter is based on a joint work with Simon Porcher and Stéphane Saussier. We are grateful to Francesco Decarolis, Philippe Gagnepain, Marian Moszoro, Brian Silverman, Giancarlo Spagnolo, Pablo Spiller, and Carine Staropoli for their precious and helpful comments. We also thanks the participants of the 6th Florence Conference on the Regulation of Infrastructures, of the 66th annual congress of the French Economic Association (AFSE), and of the 21st Annual Conference of the Society for Institutional & Organizational Economics (SIOE).

serve no variation across municipalities and no switch in a municipality across time in the mode of governance of a public service with identical characteristics.

However, it could be the case that public entities decide to disrupt the statu-quo by switching to another mode of provision of a public service. The literature identifies two main reasons for this. First, transaction costs may vary across municipalities for an identical service. Second, transaction costs do not appear to be the only factor explaining the choice of governance. In particular, the literature has extensively made attempt to find out the determinants other than transaction costs that may explain privatization (political patronage and fiscal stress). Finally, even though the literature has extensively attempted to analyze the determinants of privatization, there is usually no clear consensus about the extent to which each class of factor is determinant in the choice of governance, and a few studies has been exclusively devoted to switches from one regime to another for a public authority. In this paper, we refer to the switch from a private to a public provision as a remunicipalization (also refered to as "reverse privatization" in the literature), whereas a switch from public to private is refered as a privatization.

Remunicipalization is a growing phenomenon in industrialized countries. Hefetz and Warner [2004] show that in the US, remunicipalization increased from 12% in the 1992-1997 period to 18% of all government service delivery from 1997 to 2002. This phenomenon is especially widespread in the public water services space, as illustrated by the cities of Berlin, Paris and Hamburg in Europe and Atlanta in the United States, where remunicipalization of water services took place during the last decade. In a recent book, Kishimoto et al. [2015] found that between 2000 and 2015, more than 200 cases of water remunicipalization took place in 37 countries. The number of cases doubled in the 2010-2015 period compared with the 2000-2010 period, illustrating a remunicipalization tendency, especially in high-income countries, where the majority of remunicipalizations took place. Although many empirical works have analyzed the reasons why public authorities privatize their public services, a few have been devoted to the decision to remunicipalize. Since a switch from private to public management may not entail the same cost and

complexity as a switch from public to private, it is important to determine whether the determinants of both privatization and remunicipalization differ.

The case of France is particularly interesting. For more than a century, private provision has been the rule more than the exception in the French water sector (more than 70% of the population is served by private water utilities). However, there is a new tendency towards remunicipalization, as illustrated by the remunicipalization of public water services in the city of Paris in France in 2009. As mentioned by Kishimoto et al. [2015], nearly 50% of the cases of remunicipalization observed worldwide by them took place in France. It is thus interesting to find out why a system that has been in place for a long time – the privatization of water services – seems to be put into question now, as well as to investigate what the main drivers of remunicipalizaton are. Specifically, the objective of this paper is to determine to what extent the search for an efficient provision of water distribution services drives the decision to switch from one regime to another.

This new tendency for remunicipalization may have several explanations that could be drawned from the literature on privatization. It is fair to say that studies looking at the relative efficiency of public versus private management of public services leads to mixed conclusions. Usually, empirical works use three classes of factors to explain the decision to privatize namely, fiscal restrictions, economic efficiency, and political interests and ideological bias (Bel and Fageda [2008]). Fiscal stress is usually expected to positively influence the likelihood of privatization. While López-de Silanes et al. [1997], Brown and Potoski [2003], and Hebdon and Jalette [2008] find a significant effect, Miralles [2009] and Bel and Fageda [2008] do not find any significant influence. The literature has also extensively used political and ideological variables for explaining the decision to privatize. Also in this case, there is no clear consensus about the influence of those variables. Whereas there seems to be a consensus about the impact of interest groups over the choice to privatize (Levin and Tadelis [2010]; Miralles [2009]), the impact of ideology is still not clear (Bel and Miralles [2003], Bel and Fageda [2008],Picazo-Tadeo et al. [2012], Sundell and Lapuente [2012], Beuve and Le Squeren [2016]). Finally, factors explaining the

decision to privatize through economic efficiency factors are usually related to cost reductions. In theory, when choosing between contracting in-house or privately, the municipality should account for the two main dimensions of the TCE, namely, asset specificity and contractual complexity (Williamson [1985], Levin and Tadelis [2010]). On the one hand, asset specificity describes the condition where the assets cannot be redeployed to alternative users or uses without loss of productive value (Williamson [1985], Klein et al. [1978]). Situations where asset specificity is strong may lead one of the parties being locked in this contractual scheme. On the other hand, contractual complexity refers to the contract completeness. Complexity is made of two main dimensions: the measurability of ex-post performances and the need for flexibility leading to high contractual costs if privatization is chosen. Therefore, public ownership is more likely as asset specificity and contractual complexity get stronger (Brown and Potoski [2003], Levin and Tadelis [2010]). Other dimensions, such as sensitivity to quality, should be accounted for. As Hart et al. [1997] show, in the case of private provision, the contractor typically has too strong incentives to reduce costs which consequently has an adverse effect over the quality. Also, the government needs to engage in negotiations with the private operator if he wants to improve the quality level. They advocate to use in-house provision when non-contractible cost reductions deteriorate quality, and when quality innovations are not an important dimension of the service. In this respect, the water sector does not appear to be relatively subject to transaction-cost issues. As explained in Chong et al. [2015], water services are made of quality dimensions[1] that should strictly refer to a list of national standards. Therefore, measuring and monitoring service quality is relatively not difficult. However, when privately provided, water distribution services are likely to be subject to a potential hold-up issue. Even though the physical assets related to water distribution remain the property of the public entity in the case of privatization, there could be lock-in effects due to the duration of the contracts. Indeed, in France, those contracts are usully awarded for

[1]In the European Union, the quality standards for tap water is framed by the 98/ 83/CE Directive. It defines 64 quality parameters fixing threshold for the amount of bacteria and chemicals. It is estimated that 96% of French households have access to tap water that meets the quality standards.

an average duration of 12 years due to the specificity and the high value of the assets. Therefore, it would be costly in terms of transaction costs to switch from a private to a public provision of water services. We should accordingly observe a few number of remunicipalizations (Masten [2002]), and only in the case where the inefficiencies are so high that is it worthy to entail such transaction costs. Indeed, this is the case in France where we observe only 300 remunicipalizations over a total of 15,000 services. There is still no clear consensus about the effect of privatization over the cost of providing the service, especially when accounting for potential transaction costs. The relevance of those economic factors should even be more important in the case of remunicipalization, since we expect to observe more transaction cost issues than in the case of privatization.

In this paper, we address the question of remunicipalization and more broadly the question of organizational switches using a new dataset on water services in France. By gathering information on the 1998-2015 period concerning the way that more than 4 200 French municipalities are organizing their water services, at contract renewal time, we identified nearly 300 remunicipalization cases. We also identified more than 200 cases of privatization. In order to investigate why municipalities decide to switch from one regime to another, we focus on efficiency indicators (i.e., pricing and leakage) as well as on other indicators that may capture the willingness of municipalities to pursue other objectives (i.e., political party, debts, unemployment levels at the municipality level) or their lack of information (i.e., mimetic behavior). Our efficiency indicators consist in measuring the extent of an *overprice* and an *overleak*. They are calculated as the difference between the price (*resp.* leak) actually observed in a municipality and a counterfactual price (*resp.* leak) that would have prevailed under another mode of provision. We use an endogenous switching regression model in a two-stage probit estimation to obtain consistent estimators that account for endogeneity and simultaneity issues.

The closest empirical analysis to this work is the one from Chong et al. [2015]. Using French data on water distribution services from 1998 to 2008, they first identify average differences in price and quality of water between public and private provision,

but also between small and large municipalities. Second, they analyse whether, at the termination of a contract, a municipality that privately provided water services renews the incumbent provider, switches to a new operator, or switches to public provision. They find that water prices are (slightly) higher when municipalities choose to go private, but this effect is true only for small municipalities (i.e., less than 10,000 inhabitants). They also find that efficiency considerations partly drive the decision to remunicipalize for large municipalities, suggesting that these considerations are important for those municipalities but may not be for smaller ones. However, our paper extent their definition of economic efficiency by adding to the price dimension a quality dimension which is approximated by the extent of leaks. By doing this, we open the room for an explanation of pendulum effect that is not present in their paper. More precisely Chong et al. [2015] mention that a municipality may wrongly decide to go private and then remunicipalize because of higher prices. In this paper we offer another explanation, which is that public authorities may go to private provision for reducing the leak as private contractor are more likely to invest in the network improvement, but potentially at the cost of a higher price. Indeed, there could be some antagonistic objectives between price and leak that may influence the mode of governance of water distribution services. Indeed, we observe that under in-house provision, prices are lower than under a private regime by an average value of 0.12 euros per cubic meter (Table 1.1). However, in-house provisions yields in average 3.8 percentage points more of leaks than private management. Therefore, it is plausible that the choice of one regime is made to the detriment of one of our two dimensions of efficiency. We also do not consider only switches from private to public provision, but also those from public to private. The time frame is expanded, since we focus on the 1998-2015 period. Finally, our empirical strategy account for the potential source of endogeneity between the choice of the organizational choice and our variables related to the economic efficiency.

Our results suggest that municipalities' decisions to remunicipalize a water service are connected to expectations concerning efficiency toward prices (the *overprice*), except for small municipalities. Our other measure of efficiency, the *overleak*, also

has an effect over their mode of provision since municipalities where we observe an overleak are more likely to remunicipalize. This dimension is even more important for large municipalities. We also find evidence of mimetic behaviors since we find a positive and signficant effect of the number of remunicipalizations that took place in the neighborhood, but this positive effect disappear for medium and large municipalities. This suggests that municipalities that are ignorant or not skilled enough to anticipate the consequences of their choice on pricing and leakage may rely on the observed decisions of neighboring municipalities.The determinants of privatization are pretty similar to those we observe for remunicipalization. Indeed, privatization gets more likely as the overprice becomes larger, even though this effect is weaker in magnitude than for the decision to remunicipalize. The overleak has also a positive and significant effect, but we do not observe any additional effect as the municipality gets larger. Finally, the prevalance of privatization in the neighborhood has a positive influence, but we do not observe any additional positive effect as the municipality gets larger. It is noteworthy that the marginal effect from the prevalance of privatization is very small compared with the one observed in the case of remunicipalization.

Overall, we observe that the extent of the overprice and the overleak should be larger for the municipality to decide to remunicipalized compared with the decision to privatize. This result is consistent with the fact that remunicipalization may entail more transaction costs than privatization and should accordingly take place only when the transaction costs would be compensated by a price and/or a leak reduction when switching to in-house provision. However, we do not observe any pendulum effect whereby the municipality decides to remunicipalize because of an overprice, but to the detriment of an increase in the leaks (since municipalities with in-house provision have more leaks in average but lower price than private provision).

The paper is organized as follows. Section 3.3 introduces the institutional context. Section 1.3 develops the hypotheses of the paper, and section 3.4 presents the dataset and the empirical strategy. Section 3.6 comments on the results. A brief conclusion follows in Section 1.6.

1.2 Remunicipalization in the French Water Sector

1.2.1 The Institutional Environment

In France, as in most European countries, municipalities must provide local public services that have public good characteristics, such as water, electricity, transportation, and heating. Municipalities monitor prices, control the entry and exit of firms into the market, organize competition, and ensure uninterrupted service. If the responsibility for public services provision and the ownership of infrastructure are always public, however, the management of such services can be either public or private. Although some municipalities manage production through direct public management and undertake every operations and investments needed for the provision of the service, the dominating organizational form is private management. Under private management, the main contractual form is a lease contract in which the operator manages the service, invests in the network and gets financial compensation through consumer receipts. This institutional context is relatively similar to that observed in Italy, Spain and the United States at a different scale.

In France, water provision contracts are awarded following a two-step procedure. The local authority that decides to contract out the management of the public service of water launches a tendering procedure specifying selection criteria that will eventually help to rank the offers. In the first step, private operators submit a statement of interest before submitting a detailed bid for the contract. In the second step, the public authority shortlists candidates and negotiates with them. At the end of the negotiation, the public authority chooses its partner. The selected firm to manage the public service benefits from a local monopoly position for the duration of the contract. At the end of the contract, there is either a new tendering procedure or a remunicipalization of the water distribution services.

Contrary to many OECD countries, there is no price-cap or rate-of-return regulation for water utilities in France since there is no national regulator. Such regulation has

been replaced by a regulation by contract in the case of a private operator, or a decision of the municipality board in the case of public management. Price setting is different whether the local community has chosen to outsource the service or not. Under direct public management, the municipality council designs rates in order to generate revenues that allow the utility to cover its costs. French legislation requires the water utility budget to be balanced following the so-called "full-cost pricing" (or "water pays water" principle), which is similar to what is observed in the United States. Prices are thus set to cover operating and capital costs, and no payment for water provision may be diverted to other uses. No subsidies can be used, regardless of the governance form used. Under private management, the rate structure is determined by projecting financial accounts provided by the operator over the duration of the contract. The contract includes periodic revisions of water rates using a price index adjustment formula. The relationship between the local municipality and the firm is formalized by means of a contract that specifies a price structure, a formula of price revision and negotiated clauses allowing for exceptional conditions (e.g. a need for general purge of the water distribution network in case of pollution). The successful bidder benefits from a local monopoly for the contract duration. At the renewal time of the contract, the municipal authority either chooses to put a new contract to tender, in which case there is a new round of competitive bidding, or to remunicipalize.

One final interesting feature of the French water sector is that all infrastructure remains the property of the municipality. Contracts with private operators can stipulate specific infrastructure improvements to be carried out by the private operator and can specifiy that the private operator will maintain infrastructure to keep water loss below specified levels. The cost of the requisite work is priced into the operator's contract bid. Thus, when a municipality decides to remunicipalize, there is no payment required from the public authority to the incumbent private operator.

1.2.2 Remunicipalizations: Evidence

Figure 1.1 shows the total number of contract renewals and distinguishes between the privatizations and remunicipalizations observed in our sample from 1998 and 2015 (the dataset will be presented in detail in the next section). The overall tendency of privatizations versus remunicipalizations shows that there have been some cycles of privatizations (1998-2001) and remunicipalizations (2005-2015). Overall, we observe more remunicipalizations than privatizations, 290 versus 236, respectively, between 1998 and 2015. In addition, it should be noted that the population affected by remunicipalization is more important than affected by privatization. Over the 1998-2015 period, remunicipalizations affected more than 4.4 millions inhabitants, while privatizations affected only 1.3 million inhabitants

As mentioned above, a public authority using direct management and willing to contract out the management of the public service can launch a tendering process. Similarly, a public authority under private management can either launch a tendering procedure or remunicipalize the public service at the end of a contract. Both switches are possible but remunicipalization is more predisposed to a potential hold-up issue. Even though the physical assets related to water distribution remain the property of the public entity in the case of privatization, there could be lock-in effects due to the duration of the contracts. Indeed, in France, those contracts are usully awarded for an average duration of 12 years (contract duration ranges from 8 to 20 years) due to the specificity and the high value of the assets. Therefore, it would be costly in terms of transaction costs to switch from a private to a public provision of water services. We should accordingly observe a few number of remunicipalizations (Masten [2002]), and only in the case where the inefficiencies are so high that is it worthy to entail such transaction costs.

Also, remunicipalization could be complex because of a lack of skills for managing the service. To circumvent this issue, public authorities usually offer to hire the staff previously in charge of the service to maintain the level of knowledge of the service in the area. Some staff might, however, decline the job offer, and the local

authorities will need to hire other staff or subcontract part of the service to private firms.

1.3 Remunicipalizations: Drivers and Propositions

1.3.1 Efficiency Considerations

At the time of contract renewal, the decision to remunicipalize is very similar to the traditional make-or-buy decision that has been widely studied in organizational economics for private transactions. Theoretical frameworks designed to tackle make-or-buy issues and contracting strategies between private firms may have provided some of the clearest insights into the issues related to contracting with governments (de Bettignies and Ross [2009]). From an economic point of view, transactors that are looking for economic efficiency will choose to contract out if the expected gains (net transaction costs) from doing so are greater than those from organizing the transaction internally. However, as stated by Masten and Saussier [2000], "The returns transactors expect from governing their transactions in different ways are difficult, if not impossible to observe."

As noted before, there is no regulator in the water sector in France. In theory, the role of such a regulator would be to determine if the observed prices paid by end-users are justified depending on the costs of identical water services. Through yardstick competition techniques (Shleifer [1985]), municipalities could achieve the same result. Such techniques may even compare the performances obtained from heterogeneous services as long as heterogeneities in water services are accounted for. Each service would be then compared to a "shadow service" constructed from suitably averaging the choices of other comparable municipalities.

Proposition 1. *Municipalities that are looking for efficiency should build their decisions to remunicipalize (or privatize) on available information. When their observed performances are lower than those of comparable water services, they should accordingly change their organizational choice.*

Proposition 1 states that informed municipalities should base their decisions to remunicipalize on their relative performances. In order to determine if municipalities achieve a fair level of efficiency compared to what other services in other municipalities are achieving, benchmarking methods can be used by municipalities to determine what their efficiency should be, taking into account all the available information. A municipality that reaches the conclusion that their water services are inefficient, if provided through private management (public management), should decide to remunicipalize (privatize).

1.3.2 Information Considerations

Even if information is available, some municipalities may not have enough resources or capacity to treat the information and develop simple benchmarking methods in order to determine their efficiency level (i.e., what could be gained from changing their organizational choices). In such a situation, municipalities may base their decisions on the only available information, that is the choices made by neighboring municipalities.

Proposition 2. *Municipalities that are looking for efficiency should build their decisions to remunicipalize (or privatize) on available information. When municipalities cannot assess if their observed performances are lower than that of comparable water services, they should base their decision on observable choices made by other informed municipalities.*

Proposition 2 states that mimicking behaviors due to a lack of information (Brown and Potoski [2003]) may drive the decision whether to remunicipalize (privatize) a service that was previously contracted out (provided in-house). Such behaviors can be rational, and analyzed as a delegation of decisions or a weak form of yardstick competition. As stated by Aghion and Tirole [1997], when a principal is not informed, it might be efficient to let an agent decide as long as he has a higher probability to be informed and his objectives are congruent with those of the principal. Uninformed municipalities can rationally base their decisions on the observed

decisions made by other supposedly informed municipalities that are looking for efficiency. This neighboring effect has been considered as a potential factor influencing the decision to privatize public services (Christoffersen and Paldam [2003], Bel and Miralles [2003], Miralles [2009]). They found that public authorities surrounded by others that had previously privatized the service are relatively more likely to privatize it.

1.3.3 Political considerations

Even if propositions concerning the way that public authorities are managing their water services can be built on contract theories, public contracts differ from private ones, and their specificity should be taken into account. As stated by Spiller [2008]:

> A fundamental difference between private and public contracts is that public contracts are in the public sphere, and thus, although politics is normally not necessary to understand private contracting, it becomes fundamental to understanding public contracting.[2]

Because water contracts are, by nature, public contracts, it is reasonable to believe that considerations other than economic efficiency, such as political considerations, may drive municipalities' decisions. Le Squeren and Moore [2016] showed, for example, that public contracts are more often renegotiated around election time and that the political leaning of the municipalities is an important driver of the decision to provide a public service through direct public management or through private management.

Proposition 3. *The decision to remunicipalize (or privatize) a public service may be driven by political considerations such as stakeholder pressure (consumer associations, citizens perceptions) or municipalities' private agendas around election time.*

Proposition 3 states that in order to understand remunicipalizations, it is necessary to consider a broader set of drivers than only efficiency considerations would suggest.

[2] pp.45

The timing of the decision (i.e., near or far from election time) as well as the political leanings of the municipalities may be important drivers.

1.4 Dataset and Empirical Strategy

1.4.1 Dependent Variables

Remunicipalization and the privatization of water services

In order to investigate the determinants of remunicipalization, we merged three datasets: data from the French Environment Institute (IFEN-SOeS), the French Agency for Water (ONEMA) and the French Health Ministry (DGS). The unit of observation is a municipality. IFEN-SOeS collected data from roughly 5,000 water authorities four times in 1998, 2001, 2004 and 2008. The sample represents more than 75% of the entire French population for which services are provided and is representative of the total population of French municipal public water authorities. Starting in 2008, ONEMA collected data on every existing French water service on a yearly basis until 2015.

One of the main factors provided in the dataset is about whether the distribution of water services is provided in-house or privately. Because we observed municipalities' choices through time, we can track remunicipalizations and privatizations throughout the period of analysis. Based on this information, we define our two main dependent variables, *Remu* and *Privatization*, which take a value of 1 when we observe a switch from private to public or public to private management, respectively.

After removing observations with missing values for our explanatory variables (our explanatory variables are presented later in section 4.2), we obtain a dataset of 18,778 observations, in which there are 10,033 cases of private provisions and 8,745 of in-house provisions. Restricting our sample only to contract renewals and remunicipalization cases over the period 1998-2015 (i.e., remunicipalization can only

occur when a contract comes to an end, that is to say, at renewal time), we end up with 1,404 expiring contracts, of which 166 are cases of remunicipalization. The remaining 1,238 contracts are related to municipalities keeping private provision of water distribution services. Similarly, considering only cases of privatization and in-house provision, we end up with a total of 8,694 observations, of which 115 are switches to private provisioning and 8,579 cases of public management. Table 1.3 provides an overview of these sub-samples.

Water service performance

In addition to organizational choices, our data provide two performance indicators: the prices paid by end-users (deflated) and the leak ratio. The price paid by end users in a given municipality and the cost of providing the water service are intertwined (cross-subsidies are not allowed). The leak ratio observed in a given municipality's network is a good proxy of the investment efforts made to reduce water losses. These two factors build our *Price* and *Leak* variables. The empirical literature does not usually consider the leak ratio as an efficiency dimension. However, in reality, this is an important criteria for public authorities for assessing the efficiency of water distribution services. Indeed, reducing water leak is an important stake in France. Indeed, leaks are estimated to represent about 1.3 billions of water waste every year.[3]

Basic statistics concerning the efficiency of water services show that private and in-house management significantly differ in terms of our main variables of interest, namely, price and leakage. Table 1.2 shows that on average, the distribution of a cubic meter of water is significantly more expensive under private provision (on average by an additional 0.14 euro), whereas in-house management seems to be less efficient regarding the maintenance of the network as leaks are on average 4 points higher than under private management.

[3]60 millions de consommateurs, "Eau : le grand gaspillage qui va coûter très cher", March 20, 2014, available at: https://www.60millions-mag.com/2014/03/20/eau-le-grand-gaspillage-qui-va-couter-tres-cher-7923

1.4.2 Explanatory Variables

Water service heterogeneity

In order to test proposition 1, we need to construct variables assessing heterogeneity in water services. Indeed, the observed performances may be influenced by local characteristics of the water service. One main driver of observed performances is the water treatments at the municipal-level needed to produce water, which is why we control for water treatment complexity. Following the definition of the French Health Ministry, we distinguish between six types of treatments (ranked by degree of complexity, mixed treatment being more complex): no treatment (*Water Treatment 0*); a simple disinfection (*Water Treatment 1*); an average disinfection (*Water Treatment 2*); a heavy disinfection (*Water Treatment 3*); or mixed treatments including a heavy treatment (*Water Treatment 4*) or only light and average treatments (*Water Treatment 5*). We also control for the origin of the water. Raw surface water is usually associated with a higher risk since it is more easily polluted than underground water (*Surface*).

Scale economies are approximated by the number of inhabitants (*Pop*) and the density of the network (*Density*). We add a control for tourist areas with variable *Touristic*, which is a dummy variable capturing whether the city is considered a tourist attraction or not following the French National institute of Statistics and Economic Studies (INSEE) definition. Touristic areas are usually characterized by oversized networks that can positively impact costs in order to be able to provide water to the population during peaks of consumption. We also account for the share of the price actually transferred to the firm in case of privatization (*Share Firm*). This variable reflects the firm's involvement in the investments made in the water distribution network. Finally, we control for the mode of provision of sanitation services in the municipality (*Sanitation*). Although sanitation and distribution services are independent, there could be some relationships between the mode of provision between the two, especially since private firms are able to operate in both services.

Mimicking behaviors

In order to test proposition 2, we need to look at potential positive spillovers coming from neighborhood municipalities. We expect that the number of neighboring municipalities with public management as well as neighboring municipalities that have remunicipalized exerts a positive influence on the remunicipalization decision. The same argument is valid for the case of privatization, in which the number of neighboring municipalities with private management and municipalities that have privatized their services may influence this decision.

As in Christoffersen and Paldam [2003] and Bel and Miralles [2003], we account for a potential neighboring effect by measuring for each municipalities three variables namely, *Private same county*, *REMU same county*, and *Privatization same county* . The variable *Private same county* represents the number of neighboring municipalities that have private management of water distribution services. We define as a neighbor a municipality that belongs to the smallest geographical unit in France which is similar to a county in the U.S. (*département*).[4] The variable *REMU same county* (resp. *Privatization same county*) represents the number of neighboring municipalities that have remunicipalized (resp. privatized) their service. Finally, since some municipalies may be located near the border of another county, and may be influcenced by their behaviors, we also control for the number of remunicipalizations (resp. privatizations) that took place in neighboring counties with the variable *REMU neighboring counties* (resp. *Privatization neighboring counties*). In the same way, we define *Private neighboring counties* as the number of municipalities located in neighboring counties that have a private management of water services.

Political dimensions

In order to test proposition 3, we collected additional data that we believe to be more connected to other factors than efficiency objectives. As López-de Silanes et al. [1997] suggest, labor-market conditions, budget constraints and ideology may drive

[4]We also test the robustness of our data by considering radius (25 and 50 kilometers) rather than a geographical unit (the *département*), and our results still hold.

privatization decisions. Therefore, we include the yearly local unemployment rate (*Unemployment*), the amount of debt per capita of the municipality (*Debt*), and personnel expenses per capita (*Personnel Expenses*) in our model. We eventually account for the political party that won the first round in the presidential elections (*Pol Party*). Using the political party of the mayor would have been an alternative to our model, but such data are only available for municipalities with more than 3,500 inhabitants before 2007 in France. Therefore, by using the first round of results of the French presidential elections, we assume that the preferences of citizens for political parties are similar regardless of the type of election, local or national, at least for the first tour. In particular, we expect left-wing mayor to be more reluctant to privatize a service. In the early 2000s, a prevailing strand in the literature was to contradict this statement. Indeed, as pointed-out by Sundell and Lapuente [2012], "The general consensus is that while political considerations may have played a role in contracting out in the 1980s, especially in the United States (Bel and Fageda [2009]), today's governments are guided more by pragmatic motivations; contracting out has become less politically controversial". However, those studies are cross-sectionnal and do not account for the ideology at the time the decision towards the mode of provision was taken. Therefore, many recent empirical papers have overcome these issues and demontrate the importance of ideology in the mode of governance decisions (Picazo-Tadeo et al. [2012]; Sundell and Lapuente [2012]; Gradus et al. [2014]; Beuve et al. [2018]). They show that left-wing municipalities are more likely to opt for a private provision of public services. Finally, we also account for the year of the election using the dummy variable *Election year* since the electoral cycle may influence switching decisions.

Table 1.2 presents descriptive statistics for the variables of interest broken down by sample type.

1.4.3 Econometric strategy

Benchmarking of water services

Our propositions are based on the assumption that governance switches (i.e., remunicipalizations or privatizations) made by municipalities should be based on the relative efficiency of their water services compared to other municipalities. In order to assess this relative efficiency, we need to measure, for each service, what its theoretical performance should be (i.e., what its price and leak ratio should be) and how far these values are from the observed values. In other words, for a given service, we need to assess whether the municipality is experiencing an overpricing and/or an overleak situation.

Under a private regime, we construct the variable $\widehat{Overprice}^{Private}$, which represents the difference between the actual price and the price that would have prevailed under in-house provisioning. Under in-house management, this variable is equal to the difference between the actual price and price that would have prevailed under a private regime ($\widehat{Overprice}^{In-house}$). The variables $\widehat{Overleak}^{Private}$ and $\widehat{Overleak}^{In-house}$ are obtained the same way.

$$\widehat{Overprice}_{t-1}^{Private} = (Price_{t-1}^{Private} - Price_{t-1}^{Inhouse})/Price_{t-1}^{Private} \quad (1.1)$$

$$\widehat{Overleak}_{t-1}^{Private} = (Leak_{t-1}^{Private} - Leak_{t-1}^{Inhouse})/Leak_{t-1}^{Private} \quad (1.2)$$

This specification requires counterfactual calculations depending on the actual management regime. As said earlier, when the municipality decides whether or not to remunicipalize, it does not observe the price and leak ratio that would have prevailed under in-house provision. As a consequence, we need to estimate price and leak equations while accounting for the regime in order to predict the counterfactual:

$$Price = X_{it}\beta + \psi I_{it} + \nu \tag{1.3}$$

$$Leak = X_{it}\alpha + \delta I_{it} + \omega, \tag{1.4}$$

where X denotes a set of exogenous variables controlling for water services heterogeneity, and I denotes the regime adopted in the municipality i at time t. ν and ω represent the error terms.

One important issue with equations (3) and (4) is that the type of regime I may not be exogenous to the model. Indeed, organizational choices and the performance (price and leak ratio) may be correlated with unobserved factors. Also, a simultaneity issue is suspected since performance may influence the organizational choice. Thus, a least-squares regression may lead to biased estimates.

In order to overcome these two issues, we use an endogenous switching regression model following the methodology introduced by Lee (1978):

$$\begin{aligned} Price &= X_{it}\beta + \psi I_{it} + \nu \\ I &= \begin{cases} 1, & \text{if } X_{it}\zeta + Z_{it}\eta \geq \epsilon \\ 0, & \text{if } X_{it}\zeta + Z_{it}\eta \geq< \epsilon \end{cases} \end{aligned} \tag{1.5}$$

and

$$\begin{aligned} Leak_{it} &= X_{it}\alpha + \delta I_{it} + \omega \\ I &= \begin{cases} 1, & \text{if } X_{it}\gamma + Z_{it}\kappa \geq \varepsilon \\ 0, & \text{if } X_{it}\gamma + Z_{it}\kappa < \varepsilon, \end{cases} \end{aligned} \tag{1.6}$$

where ϵ and ε represent the error terms.

These equations are solved using the whole dataset. We apply an endogenous switch-

ing regression model using a two-stage probit estimation from equations (5) and (6). We use a set of instruments for the selection equation. The candidate instrument should be correlated with the mode of provision, but should be independent from our efficiency variables, namely, price and leak. We therefore use the political color of the municipality as our instrumental variable. As previously detailed, ideology is usually considered as a factor explaining the decision to privatize (Picazo-Tadeo et al. [2012]; Sundell and Lapuente [2012]; Gradus et al. [2014]; Beuve et al. [2018]). Specifically, those paper demonstrate that left-wing governments are less likely to privatize their water distribution services. We therefore define the variable *Left wing* as a dummy equal to one if the municipality has a left-wing tendency.

Estimates from the price and leak regressions allow for predicting the value of the counterfactual prices and leaks from equations (1) and (2). We thus obtain $\widehat{Overprice}$ and $\widehat{Overleak}$.

1.4.4 Remunicipalization

In order to investigate the determinants of remunicipalization, we estimate the following probit model:

$$
\begin{aligned}
Remu_{it} \;=\; & \beta_0 + \beta_1 \widehat{Overprice}_{it}^{\,Private} + \beta_2 \widehat{Overleak}_{it}^{\,Private} && (1.7)\\
& + \beta_3 Surface_{it} + \beta_4 Touristic_{it} + \beta_5 Density_{it} \\
& + \beta_6 Debt_{it} + \beta_7 Unemployment_{it} + \beta_8 Personnel_{it} \\
& + \beta_9 ShareFirm_{it} + \beta_{10} Treatment_{it} + \beta_{11} Sanitation_{it} && (1.8)\\
& + \beta_{12} Population_{it} + \beta_{13} PolParty_{it} \\
& + \beta_{14} REMUsamecounty_{it} + \beta_{15} Election\_Year_{it} + u
\end{aligned}
$$

where $Remu_{it}$ is a dummy variable equal to one if the city decides to remunicipalize at the end of the contract and $\widehat{Overprice}_{it}^{\,Private}$ and $\widehat{Overleak}_{it}^{\,Private}$ are obtained in equations (1) and (2). We perform this regression over the sample of private management and remunicipalization in the year that the contract terminates (it is

only at renewal dates that a municipality might decide to switch back to public management).

Privatization

We perform the same methodology for privatization cases (i.e., cases where the municipality switches from in-house to private management). We restrict our sample to services either provided in-house or that switched to private management and estimate the following equation:

$$
\begin{aligned}
Remu_{it} \;=\; & \xi_0 + \xi_1 \widehat{Overprice}_{it}^{\,In-house} + \xi_2 \widehat{Overleak}_{it}^{\,In-house} && (1.9)\\
& + \xi_3 Surface_{it} + \xi_4 Touristic_{it} + \xi_5 Density_{it} \\
& + \xi_6 Debt_{it} + \xi_7 Unemployment_{it} + \xi_8 Personnel_{it} \\
& + \xi_9 ShareFirm_{it} + \xi_{10} Treatment_{it} + \xi_{11} Sanitation_{it} && (1.10)\\
& + \xi_{12} Population_{it} + \xi_{13} PolParty_{it} \\
& + \xi_{14} Privatizationssamecounty_{it} + \xi_{15} Election\_Year_{it} + u
\end{aligned}
$$

where *Privatization* is a dummy variable equal to one if the city decides to switch from public to private management and variables $\widehat{Overprice}$ and $\widehat{Overleak}$ are obtained as follow:

$$
\hat{Overprice}_{it}^{\,In-house} = Price_{t-1}^{Inhouse} - Price_{t-1}^{Private} \quad (1.11)
$$

$$
\hat{Overleak}_{it}^{\,In-house} = Leak_{t-1}^{Inhouse} - Leak_{t-1}^{Private} \quad (1.12)
$$

1.5 Results

The results from the endogenous switching model[5] as derived from equations (5) and (6) are displayed in Table 1.4. Several conclusions can be drawn. First, the selection equations suggest that the choice to go private or public is not randomly decided by a municipality. Increasing complexity of water treatment as well as having a private rather than a in-house provision of water sanitation services both positively influence the probability of a municipality to organize water services through private management. The latest result is in accordance with Desrieux et al. [2013] who demonstrate that the transfer that the public authority must pay to achieve the social optimum is lower when both contracts for distribution and sanitation services are awarded to the same operator, whereby the total price paid for the management of both services is also lower. Variables related to the fiscal stress of the municipality such as a higher level of debt and higher level of expense for personel increase this probability as well. These results are in ligne with Brown and Potoski [2003] and Hebdon and Jalette [2008]. On the contrary, higher levels of local unemployement decrease the probability to use a private provision. As the provision of public services creates local employment, there could be some political reluctance to privatize a service that may destroy employment, especially in localities with high unemployment levels (Boycko et al. [1996]). Finally, municipality with left-wing label are also less likely to opt for a private management of their water services.

The core results of this paper are given in Tables 1.5 and 1.6 for remunicipalization and in Tables 1.7 and 1.8 for privatization. If we first look at the determinants of remunicipalization (Tables 1.5 and 1.6), the first interesting result is that the probability to switch back to public management strongly increases with *Overprice*. At the mean level of *Overprice*, a 1 percent increase of overpricing increases the probability of remunicipalization by an average of 9 percentage-point (columns 1

[5]To to get consistent standard errors, we use an endogenous switching model with full information maximum likelihood method (FIML) developped by Lokshin and Sajaia [2004], and implemented by the Stata command "movestay". Therefore, binary and continuous parts of the model are simultaneously estimated so that we obtain consistent standard errors. More information is available at http://www.stata-journal.com/sjpdf.html?articlenum=st0071.

and 3). When interacting the *Overprice* with the population variables (columns 2 and 4), we observe that even though the extent of overpricing is not significant for small municipalities, it positively influences the probability to remunicipalize for medium and large municipalities.

The other dimension of efficiency, *Overleak* has a strong and significant effect over the probability to remunicipalize (columns 1 and 3). At the mean level of *Overleak*, a 1 percent increase of this variable increases the probability of remunicipalization by an average of 11 percentage-point. When interacting with the size of the municipality, we observe that there is no additional impact for medium-size municipalities, but we observe a significant and positive effect for large municipalities (>10K inhabitants). These results confirm our proposition 1, except for small municipalities that do not seem to remunicipalize for efficiency reasons in terms of price. They appear to react only in the presence of overleak.

Another interesting result is that, when looking at the influence of the variables capturing possible neighboring effects of the municipalities (*REMU same county*), we find that there is a positive and significant influence of the number of remunicipalization of neighboring municipalities (columns 1 and 3). The marginal effect suggests that one or more neighboring municipalities that have previously remunicipalized increases the probability of remunicipalizing by about 9 percentage-point, when holding the variables at their mean value. When accounting for the interaction between *REMU same county* and the size of the municipality, we observe that small ones are influenced by the neighbors' behaviors. We find negative coefficients for large municipalities, but the overall effect of the prevalance of private provision is still positive. This result confirms our proposition 2 in particular since we expect small municipalities to be less informed than large ones. We also make sure that this effect is local by accounting for the neighboring effect in bordering counties and find no significant effect (columns 3 and 4). Our variables measuring the political dimension of the remunicipalization decision do not appear to be a decisive in the choice of municipalities to remunicipalize. Our proposition 3 is not confirmed.

If we now look at the determinants of the decision to privatize water services (Tables 1.7 and 1.8), we observe that *Overprice* and *Overleak* positively influence the probability of privatizing. At the mean level of *Overleak*, a 1 percent increase of this variable increases the probability of remunicipalization by an average of 4 percentage-point. The extent to which the overprice influences the decision to privatize is less important than for the decision to remunicipalize. There is no additional effect for medium-size municipalities but there is a positive one for large municipalities (columns 2 and 4). The effect of *Overleak* is also positive and signficant. At the margin, we observe that an increase of 1 percent of *Overleak* makes privatization more likely by 2 percentage-points. However, there is no additional effect as the municipality gets larger. These results confirms our proposition 1 and suggest that the observed privatizations can be largely explained for efficiency motives. We also find neighboring effects for the decision to privatize. There is a positive and significant influence of the number of privatizations that took place in neighboring municipalities. The existence of one or more neighboring municipalities that have previously privatized increases the probability, but the marginal effect is not important. This results is in line with Christoffersen and Paldam [2003] and Miralles [2009] who find a positive effect from the prevalance of privatization in the neighborhood over the decision to privatize. Lastly, our variables measuring the political dimension of the privatization decision do not appear to be crucial for understanding the choice of municipalities to privatize with the exception of the strong influence of being in an election year on the decision to privatize. Our proposition 3 is therefore not confirmed.

1.6 Conclusions

This paper examines the determinants of switches in the mode of provision of a public service. By gathering information on the 1998-2015 period concerning the way that more than 4 200 French municipalities are organizing their water distribution services, at contract renewal time, we identified nearly 300 remunicipalization and more than 200 cases of privatization. Use a two-stage probit estimation, we

explain remunicipalizations and privatizations of water public services in French municipalities between 1998 and 2015. Our results show that remunicipalization and privatization decisions are determined by expectations about what would be the evolution of price and leaks after the organizational change takes place. It is also influenced by other factors, such as the tendency to switch from one regime to another one in neighboring municipalities and to a less extent by local unemployment. Our findings show that remunicipalizations fostered by a mixture of efficiency concerns and mimetism. We test our propositions on privatizations as well, and find that remunicipalizations and privatizations are influenced by the same variables.

Because the French model of water regulation is rather similar to those in Spain or the United States, we believe that our results are of interest for other countries. The excessive price of water or mismanagement of the system are reasons frequently underlined in the remunicipalization process, such as in Atlanta, Berlin and Paris.

Our analysis leaves many questions open. Our analysis focuses only on the determinants of remunicipalizations and privatizations; it would be interesting to study the impact of remunicipalizations - and privatizations - on performance. Another project would be to assess the outcomes of remunicipalization decisions depending on the changes in the nature of transaction costs. This would however require more detailed (panel) data, which is one reason why evidence on this front is limited.

Figures

Figure 1.1: Remunicipalizations and Privatizations in France 1998-2015

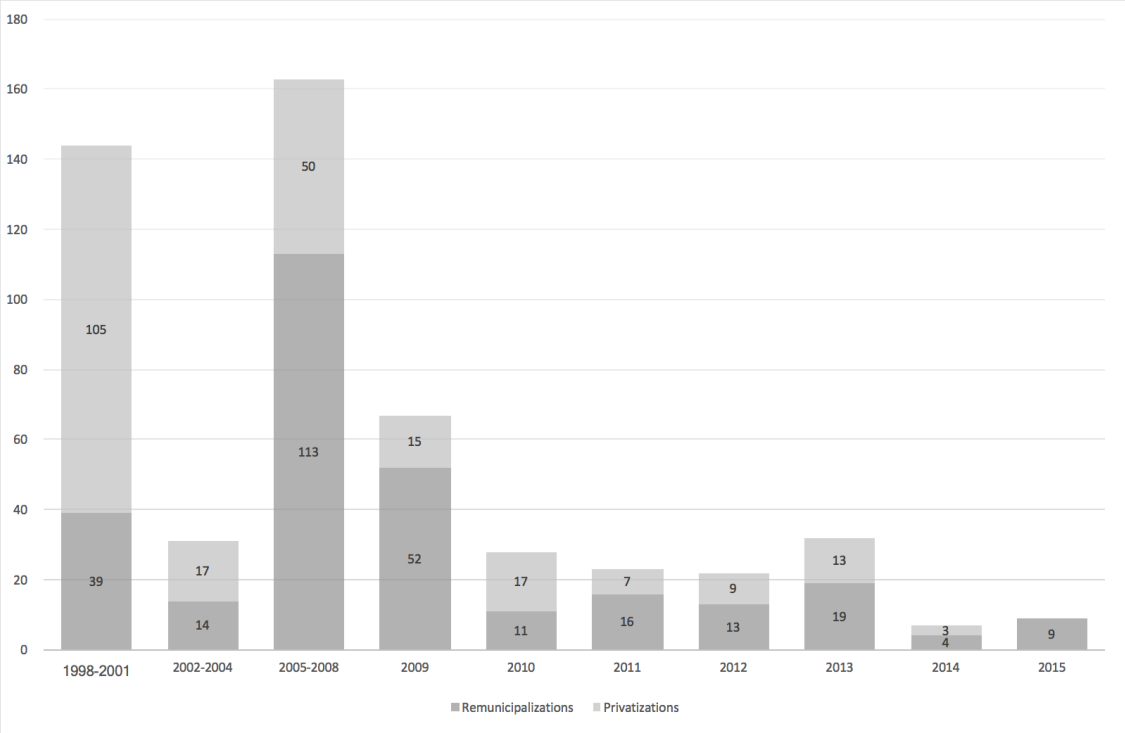


Table 1.1: Average value for price and leak across management

	Mean(In-house)	**Mean(Private)**	**Diff.**	**Std.Error**
Price	1.52	1.64	−0.12***	0.0074
Leak	25.72	21.89	3.83***	0.1977

Table 1.2: Summary statistics

		WHOLE SAMPLE						REMUNICIPALIZATIONS SAMPLE						PRIVATIZATION SAMPLE					
Variable	**Definition**	**Count**	**Mean**	**Median**	**SD**	**Min**	**Max**	**Count**	**Mean**	**Median**	**SD**	**Min**	**Max**	**Count**	**Mean**	**Median**	**SD**	**Min**	**Max**
Price	Average price per cubic meter, all taxes included	18779	1.58	1.52	0.51	0.50	5.96	1404	1.50	1.43	0.49	0.56	5.78	8694	1.52	1.46	0.49	0.50	4.36
Leak	[(Production – Billed water) / Production] x 100	18779	0.24	0.22	0.14	0.00	0.94	1404	0.23	0.22	0.12	0.00	0.80	8694	0.26	0.24	0.15	0.00	0.80
$Overprice_{In\text{-}house}$	Calculated difference between the actual price and the price that would have prevailed under private provision	8745	-0.20	-0.15	0.31	-2.85	0.59	-	-	-	-	-	-	8694	-0.19	-0.15	0.32	-2.85	0.95
$Overleak_{In\text{-}house}$	Calculated difference between the actual leak ratio and the leak ratio that would have prevailed under private provision	8745	-0.37	0.03	1.39	-12.51	0.68	-	-	-	-	-	-	8694	-0.34	0.02	1.31	-11.45	0.70
$Overprice_{Private}$	Calculated difference between the actual price and the price that would have prevailed under in-house provision	10033	-0.02	0.03	0.28	-1.89	0.66	1404	-0.05	0.00	0.31	-1.83	0.82	-	-	-	-	-	-
$Overleak_{Private}$	Calculated difference between the actual leak ratio and the leak ratio that would have prevailed under in-house provision	10033	-0.73	-0.31	1.52	-15.86	0.54	1404	-0.56	-0.19	1.46	-15.61	3.82	-	-	-	-	-	-
Private	Dummy equal to 1 for privately managed services	18779	0.53	1.00	0.50	0.00	1.00	1404	0.89	1.00	0.31	0.00	1.00	8694	0.01	0.00	0.10	0.00	1.00
Pop	Takes the value 1 if population<5000, 2 if 5000<population<10000, and 3 if population>10000	18779	1.96	2.00	0.81	1.00	3.00	1404	2.03	2.00	0.78	1.00	3.00	8694	1.76	2.00	0.78	1.00	3.00
Surface	Dummy equal to 1 if the water is pumped out from the surface	18779	0.11	0.00	0.32	0.00	1.00	1404	0.12	0.00	0.33	0.00	1.00	8694	0.08	0.00	0.27	0.00	1.00
Density	Number of inhabitants per km of network	18779	59	34	96	0.30	2 400	1404	60.90	43.00	64.73	1.00	891.00	8694	50.78	25.00	103.15	0.30	2 400.00
Share Firm	Amount of the price of water transfered to the private firm if any	18779	0.10	0.00	0.59	0.00	53.77	1404	0.05	0.00	0.16	0.00	0.91	8694	0.00	0.00	0.03	0.00	0.84
Sanitation	Dummy equal to 1 if the water sanittaion service is provided privately	18779	0.35	0.00	0.48	0.00	1.00	1404	0.53	1.00	0.50	0.00	1.00	8694	0.09	0.00	0.29	0.00	1.00
Touristic	Dummy equal to 1 if the municipality is a touristic area	18779	0.12	0.00	0.32	0.00	1.00	1404	0.14	0.00	0.35	0.00	1.00	8694	0.09	0.00	0.29	0.00	1.00
Unemployment	Annual local unemployment rate (%)	18779	8.60	8.30	2.27	3.30	18.00	1404	7.60	7.40	1.87	3.30	15.80	8694	8.85	8.50	2.39	3.30	18.00
Debt	Annual debt of the municipality per capita (thousand euros)	18779	0.74	0.60	0.92	0.00	54	1404	0.71	0.60	0.56	0.00	6.24	8694	0.72	0.56	1.02	0.00	54.4
Taxes	Annual amount of local taxes of the municipality per capita (thousand euros)	18779	0.34	0.30	0.24	0.00	4	1404	0.33	0.29	0.21	0.03	1.86	8694	0.32	0.28	0.22	0.01	3.54
Personnel	Annual personnel expenses of the municipality per capita (thousand euros)	18779	339	290	220	0.00	3 788	1404	327.83	282.20	201.81	11.30	1 596.84	8694	309.68	264.03	197.00	8.20	3 738.64
Water Treatment 0	Dummy equal to 1 if raw water does not need a treatment before distribution	18779	0.03	0.00	0.16	0.00	1.00	1404	0.01	0.00	0.07	0.00	1.00	8694	0.05	0.00	0.22	0.00	1.00
Water Treatment 1	Dummy equal to 1 if raw water needs a light treatment before distribution	18779	0.64	1.00	0.48	0.00	1.00	1404	0.55	1.00	0.50	0.00	1.00	8694	0.74	1.00	0.44	0.00	1.00
Water Treatment 2	Dummy equal to 1 if raw water needs an average treatment before distribution	18779	0.11	0.00	0.31	0.00	1.00	1404	0.14	0.00	0.35	0.00	1.00	8694	0.08	0.00	0.28	0.00	1.00
Water Treatment 3	Dummy equal to 1 if raw water needs a heavy treatment before distribution	18779	0.13	0.00	0.34	0.00	1.00	1404	0.19	0.00	0.39	0.00	1.00	8694	0.07	0.00	0.25	0.00	1.00
Water Treatment 4	Dummy equal to 1 if raw water needs a mixture of treatments including a heavy treatment	18779	0.05	0.00	0.21	0.00	1.00	1404	0.07	0.00	0.25	0.00	1.00	8694	0.03	0.00	0.16	0.00	1.00
Water Treatment 5	Dummy equal to 1 if raw water needs a mixture of light and average treatment	18779	0.04	0.00	0.20	0.00	1.00	1404	0.05	0.00	0.21	0.00	1.00	8694	0.04	0.00	0.20	0.00	1.00
Private Same County	Number of municipalities with in-house provision in the same country (*département*)	18779	34	30	24	0	123	1404	37.01	34.00	20.50	0.00	123.00	8694	27.16	21.00	22.51	0.00	123.00
Privatizations Same County	Number of municipalities with privatizations within the same country (*département*)	15399	3	0	10	0	84	1404	1.96	0.00	7.04	0.00	84.00	8694	2.55	0.00	10.86	0.00	84.00
REMU Same County	Number of municipalities with remunicipalizations within the same country (*département*)	15399	1	0	2	0	22	1404	1.79	1.00	2.59	0.00	22.00	8694	1.28	0.00	2.37	0.00	22.00

Table 1.3: Samples for in-house and private provisions

	Whole Sample			Remunicipalization Sample			Privatizations Sample		
	Number of observations			Number of observations			Number of observations		
Year	**In-house provisions**	**Private provisions**	**Population**	**Contract renewals**	**Remunicipalizations**	**Population**	**In-house provisions**	**Privatizations**	**Population**
1998-2001	1 115	2 265	26 733 813	294	24	1 248 057	1137	46	7 945 120
2002-2004	1 110	2 288	29 119 123	303	13	1 582 447	1107	10	7 457 634
2005-2008	1 491	2 293	30 696 108	635	90	3 378 051	1444	43	8 412 040
2009	247	391	10 108 737	29	18	2 527 549	238	9	2 891 604
2010	438	507	9 103 594	29	2	125 416	440	4	5 137 145
2011	640	490	8 974 893	29	6	131 820	635	1	5 308 610
2012	733	483	9 033 077	20	3	101 462	731	1	5 466 913
2013	850	476	8 904 524	24	5	217 936	846	1	5 616 351
2014	1 130	487	9 169 616	30	2	131 859	1 128	0	5 999 543
2015	991	353	4 774 212	11	3	73 895	988	0	2 653 726
Total	**8 745**	**10 033**	**-**	**1 404**	**166**	**-**	**8 694**	**115**	**-**

Notes:

The whole sample refers to the case where all the variables of interest are populated. It is split between a total of 8,745 cases of in-house provisions and 10,033 of private ones. The remunicipalization sample only deals with municipalities where contracts are renewed or remunicipalization takes place. There is a total of 1,404 observations, of which 166 remunicipalizations. The privatization sample is made of 8,694 observations, that is the sum of the number of in-house provision cases and of privatizations.

Table 1.4: Endogenous switching regression for private provision

	PRICE			LEAK		
	(1)	(2)	(3)	(4)	(5)	(6)
	Selection	**Equation (6)** ***PRIVATE =0***	**Equation (6)** ***PRIVATE =1***	**Selection**	**Equation (7)** ***PRIVATE =0***	**Equation (7)** ***PRIVATE =1***
Pop 5K-10K	0.0816	-0.0730***	-0.123***	0.0727	-0.0225**	-0.000861
	(0.0715)	(0.0264)	(0.0222)	(0.0714)	(0.00884)	(0.00520)
Pop>10K	0.156*	-0.157***	-0.174***	0.144*	-0.0514***	-0.0227***
	(0.0852)	(0.0307)	(0.0259)	(0.0857)	(0.0116)	(0.00590)
Surface	0.0290	0.0568**	0.196***	0.0285	0.00428	-0.0209***
	(0.0749)	(0.0262)	(0.0218)	(0.0745)	(0.00906)	(0.00475)
Density	-0.000140	0.000118	0.000119*	-0.000150	-6.38e-05***	4.17e-05
	(0.000249)	(0.000104)	(6.60e-05)	(0.000249)	(1.85e-05)	(2.58e-05)
Sanitation	1.499***	0.105***	0.00330	1.499***	0.0179	-0.000587
	(0.0436)	(0.0252)	(0.0233)	(0.0437)	(0.0216)	(0.00359)
Touristic	-0.0747	0.0245	0.0563***	-0.0728	0.0111	0.00197
	(0.0730)	(0.0269)	(0.0212)	(0.0733)	(0.00994)	(0.00558)
Treatment 1	1.232***	0.115***	0.193	1.213***	0.0508***	0.0368
	(0.168)	(0.0338)	(0.152)	(0.172)	(0.0136)	(0.0243)
Treatment 2	1.553***	0.298***	0.378**	1.535***	0.0241	0.0210
	(0.178)	(0.0407)	(0.154)	(0.180)	(0.0171)	(0.0247)
Treatment 3	1.863***	0.331***	0.386**	1.853***	0.00170	-0.00702
	(0.179)	(0.0437)	(0.154)	(0.181)	(0.0207)	(0.0245)
Treatment 4	1.669***	0.379***	0.368**	1.664***	0.0130	0.00210
	(0.191)	(0.0620)	(0.155)	(0.194)	(0.0198)	(0.0249)
Treatment 5	1.383***	0.241***	0.264*	1.377***	0.0366**	0.0177
	(0.190)	(0.0473)	(0.157)	(0.193)	(0.0176)	(0.0251)
Private same county	0.445***	0.0222**	0.0654***	0.448***	0.00464	-0.0216***
	(0.0277)	(0.00925)	(0.0123)	(0.0277)	(0.00551)	(0.00275)
Unemployment	-0.0419***	-0.0147***	-0.0113***	-0.0406***	0.00117	0.00671***
	(0.0110)	(0.00373)	(0.00402)	(0.0110)	(0.00134)	(0.000962)
Debt	0.0327*	0.0153**	0.0172***	0.0307*	0.00238	-0.000971
	(0.0180)	(0.00723)	(0.00659)	(0.0179)	(0.00214)	(0.00163)
Personnel	0.142***	0.0184	-0.0831***	0.141***	0.0222***	-0.0155***
	(0.0525)	(0.0187)	(0.0209)	(0.0522)	(0.00639)	(0.00481)
Taxes	0.105**	-0.00617	-0.0609***	0.105**	-0.00539	-0.00331
	(0.0515)	(0.0188)	(0.0220)	(0.0507)	(0.00620)	(0.00475)
Left Wing	-0.180***			-0.145**		
	(0.0588)			(0.0593)		
Constant	-4.400***	0.854***	1.588***	-4.391***	0.116***	0.366***
Sigma 0		-0.954***			-1.906***	
		(0.0190)			(0.0146)	
Rho 0		0.287***			0.0872	
		(0.0467)			(0.138)	
Sigma 1			-0.921***			-2.195***
			(0.0176)			(0.0130)
Rho 1			0.163**			-0.0601*
			(0.0659)			(0.0357)
Observations	18,317	18,317	18,317	18,317	18,317	18,317

* p<0.1, ** p<0.05, *** p<0.01. Clustered standard errors by municipality in parentheses.

Table 1.5: Determinants of remunicipalization

	(1)	(2)	(3)	(4)
Overprice	0.777***	0.291	0.785***	0.301
	(0.217)	(0.248)	(0.221)	(0.253)
	[0.091]	[0.097]	[0.092]	[0.097]
Overprice x Pop 5K-10K		1.550**		1.553**
		(0.609)		(0.607)
Overprice x Pop>10K		1.643**		1.609**
		(0.648)		(0.645)
Overleak	0.951***	0.887***	0.944***	0.880***
	(0.126)	(0.154)	(0.126)	(0.153)
	[0.111]	[0.112]	[0.111]	[0.112]
Overleak x Pop 5K-10K		−0.012		−0.011
		(0.254)		(0.252)
Overleak x Pop>10K		0.755*		0.770*
		(0.448)		(0.448)
REMU same county	0.725***	0.867***	0.732***	0.871***
	(0.087)	(0.111)	(0.088)	(0.113)
	[0.085]	[0.084]	[0.086]	[0.084]
REMU same county x Pop 5K-10K		−0.313		−0.308
		(0.197)		(0.196)
REMU same county x Pop >10K		−0.470**		−0.467**
		(0.234)		(0.232)
REMU neighboring counties			0.056	0.047
			(0.078)	(0.079)
			[0.007]	[0.005]
Pop 5K-10K	0.234	0.507**	0.219	0.492**
	(0.190)	(0.243)	(0.187)	(0.239)
	[0.029]	[0.040]	[0.027]	[0.038]
Pop>10K	0.012	0.342	−0.002	0.327
	(0.250)	(0.327)	(0.251)	(0.328)
	[0.001]	[0.009]	[−0.000]	[0.008]
Categories of pop. size	NO	YES	NO	YES
Time fixed-effect	YES	YES	YES	YES

* p<0.1, ** p<0.05, *** p<0.01. Clustered standard errors by municipality in parentheses.

Table 1.6: Determinants of remunicipalization - Continuation of previous Table

	(1)	(2)	(3)	(4)
Sanitation	−0.535***	−0.542***	−0.532***	−0.538***
	(0.138)	(0.144)	(0.138)	(0.144)
	[−0.062]	[−0.061]	[−0.062]	[−0.061]
Surface	−0.027	−0.062	−0.009	−0.046
	(0.220)	(0.220)	(0.220)	(0.220)
	[−0.003]	[−0.007]	[−0.001]	[−0.005]
Treatment 1	1.812***	1.656***	1.796***	1.642***
	(0.359)	(0.491)	(0.360)	(0.492)
	[0.097]	[0.094]	[0.096]	[0.093]
Treatment 2	2.245***	2.096***	2.241***	2.092***
	(0.385)	(0.507)	(0.385)	(0.505)
	[0.155]	[0.152]	[0.156]	[0.152]
Treatment 3	1.578***	1.388***	1.583***	1.391***
	(0.385)	(0.504)	(0.385)	(0.502)
	[0.073]	[0.067]	[0.074]	[0.068]
Treatment 4	2.230***	1.996***	2.239***	2.002***
	(0.432)	(0.560)	(0.432)	(0.556)
	[0.153]	[0.137]	[0.155]	[0.139]
Touristic	0.178	0.099	0.167	0.090
	(0.197)	(0.206)	(0.198)	(0.207)
	[0.022]	[0.012]	[0.021]	[0.011]
Density	−0.001	−0.001	−0.001	−0.001
	(0.001)	(0.001)	(0.001)	(0.001)
	[−0.000]	[−0.000]	[−0.000]	[−0.000]
Share Firm	−1.993**	−1.879**	−2.027**	−1.907**
	(0.835)	(0.848)	(0.837)	(0.851)
	[−0.234]	[−0.214]	[−0.237]	[−0.217]
Unemployment	0.033	0.033	0.031	0.032
	(0.043)	(0.044)	(0.043)	(0.044)
	[0.004]	[0.004]	[0.004]	[0.004]
Debt per capita	−0.084	−0.086	−0.082	−0.084
	(0.067)	(0.068)	(0.067)	(0.068)
	[−0.010]	[−0.010]	[−0.010]	[−0.010]
Personnel expense	0.005	−0.072	0.012	−0.065
	(0.226)	(0.223)	(0.228)	(0.225)
	[0.001]	[−0.008]	[0.001]	[−0.007]
Local taxes	0.129	0.200	0.120	0.191
	(0.221)	(0.226)	(0.221)	(0.227)
	[0.015]	[0.023]	[0.014]	[0.022]
Election year	0.773	0.659	0.646	0.548
	(0.558)	(0.590)	(0.575)	(0.605)
	[0.000]	[0.000]	[0.000]	[0.000]
Left	0.214	0.185	0.215	0.187
	(0.213)	(0.223)	(0.214)	(0.223)
	[0.027]	[0.022]	[0.027]	[0.023]
Constant	−3.941***	−3.835***	−3.955***	−3.841***
	(1.067)	(1.103)	(1.069)	(1.100)
Categories of pop.size	NO	YES	NO	YES
Time fixed-effect	YES	YES	YES	YES
Log-likelihood	-231	-224	-231	-224
Pseudo R2	0.443	0.460	0.443	0.460
Obs.	1082	1082	1082	1082

* p < 0.1, ** p < 0.05, *** p < 0.01. Clustered standard errors by municipality in parentheses.

Table 1.7: Determinants of privatization

	(1)	(2)	(3)	(4)
Overprice	2.278***	1.635***	2.288***	1.655***
	(0.340)	(0.459)	(0.350)	(0.466)
	[0.043]	[0.044]	[0.043]	[0.043]
Overprice x Pop 5K-10K		0.631		0.603
		(0.728)		(0.759)
Overprice x Pop>10K		1.545*		1.535*
		(0.835)		(0.838)
Overleak	1.245***	1.297***	1.265***	1.314***
	(0.177)	(0.250)	(0.177)	(0.249)
	[0.024]	[0.023]	[0.024]	[0.024]
Overleak x Pop 5K-10K		−0.255		−0.246
		(0.341)		(0.342)
Overleak x Pop>10K		0.136		0.126
		(0.555)		(0.543)
Privatizations same county	0.369***	0.429***	0.397***	0.454***
	(0.060)	(0.080)	(0.066)	(0.082)
	[0.007]	[0.007]	[0.007]	[0.008]
Privatization same county x Pop 5K-10K		−0.164*		−0.161*
		(0.093)		(0.094)
Privatizations same county x Pop >10K		0.026		0.023
		(0.104)		(0.103)
Privatizations neighboring counties			−0.103	−0.097
			(0.075)	(0.074)
			[−0.002]	[−0.002]
Pop 5K-10K	−0.117	0.105	−0.112	0.106
	(0.201)	(0.282)	(0.201)	(0.286)
	[−0.002]	[−0.003]	[−0.002]	[−0.003]
Pop>10K	−0.153	−0.397	−0.128	−0.364
	(0.221)	(0.367)	(0.217)	(0.359)
	[−0.003]	[−0.004]	[−0.002]	[−0.003]
Categories of pop. size	NO	YES	NO	YES
Time fixed-effect	YES	YES	YES	YES

* p<0.1, ** p<0.05, *** p<0.01. Clustered standard errors by municipality in parentheses.

Table 1.8: Determinants of privatization - Continuation of previous Table

	(1)	(2)	(3)	(4)
Sanitation	0.500**	0.510***	0.531***	0.543***
	(0.195)	(0.197)	(0.200)	(0.201)
	[0.013]	[0.013]	[0.014]	[0.014]
Surface	−0.089	−0.064	−0.051	−0.029
	(0.255)	(0.258)	(0.252)	(0.256)
	[−0.002]	[−0.001]	[−0.001]	[−0.001]
Treatment 1	0.296	0.236	0.254	0.206
	(0.272)	(0.259)	(0.278)	(0.265)
	[0.004]	[0.003]	[0.004]	[0.003]
Treatment 2	0.885***	0.821**	0.816**	0.767**
	(0.334)	(0.327)	(0.323)	(0.319)
	[0.020]	[0.019]	[0.019]	[0.018]
Treatment 3	0.475	0.479	0.379	0.396
	(0.346)	(0.354)	(0.355)	(0.367)
	[0.008]	[0.008]	[0.006]	[0.007]
Treatment 4	0.457	0.341	0.389	0.284
	(0.363)	(0.357)	(0.354)	(0.349)
	[0.007]	[0.005]	[0.006]	[0.004]
Touristic	−0.235	−0.206	−0.259	−0.229
	(0.188)	(0.189)	(0.194)	(0.196)
	[−0.004]	[−0.003]	[−0.004]	[−0.004]
Density	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]	[0.000]
Share Firm	3.060**	3.257**	3.137**	3.319**
	(1.406)	(1.462)	(1.443)	(1.488)
	[0.058]	[0.061]	[0.059]	[0.062]
Unemployment	−0.106***	−0.107***	−0.095***	−0.096**
	(0.035)	(0.036)	(0.036)	(0.038)
	[−0.002]	[−0.002]	[−0.002]	[−0.002]
Debt per capita	0.034	0.025	0.028	0.019
	(0.070)	(0.069)	(0.069)	(0.069)
	[0.001]	[0.000]	[0.001]	[0.000]
Personnel expense	0.172	0.209	0.168	0.201
	(0.202)	(0.206)	(0.205)	(0.207)
	[0.003]	[0.004]	[0.003]	[0.004]
Local taxes	−0.317	−0.289	−0.328	−0.300
	(0.199)	(0.194)	(0.201)	(0.196)
	[−0.006]	[−0.005]	[−0.006]	[−0.006]
Election year	0.626***	0.668***	0.722***	0.757***
	(0.194)	(0.195)	(0.235)	(0.233)
	[0.000]	[0.000]	[0.000]	[0.000]
Left	−0.325	−0.307	−0.374	−0.357
	(0.334)	(0.328)	(0.331)	(0.325)
	[−0.005]	[−0.005]	[−0.006]	[−0.005]
Constant	−2.019*	−2.349*	−1.884	−2.208*
	(1.224)	(1.205)	(1.200)	(1.182)
Categories of pop.size	NO	YES	NO	YES
Time fixed-effect	YES	YES	YES	YES
Log-likelihood	-186	-182	-185	-181
Pseudo R2	0.481	0.492	0.485	0.495
Obs.	5247	5247	5247	5247

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Clustered standard errors by municipality in parentheses.

CHAPTER 2

All for One and One for All! How Do Corruption Investigations Affect Municipalities' Public Procurement Choices?*

2.1 Introduction

Public procurement is traditionaly a fertile ground for corruption: 57% of corruption cases are found to be related to public procurement (OECD [2011a]). In Europe, about 38% of companies consider that corruption is a problem when doing business in their country (European Commission [2017b]). Whereas almost all Northern countries have results below the EU average, corruption seems to be a significant issue in many European countries, including the more developped ones (for instance, 52% French companies consider corruption as a problem for doing business). As public procurement represents between 15 and 25% of GDP in OECD countries, the stakes in fighting corruption are high.[1] Also, the quality of public services depends

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[1]OECD statistics, available at: http://stats.oecd.org/

on good practices in public procurement: the greater the extent of corruption is, the more expensive and less efficient the public services are likely to be (Djankov et al. [2017]). Specifically, corruption in public procurement generates inefficiencies mainly due to a misallocation of the contract, higher price and/or lower quality, and a distorsion of competition.

Public demand for goods and services in Europe and in the U.S. is typically procured through the use of open auctions. On one side, limiting discretion through the use of an open auctions fosters transparency and competition (Bulow and Klemperer [1996]). On the other side, the use of discretion could help the authority to facilitate the dialogue between the parties to make the contracts as complete as possible (Bajari and Tadelis [2001], Bajari et al. [2014]). Dialogue and negotiation are particularly valuable when it is difficult to specifiy all dimensions and contingencies of a transaction in a contract. Specifically, reducing contractual incompleteness makes ex-post opportunistic behaviors less likely. Discretion also eases the implementation of relational contracts (Kim [1998], Spagnolo [2012], Coviello et al. [2017]). Indeed, contractors may have incentives to preserve a good reputation to increase their chance of being selected in the future. Using discretion may therefore result in a better value for money as well as a lower cost of organizing the tender. However, the use of discretion could be detrimentally used by a public authority to favor a particular firm and reap-off some personnal benefit. Corruption exists if there is some room for discretion. Using internal records from a bribe-paying firm, Tran [2011] identifies that procurement procedure with more discretion are more likely to be subject to corruption. More recently, in Italy, as Baltrunaite et al. [2018] show, tenders using negotiation are more likely to select "politically" connected firms, namely those having a local politicians among its administrators or shareholders. In the same vein, Palguta and Pertold [2017] use public procurement data from Czech Republic. They observe that the possibility of pre-selecting participants to a tenders under a particular threshold of contract value is likely to yield to a manipulation of procurement values so that the tender is below the threshold. They also observe that firms with a hidden owner are more likely to win the contract when the procurement

value is manipulated.

The optimal award mechanism should therefore be a compromise between mitigating risk of corruption and fostering efficiency of procurement through the use of discretion. Bandiera et al. [2009] proposes a distinction between active and passive waste in public procurement. On one side, active waste is defined as such that "its presence entails direct or indirect benefit for the public decision maker. In other words, reducing waste would reduce the utility of the decision maker. The classical example is corruption in public procurement". On the other side, passive waste is such that "its presence does not benefit the public decision maker. In other words, reducing waste would (weakly) increase the utility of the decision maker. [...] Another cause of passive waste, following Kelman [1990, 2005], is that excessive regulatory burden may make procurement cumbersome and increase the average price that the public body pays".

Deriving from these definitions, it appears that the choice of the award mechanism is usually guided by a trade-off between giving discretion to reduce passive waste, and promoting transparency through open auctions to reduce possibilities of active waste. This is the reason why, in Europe, the risk of passive and active waste is balanced with the introduction of a threshold[2] (hereafter *EU threshold*) below which the public buyers have the possibility to use discretion. Indeed, as the value of the contract increases, the temptation and gains from bribes gets larger. In France, public buyers have the possibility to use of an "adapted procedure" (*procédure adaptée*) below this threshold. This procedure–whose specifities are detailed in a further section of this paper– is adapted compared with a rigid and formal procedures (open auctions) in the sense that ways and means are freely chosen by the public buyer and should adapt to the nature and characteristics of the needs, the number or location of firms that are likely to participate to the tender, and to the circumstances of the procurement.

In this paper, we focus on one dimension of corruption, namely, favoritism. By

[2]This threshold was introduced in 2004 by the EU Directive 2004/18/EC on public procurement. It is reevaluated every two years.

manipulating *ex-ante* a call for tenders, public authorities can favor one specific candidate, therefore generating active waste. Our objective is to assess the impact of investigation of corruption, as defined by the opening of a judicial investigation, on procurement award mechanisms in municipalities. First, we compare the degree of discretionary power used in award procedures before and after a investigation is publicly raised in the local press. Corruption is more likely when a public authority uses an award procedure that allows for discretion. Second, we assess whether investigation of corruption triggers any change in the competitive environment (i.e., the number of participants to the tender) and in the location of winning firms (i.e., the choice of a local firm) when discretion is involved. All these potential effects of investigation are considered for both the investigated municipalities but also for the neighboring municipalities, the latter not being under investigation.

We use an original dataset for public procurement in France from 2006 to 2015. We identify municipalities investigated for favoritism and report the judiciary outcomes using the local press. We ultimately consider 87 cases that took place between 2006 and 2015.

Using a differences-in-differences empirical strategy, we observe that an investigated municipality does not react by opting for more formal and rigid award mechanism (open auctions). One plausible explanation is that such municipalities have no interest in changing their behavior as long an investigations is pending. Behaviors that facilitate corruption have to be hidden, knowing the cost incurred in the event of being convicted. As soon as one municipality is investigated for corruption, the probability of being effectively convicted is independent of its current choice of award procedure. In addition, since the objective of the adapted procedure is to lighten the regulatory burden related to the organization of a tender, it might still be efficient to go on with this procedure. However, neighbors of investigated muncipalities do react as we observe that they are less likely to use an adapted procedure, thereby giving discretionary power to the buyer. Neighboring municipalities may react for two reasons. First, if they are not corrupted and are just afraid that too much use of discretion would be misinterpreted, this would generate passive waste. In-

deed, as the main objective of the adapted procedure is to provide the best value for money for low-value contracts, reducing their use by fear of being suspected is inefficient. Second, if the neighbor react because he is actually corrupted and potentially involved in the case under investigation, the change of behavior would reduce active waste. In the first case, prosecuting corrupted municipalities would generate negative externalities (increase passive waste), whereas in the second case, it would generate positive externalities (decrease active waste). To disentangle between those two explanations, we differentiate between neighbors of investigated municipalities that were eventually convicted from those that were find to be not guilty. Our results indicate that only neighbors of municipalities that are found guilty change their behavior. This finding suggests that responsive neighbors to investigation might be also involved in the case under investigation, even though this conclusion is just a supposition.

Even though our results indicate that investigated municipalities do not react to investigations of favoritism by changing the award procedures for their procurement contracts, they might make efforts to reduce favoritism within a given procedure. In other words, investigated municipalities might not change their award procedures because it is still an efficient way to award a contract, but they might want to stop favoritism since suspicion may make them more closely monitored. If municipalities follow such a strategy, this would lead investigated ones to increase competition by giving incentives to competitors to make offers when tenders are launched. This would also lead them to select fewer local suppliers (i.e., to reduce favoritism).

We observe that only investigated municipalities that are eventually found guilty do attract more participants in their adapted procedures. The channel trough which competition is fostered is not totally clear. It could either result from a change in the number of participants invited to the tender or it could be the consequence of firms more willing to participate to a tender in a municipality that is more likely to be under scrutiny. In addition, participation increases only for municipalities with an investigated neighbor that is eventually convicted. The possible explanations would be that either those municipalities are also corrupted, or that they just in-

crease the number of invited firms to participate by fear of being unfairly suspected of corruption. Indeed, when using an adapted procedure, public buyers have the possibility to restrict competition. Another possibility is that firms are more likely to win the tender since those that were involved in the corruption case do no longer participate to public procurements. As a consequence, firms may be more willing to participate to tenders.

Finally, we find that investigated municipalities do select more distant (i.e. less local) bidders compared to other municipalities in adapted procedures. This effects is especially driven by municipalities that are eventually found guilty.

We believe our paper contributes to the wide range of literature on corruption in public procurement. More specifically, we restrict our setting to the framework where the public buyer has the possibility to use discretion in the award mechanism. Due to the hidden dimension of corruption in public procurement, there are few empirical papers devoted to this topic. Various aspects of corruption in public procurement have been considered, but as far as we know, this is the first paper to study the impact of investigation over the use of discretionary power. The closest work to ours seems to be that of Tran [2011]. Also, our work shares some similarities with Di Tella and Schargrodsky [2003] who study the prices paid for basic inputs during a crackdown on corruption in the public hospitals of the city of Buenos Aires in Argentina, between 1996 and 1997. However, our approach is quite different, as our objective is to assess whether investigation of corruption changes the degree of discretion used in the award mechanism, and its potential consequences in terms of social welfare.

The rest of this paper is organized as follows. In section 2.2, we review the literature on the choice of award procedures and their relations with discretion and favoritism. Section 2.3 provides a simple framework for the cost of corruption for municipalities. Propositions are provided concerning the impact of being investigated for corruption on municipalities' behavior. Section 3.3 provides an overview of the institutional framework. When then present the data and the sample we use in Section 3.4.

Subsequently, our empirical strategy and results are presented in sections 2.6 and 3.6. Robustness checks and placebo tests are proposed in section 2.8. Finally, we conclude this paper in section 3.8.

2.2 Award Procedures, Discretion and Favoritism

The goods and services needed by citizens are procured using several award procedures. Some procedures are rigid, restricting the discretionary power of public authorities in their choice of contractors. Others are more flexible, introducing more discretionary power for the public authority to select the preferred contractors, and potentially reducing competition. Such discretion might be introduced through award mechanisms that are based on negotiations instead of pure auctions (Bajari and Tadelis [2001], Bajari et al. [2009], Herweg and Schmidt [Herweg and Schmidt]), through the use of imprecise criteria (Burguet and Che [2004]) or through restricted auctions (Chever et al. [2017], Coviello et al. [2017]).

The economic literature suggests that buyers might deliberately choose to engage in award procedures that create room for public authorities' discretionary power for efficiency reasons. The primary reason for introducing discretion is that award procedures based on open auctions may lead to inefficient outcomes if the good or service to be procured is technically complex and/or barely contractible. In particular, it facilitates the dialogue between the parties to make the contracts as complete as possible (Goldberg [1977], Bajari and Ye [2001], Bajari et al. [2014]). Using discretion to select the winning firm may also ease the implementation of relational contracts, thereby reducing the risk of ex-post opportunistic behaviors (Spagnolo [2012]. As Coviello et al. [2017] show, discretion increases the probability that an incumbant is awarded the contract when renewed. Their results also suggest that incumbents are more likely to be renewed if they had better performance in the past than the average (in terms of delay). In addition, discretion could still be beneficial to the buyer in non-complex contracts, by reducing the cost and complexity related to the organization of the tender.

However, the economic literature also suggests that discretion associated with negotiation may be detrimentally used to favor a bidder during the award phase. The seminal paper of (Burguet and Che [2004]) illustrates manipulation power using scoring rules auctions, where the contracting authority may manipulate one dimension of qualitative criteria to favor one participant in the auction. The theory argues in favor of such a scoring rule, as it gives the buyer a larger set of choices between price and quality, potentially increasing the number of bidders, and makes collusion less sustainable. However, they show that with a high degree of manipulation power, corruption softens price competition and results in higher procurement costs. Indeed, one of the biggest issue of corruption in public procurement is that is increases costs. Di Tella and Schargrodsky [2003] study the prices paid for basic inputs during a crackdown on corruption in the public hospitals of the city of Buenos Aires in Argentina, between the 1996–1997 period. They find that detection of corruption decrease procurement costs by an average of 15%. These findings were confirmed by Tran [2011], who obtained access to internal records of a bribe-paying firm in Indochina. He analyzes the impact of scoring and price-only auctions on corruption by taking advantage of two successive changes in the policy on award mechanisms. Whereas scoring auctions were found to increase the bribes and profits of bribe-paying firms, the implementation of price-only auctions reduced both the amount of bribes and profits of those paying bribes. In Italy, Baltrunaite et al. [2018] show that tenders using discretion are more likely to select politically connected firms in more corrupted environments. In the same vein, Palguta and Pertold [2017] use public procurement data from Czech Republic. They observe that the possibility of pre-selecting participants to a tenders under a particular threshold of contract value is likely to yield to a manipulation of procurement values so that the tender is below the threshold. They also observe that firms with a hidden owner are more likely to win the contract when the procurement value is manipulated .In addition, in a paper using data on almost 34,000 firms from the World Bank's Enterprise Surveys in 88 countries, Knack et al. [2017] found that in countries with more transparent procurement systems, where exceptions to open competition in tendering must be explicitly justified, firms report paying fewer and smaller kickbacks to officials.

2.3 The cost of corruption

The extent to which public authorities might abuse of their discretionary power to follow a private agenda disconnected from public procurement efficiency reasons is related to the probability of being investigated, and that of being effectively convicted. As Becker [1968] show, optimal policies for fighting illegal conducts are subject to an optimal allocation of ressources. Indeed, he demonstrates that the optimal amount of enforcement depends on, among other things, the cost of detecting and convicting offenders and the nature of sanctions. In the case of corruption in public procurement, the cost of being investigated is primarily a political cost: it influences the probability of being reelected as mayor (if voters punish the unlawful behavior of investigated municipalities, Coviello et al. [2017]). The cost of being investigated is also an increase in the level of scrutiny over the suspect's actions, reducing the public authority's discretionary power and increasing the probability of being challenged by third parties Spiller [2008]. Indeed, third-parties, in particular political opponents, may benefit from the investigation of corruption. They may therefore behave opportunistically by discrediting the suspect. It is noteworthy that the politician may be under investigation for a while since the time span between the opening of an investigation and the trial usually takes many years in France (an average of 7.5 years).

The cost of a conviction is the possibility of the elected official involved in a corruption case to being fined and going to jail. Also, the probability of reelection are compromised. Muço [2017] investigates the impact of random audit in Brazilian municipalities and shows that the reelection of the party at the municipal level is less likely when corruption occurs. This result is confirmed by Ferraz and Finan [2008], Costas-Pérez et al. [2012], and Bobonis et al. [2016] who study the effect of detection of corruption over political outcomes in respectively Brazil, Spain, and Puerto Rico. They all find that corrupted politicians are punished by a decrease in their share of vote. This cost is linked to past behavior on the judicial side during the investigation period, but also on ongoing behaviors on the political side (more

scrutiny from third parties). Hence, we can distinguish two periods (Figure 2.1).

The cost of corruption for a municipality a serving in a municipality where there is no ongoing investigation of corruption is given by NS_a:

$$NS_a = P_a(Suspected) * Political\ Costs + P_a(Convicted) * Conviction\ Costs$$

As soon as the municipality is under investigation, the political costs are borne by the municipality, regardless of the result of the investigation, which usually spans a long period.[3] The cost of corruption for a municipality a serving in a municipality when investigation of corruption is triggered is given by S_a:

$$S_a = Political\ Costs + P_a(Convicted) * Conviction\ Costs$$

This leads us to the following straightforward propositions:

Proposition 1: *A municipality facing investigation for favoritism will not use more transparent and open award procedures during an investigation than before investigation.*

Behaviors that facilitate corruption have to be hidden, given the cost incurred upon being detected. As soon as one public authority is investigated for corruption, the probability of being effectively convicted is independent of whether it adapts by using more open auctions. Adaptation might even be perceived as an element of proof that a certain aspect of contract award procedures was improper. In addition, it might not be efficient to go on with more transparent and open award due to the characteristics of the contract. The best strategy is to continue as before, arguing that the existing approach is the right way of awarding public procurement contracts and waiting for the investigation results.

However, if there is no advantage in changing the way contracts are awarded, there is an incentive to reduce corrupt practices (i.e., to open to competition and reduce favoritism) to be able to argue that procedures allowing discretionary power are efficient and to reduce the cost of a conviction, if any.

[3]In our dataset, the average duration of prosecutions is five years.

Proposition 2: *A municipality facing investigation for favoritism will reduce corrupt practices by increasing competition during award procedures and by reducing favoritism.*

What can be expected for municipalities located near the investigated municipality a? The cost of corruption for a neighboring municipality b where there is no investigation of corruption is given by NS_b:

$$NS_b = P_b(Detected) * Political\ Costs + P_b(Convicted) * Conviction\ Costs$$

If the probability of a neighboring municipality b being detected is independent of the probability of a neighboring corrupt municipality a being detected, then, naturally, the cost of corruption is the same for both municipalities. However, one can expect that the scrutiny over the actions of municipalities located near the investigated ones is increased (i.e., monitoring from third parties' is increased).[4] This means that $P_b(Detected|\text{a=1})$ is not equal to $P_b(Detected|\text{a=0})$ for neighboring municipalities. The fact that a municipality is investigated for corruption increases the probability of neighboring municipalities being detected, leading them to adapt their behavior when the case is public.

Proposition 3: *Municipalities will use more transparent and open award procedures to dismiss any suspicions when a neighboring municipality is under the spotlight on corruption.*

This third proposition highlights the fact that investigation of corruption in a municipality has some spillovers over its neighbors. We expect that, to avoid being investigated for favoritism as well, municipalities located in the neighborhood of an investigated one will adapt by using more transparent and open award procedures to reduce the probability of being investigated for favoritism. Therefore, to avoid any

[4]Very often, when a private company is engaged in corrupt practices with one municipality, it also tries to engage in such practices with other municipalities located in its business area. This is why a corrupt municipality in the north of France should not worry about investigations in the south but should be significantly worried about investigations in its vicinity. See, e.g., https://www.nouvelobs.com/justice/20170118.OBS3990/plusieurs-maires-d-ile-de-france-corrompus-par-un-promoteur-immobilier.html

suspicion, municipalities will tend to use open auctions instead of award procedures allowing discretionary power.

From Bandiera et al. [2009] we derive a distinction between active and passive waste. On one side, active waste is generated when decision makers derive utility from waste. The typical example is corruption. On the other side, passive waste is such that its presence reduces his utility. One potential cause of passive waste in public procurement is the excessive regulatory burden that makes procurement costly and time-consuming (Kelman [1990, 2005]). If the neighbors of investigated municipalities are actually not corrupted and react by fear of being suspected, the signal received may generate passive waste. Indeed, municipalities may react by using more transparent and open award procedures, which could not be optimal if an award mechanism with more discretionary power would yield a better outcome. On the contrary, if the neighboring municipalities do react by using more transparent and open award procedures, because they are actually guilty, the spillovers trigger a positive effect by reducing active wastes. The reduction of active waste may outweight the increase of passive waste in that case.

2.4 The institutional context

2.4.1 The use of discretion in public procurement

The French law on public procurement is primarily based on the European procurement directive. As our procurement data cover the period from 2006 to 2015, our institutional framework is based on the EU Directive 2004/18 of March 31, 2004, as well as on the 2006 French Code for public procurement[5]. To mitigate the risk of corruption in public procurement, the European Commission (EC) sets value thresholds above which public authorities have to use a formal procedure, which consists of an open auctions without negotiation (Table 3.2). The use of negotiated procedures is not allowed, except in certain specific cases set by the EC. For every contract

[5]We are not concerned with the new European Directives on Public Procurement voted on in 2014 (2014/24/UE and 2014/25/UE) and adopted into French law in 2016.

below this threshold, national laws apply while still respecting the pillar principles set by the EU, namely, equal treatment, non-discrimination, and transparency.

In France, public buyers may in this case use what is called an adapted procedure (*procédure adaptée*). Its main objective is to give a high degree of discretion and flexibility to the buyer in order to find out the most efficient way to procure goods and services involving low complexity. Indeed, projects that are more complex are usually more difficult to execute (Bajari et al. [2009], Chong et al. [2014]). In this procedure, "ways and means are freely chosen by the public buyer and should adapt to the nature and characteristics of the needs, the number or location of firms that are likely to participate to the tender, and to the circumstances of the procurement"[6]. The buyer is in particular free to define the advertising and competitive processes that are the most proportionate to the purpose, value and circumstances of the purchase (see Table 3.1 for a detailed presentation of the characteristics of this procedure, as well as a comparison with the open auctions procedure).

The main benefits of this procedure are the possibility to directly negotiate, the possibility to adjust the deadlines to the constraints (nonexistence of a minimal number of days to submit an offer), the possibility of not specifying the weights associated with selection criteria ex ante, the possibility to choose the most appropriate publicity support, a freedom of choice regarding the contracting formalism, and the possibility to directly contact the firms to submit an offer. Also, public buyers have the possibility to award to select the contractor based on his experience. It is noteworthy that, in case of negotiation, the buyer has the possibility to restrict competition to a limited number of candidate firms. He is even advocated to do so since negotiating with too much candidates is a waste of time and thereby, a cost. It is estimated that it is difficult for a small public buyer to directly negotiate with more than two or three candidates.[7] The restriction of competition to a pool of bidders should be notified in the call for tenders.

[6]Article 28 of the French Code for public procurement

[7]Direction des Affaires Juridiques (French Legal department), Les marchés à procédure adaptée, available at: https://www.economie.gouv.fr/files/directions_services/daj/marches_publics/conseil_acheteurs/fiches-techniques/mise-en-oeuvre-procedure/marches-procedures-adaptees.pdf

This flexibility should lower the administrative burden of organizing a tender, thereby resulting in lower ex-ante procurement costs compared to the rigid open auctions procedure. The other ambition of this procedure is to facilitate the access of firms that are not able to participate to tenders above the formal thresholds, in particular new entrant and SMEs. Indeed, contracts above the formal threshold value require a three-year balance sheet of the firms, a document that new entrants are not able to provide. On the opposite, the adapted procedure accepts a simple official bank statement. Additionally, new entrants and SMEs are often not used to formal procedures, which results in disproportionally high costs for them. Finally, it is recommanded that the public buyer does not ask for an excessive number of documents, in particular to SMEs.

It is noteworthy that, under the formal thresholds, the authority is not compelled to use an adapted procedure. It has the possibility of using a formal one. In practice, below the European thresholds, French municipalities use both the adapted procedure and open auctions. Ultimately, below the European thresholds, French municipalities might decide to use a very flexible award procedure in terms of degree of discretion (the adapted procedure) or a formal one (an open auctions). As the adapted procedure is considered less costly for simple contracts, we should observe only this type of award procedure below formal thresholds.

However, it appears that public buyer often opt for a formal procedure instead of an adapted one by fear of any legal risk.[8] Adapted procedure has been increasingly used in France. Whereas they represented less than 40% of award procedures for contracts below the EU threshold in 2006, they represented almost 80% of them in 2015. On average, adapted procedures represent approximately 70% of calls for tenders in France between 2006 and 2015 (see Table 2.3). This type of procedure has been first introduced in 2004, and it has been increasingly used since (Figure 3.1).

One of the reasons why we do not exclusively observe adapted procedures in con-

[8]EDT, Vade-mecum Mapa, available at: http://www.achatpublic.info/sites/default/files/document/documents/guide_MAPA_ETD_1.pdf?from=base-documentaire&page=228, 2010

tracts below the threshold is because this procedure entails much greater legal uncertainty than open auctions. The procedural flexibility associated with this procedure is limited by the pillars set by the EC mainly transparency, freedom of access and equal treatment of candidates. Given the flexibility allowed by the procedure, it is very difficult for public buyers to be sure to comply with these obligations. For example, the adapted procedure allows a negotiation phase. At the drafting stage of the consultation document, the question for public buyers is whether the modalities under which the negotiation is going to take place are accurate enough to comply with the principles of public procurement. For example, public buyers may wonder whether it is possible to specify only that negotiation is going to be allowed or whether they should precisely define the modalities of the negotiation. During the negotiation phase, other questions may arise such as how to ensure the traceability of the dialogue between the companies and the buyer. Once the selection of the operator has been made, the period before the signature of the contract is also a source of great uncertainty for buyers because the case law is unclear on whether a time limit between the notification to unsuccessful candidates and the signature of the market should be respected. Because of the legal uncertainty associated with the adapted procedures, some buyers may prefer to resort to open auctions, to avoid the risk of legal claims and the costs associated with mastering the procedure. The challenging of contracts before a court is costly and time consuming, and may cause the elected official to leave its public position and to be prosecuted. Second, public buyers may be reluctant to use the adapted procedure to avoid any suspicion of corruption. The adapted procedure indeed introduces discretion at several stages of the procedure, from the advertising to the way the choice of the operator is made. Spiller [2008] shows that when a third party competes with the public buyer in another political market, the former may behave opportunistically by challenging the probity of the latest. In this case, contracts are more likely to be framed in a formal award mechanism and the use of relational contracting is less likely (Beuve et al. [2018]). Third, some public buyers are also unaware of the freedom this procedure offers them.

2.4.2 The anti-corruption legal framework

The legality of the award procedure is ensured by the obligation to select the winner of the contract within an award commission. Its role is to examine the offers and to award the contract. It is made of six participants, of which the mayor, and five other elected members of the municipal council. However, this commission is not mandatory anymore in case of a contract below the formal threshold. In a second step, the legality of the contract is randomly audited by the head of the *département* (a geographical division, similar to counties) as soon as the value of the contract is above the threshold value of supplies and services (even in the public works sector whose threshold is larger). Finally, there could be an ex-post audit to oversee the smooth running of the contract. This audit is also random and very general. In general, this type of audits only leads to overall recommandations about a better use of public funds.

Suspicion of corruption could be triggered either by the denounciation from a third party or either from auditing. It takes a judicial dimension as soon as there is a formal complaint. Then a criminal investigation is opened by a criminal court, and may yield to the custody and perquisition of the suspected entity. At the end of the investigation, the suspect is either prosecuted or the case is closed (Figure 2.3). The defendant encurs a penalty of up to 2 years of imprisonment and a fine of maximum 30,000 euros. Also, he may lose his citizen's privilege for up to 5 years.

The judicial procedure in France for cases of favoritism takes a long while. Indeed, the average duration of the legal proceeding (i.e. the duration between the date of the infrigement and the trial) is about 7.5 years (SCPC [2014]). In 2013, a total of 16 cases of favoritism went before a court. 63% of condamnation for favoritism were punished with fines and 44% with emprisonment. It is noteworthy that the incriminated facts cannot be prosecuted three years after they have been committed.

2.5 Data

2.5.1 Award notices

This paper is based on two datasets. The first is a collection of information about public procurement contracts of French municipalities between 2006 and 2015.[9] It includes every call for tenders in France (i.e., approximately 80K observations per year). We were able to collect award notices only for a sub-sample of contracts (i.e., for approximately 14K observations per year). When focusing only on municipalities, we end up with a sample of 64,304 observations, where each represents a contract (see Table 2.4).[10]

Contracts

To account for the award mechanism, we created a dummy variable *Formal procedure* that takes the value of one if a municipality decides to award a contract i through a formal procedure that consists of an open auctions. In the rest of this paper, we refer to the use of open auctions when under the formal threshold as a "formal procedure".

In addition to the information concerning the award procedure, we also have access to the object that is tendered; we categorize it at a broad level (supplies, services, and public works contracts) and at a finer level, as we have the associated Common Procurement Vocabulary (CPV) code.[11] As in Bajari and Tadelis [2001], the complexity of the contract is approximated by two variables, namely, *Total value* and *Divisions*. The former variable corresponds to the overall project value, while the latter is the number of divisions[12] (lots) of the contract. Usually, more expansive

[9] We thank InfoPro Digital for producing and gracefully offering us these data.

[10] Examining the sample distribution by product type (e.g., Public works, Services and Supplies) and by type of award mechanism (see Tables 2.5 and 2.6), we observe that in our sample, certain product types and mechanisms are overrepresented because the data collection focuses on high value contracts.

[11] The CPV code establishes a single classification system for public procurement at the European level. Information is available at https://simap.ted.europa.eu/web/simap/cpv

[12] We use the terminology of Bajari et al. [2009]. In europe, division of contracts are also desig-

projects with more divisions are associated with a higher degree of complexity. We also observe the value of each division, *Value of division*. Finally, our dataset indicates the number of participants to the tender *Number of bidders*, and we construct a variable indicating the expected number of participants to the tender, *Expected participation*. As participation is known *ex-post*, we use the calculated average number of bidders participating in a tender in the past within the same buyer's *département* (county) and in the same category of projects of the contract.

Contracting authorities

We also have access to detailed information about the identities of contracting municipalities. The location of the municipality is known accurately, as we have its address and postal code. We also control for the buyer's experience toward the use of adapted procedure, *Experience*. This variable is calculated as the number of adapted procedures used by the municipality in the previous period over its total number of contracts awarded under the formal threshold. As a more recent buyer's behavior is more likely to impact the current one, we give more weight to observations that gets closer to the date of the contract.

Private contractors

Our dataset indicates the identity of the firm that wins a division of a tender. Using its location, we can compute *Distance*, which is equal to the distance between the winner and the contracting authority. This allows us to control for the impact of investigation of favoritism in a further step.

2.5.2 Corruption cases

In France, there is no institution that maintains a centralized and exhaustive registry of corruption cases to make such data public and easily accessible. To collect this information, we used an online platform collecting press articles from approximately 8,000 sources.[13] We collected publicly alleged or adjudicated cases of favoritism

nated by the term *allotment*.

[13]http://www.europresse.com/en/public-library/

in public procurement that were published in the local press. We restricted our collection to cases that happened in France from 2005 to 2015. Through these press article, we were able to collect the name of the investigated local official, the name of the public entity that he represents, and the date the official investigation has been opened. We were also able to track the cases over time and observe whether it was any judicial proceeding, and if this was the case, whether the defendant was found guilty.

We eventually obtained 87 cases of favoritism. Almost all our collected cases were subject to an official investigation (81%). 92% of cases that were investigated yield to a lawsuit (for 8% of them we have no information about whether the case was dropped or whether the trial is forthcoming). Then, of the cases that were brought before a court, the defendant was found guilty for 88% of them. Interestingly, all size of municipalities are represented in our sample (Figure 2.5).

2.6 Empirical Strategy

We distinguish two groups in our data, the treatment and the control groups. First, the investigated municipalities constitute our treatment group. Second, we compare this group with a control group that is made of municipalities that are not under investigation. We can also observe the data before and after an exogenous shock that is the opening date of the investigation of corruption. More specifically, we consider a municipality to be investigated when an official investigation is opened (Figure 2.3). The reason is that local press almost exclusively reports a corruption case once under inquiry.

In a second step, we test our third proposition by exluding the suspects from our treatment group, and instead consider the neighbors of investigated municipalities. Following the literature on the impact of media coverage of corruption cases (Di Tella and Franceschelli [2011], Costas-Pérez et al. [2012], Muço [2017]), we define neighbors as municipalities belonging to the same region as the suspect.[14] France, is made

[14]We also test the robustness of our data by considering a lower geographical unit, the *départe-*

of 18 regions[15] that consists of geographical units. Indeed, our cases of supicion are collected in the regional press, and should therefore cover the region. The regional press is the second channel of information in France, after the television.[16]

Therefore, we examine the effect of investigation of favoritism using a differences-in-differences methodology that is estimated as follow:

$$Y_{ijt} = \beta X_{ijt} + \delta I_{it} + \alpha_i + \alpha_t + \epsilon_{ijt} \tag{2.1}$$

where i indexes municipalities, j indexes contracts, t indexes time, Y_{ijt} is the dependent variable, X_{ijt} is a set of explanatory variables, I_{it} is a dummy variable equal to one if the municipality has been under investigation or is in the neighborhood of a municipality that has been under investigation by time t in municipality i, and α_i and α_t represent municipality and time fixed effects, respectively.

One difficulty of this setting is that we do not have a unique exogenous shock, namely, the year of being under investigation, that would allow us to clearly define the control group before and after the shock. As discussed by Bertrand and Mullainathan [2003], we have staggered dates so that our control group is not restricted to municipalities that were not under investigation at all.

The same empirical strategy is used when examining the impact of investigation on neighborhood municipalities instead of investigated municipalities themselves. Using the dataset listing cases of favoritism, we were able to identify the award notices of tenders that were organized in investigated municipalities.[17]

Our empirical strategy consists on measuring three outcomes. First, we assess the impact of investigation over the degree of discretion adopted by a municipality for each contract. According to the law, discretion may be used for contracts of value

ment, and our results still hold.

[15] In the time frame we consider in our data, there were 27 regions. A law was passed in 2016 to reduce their number to 18 regions.

[16] Observatoire du journalisme, 2018

[17] We removed the concession contracts – which are a specific type of public procurement – and contracting authorities located overseas. We only kept observations for which the value of the contract is known and excluded the purchase orders.

below the formal European thresholds through the use of an adapted procedure. However, as discussed before, the use of such a mechanism is not mandatory, as the authority may decide to use a formal mechanism (i.e. an open auctions). Therefore, we take advantage of this freedom of choice between an adapted and a formal procedure under the thresholds to examine the impact of investigation of corruption on the degree of discretion chosen by a local contracting authority. This impact is considered over two geographic dimensions. The first is the effect on the investigated municipality itself. The second addresses the municipalities located in the same region as the investigated municipality. We ultimately obtain 33,464 observations with a total of 36 investigated municipalities (Table 2.8).[18] Second, we asses whether investigation of corruption triggers any change in the competitive environment (i.e., the number of participants to the tender) when there is discretionary power. Finally, we perform the same analysis but we consider the location of winning firms (i.e., the choice of a local firm) as our outcome of interest. Indeed, since corruption is more likely to be settled with local firms, we expect to observe an impact of investigation over the location of the selected supplier. We also consider the impact over both investigated and neighboring municipalities. Since the number of partipants to the tender and the location of the winning firm are both provided at the division level of the contract, each observation constitutes a division of a contract. We eventually end-up with 9,063 observations when considering the participation as our outcome of interest (Table 2.10), and 22,872 for the localism (Table 2.11). Since these outcomes are potentially influenced by ideology, we control for the political dimension by using the political color of the mayor of the municipality (right wing vs. left wing). We refer to the political wing by using the dumy variable *Left* that is equal to one if the mayor belongs to the left wing.

[18]We intially collected 86 cases of corruption. However, we only consider those who lead to the opening of an official investigation. More importantly, since our empirical strategy consists of a differences-in-differences setting, we only keep cases related to municipalities with a reasonable number of of award notices before and after the opening of the investigation.

2.7 Results

2.7.1 Effect of the investigation of corruption over the choice of award procedure

To examine the consequence of investigation on the likelihood to use of formal award procedures (open auctions), we estimate equation (1) using a logit regression. The dependent variable *Formal procedure* is a dummy equal to one if the municipality awards the contract using an open auctions (and therefore has to comply with the European formal rules of public procurement). The variable of interest, *Suspect*, is a dummy equal to one if a municipality has been investigated for favoritism. This regression thus estimates the likelihood of using a formal procedure when the municipality is under investigation. As the serial independence assumption is likely to be violated, standard errors are clustered at the municipality level (Bertrand et al. [2004]). Summary statistics of our control variables are provided in Table 2.8. Results from our model are given in Table 2.9. Columns 1 and 2 show estimates of a logit regression of the effect of investigation on the choice of award mechanism in an investigated municipality. As expected, we observe no significant effect of investigation, meaning that municipalities do not change their behavior once under investigation. This is consistent with our Proposition 1 suggesting that as soon as one municipality is investigated for corruption, the probability of being effectively convicted is independent of its adaptation. Indeed, as soon as one municipality is investigated for corruption, the probability of being effectively convicted is independent of its current choice of award procedure. In addition, since the objective of the adapted procedure is to lighten the regulatory burden related to the organization of a tender, it might still be efficient to go on with this procedure. The best strategy is therefore to continue as before and wait for the investigation results. This finding is confirmed in columns 3 and 4 where we differentiate between investigated municipalities that were found guilty (*Suspect - Guilty*) from those where the defendent was not convicted (*Suspect - Not guilty*).

We also observe that the potential number of participants in the tender significantly decreases the probability of using a formal procedure (columns 2 and 4). Higher value contracts are associated with a positive probability to use an adapted procedure. Those two results are not consistent with the propositions of Bajari et al. [2009]. However, we must keep in mind that we are only considering low-value contracts that are below the EU threshold. As higher value contracts are usually associated with more complexity (Bajari et al. [2009]), we expect the contracts we consider to be not complex. Also, another plausible explanation for these results is that adapted procedure are promoted because they are less costly to organize. Therefore, it is may be worthy to use this procedure for a low-value contract since the cost of organizing the tender represents a higher share of the total value of the contract. As the latest increases, the use of an adapted procedure gets less worthy. Also, this result may be driven by the need to avoid suspicions of corruption or favoritism for contracts of higher total values (Spiller [2008], Moszoro and Spiller [2012]).

The number of divisions of the contract, which is commonly used as a proxy for complexity (Bajari et al. [2009]), does not play any significant role and we observe that buyers that are more used to adapted procedures (*experience*) are significantly less likely to adopt an open auctions mechanism. Finally, the services and supplies sector are more likely than public works to be awarded through a formal mechanism.

To test our third proposition, we use similar specification but instead of accounting for the effect of investigation over the investigated municipality itself, we consider its effect over neighboring municipalities. Results from Table 2.12 show that the primary variable of interest, $Neighbor$, which is a dummy equal to one if the municipality is located in the same region as the investigated one, is significantly positive as long as the municipality fixed-effect is introduced (column 2). This results is in line with our expectations (Proposition 3). Neighboring municipalities therefore react by increasing their likelihood of adopting a formal instead of an adapted procedure. This suggests that for municipalities located near investigated ones, the scrutiny of their actions increases, as does their probability of being detected, giv-

ing them incentives to adapt quickly to the new circumstances. Since corruption is often a network phenomenon involving many municipalities, one possibility is that municipalities are also involved in the same case of corruption as the investigated one. We therefore assess whether neighbors react only when the investigated one is actually guilty (and do not react if the suspect is found not guilty) in columns 3 and 4.

We find a significant an positive effect from being neighbor of a guilty municipality (*Neighbor - Guilty*) over the probability to use a formal procedure. There is however no significant effect when the neighbor is found not guilty (*Neighbor - Not guilty*). In column 4, we observe that all the effect from investigation comes from investigated municipalities (there is no sufficient variation in the "not guilty" group).

We draw two main conclusions from this section. On the one hand, investigated municipalities do not react by opting for more formal and rigid award mechanism (open auctions). This result confirm our first proposition claiming that once under investigation, the probability of a municipality being effectively convicted is independent of its adaptation. On the other hand, neighbors of investigated muncipalities do react as they are less likely to use an adapted procedure after investigation. However, only neighbors of municipalities that are found guilty change their behavior. This finding suggests that responsive neighbor to investigation might be also involved in the case under investigation.

2.7.2 Suspicion of corruption and competition

Even if investigated municipalities do not react to investigations of favoritism by changing the award procedures for their procurement contracts, they might make efforts to reduce favoritism, in particular when the buyer has a discretionary power. In other words, investigated municipalities might not change the way they award a contract, but they might want to reduce favoritism, especially since suspicion of corruption triggers scrutiny. If municipalities follow such a strategy, this would lead investigated municipalities to increase competition either by increasing the number

of invited bidders if they restrict competition, or by sending a positive signal to the firms. When a case of corruption is pubicly raised, firms may receive a positive signal since they can suppose that the investigated municipality is less likely to be bribed anymore. Investigation may also lead them to select fewer local suppliers (i.e., to reduce favoritism). To this end, if competition is restricted, the municipality may change the pool of invited bidder, or it may also stop to restrict competition at all. However, our data are not accurate enough to indicate whether competiton is restricted when using adapted procedures. Finally, it could be the case that selecting local firm is one criteria of the award. In that case, municipalities may cease this practice. The extent of localism consists of the calculation of the distance between the contracting authority and the location of the winning contractor.

The empirical strategy is analogous to the one given in equation (1), except that we restrict our sample to contracts awarded with adapted procedures. Indeed, we want to measure the impact of investigation over competition when discretion is allowed. Also, since contracts are divided in divisions and the number of participants may vary between them, our specification is at the division level, not at the contract one. We examine the effect of investigation of favoritism on the number of participants and localism using a differences-in-differences methodology.

Suspicion of corruption and the number of participants

Variables used in the following specifications are identical to those used for the primary set of regressions from section 2.7.1. Summary statistics of the these variables are available in table 2.10.

As the number of participants is a count variable that takes only nonnegative integer values, we estimate our specification using a negative binomial regression.[19] As it is always informative to perform an OLS regression in such a case, we first display the results from this estimation in table 2.13.

Columns 1 to 4 from table 2.14 assess the impact of investigation of corruption

[19]In the case of count dependent variable with a greater variance than the mean (overdispersion), it is recommended to use a negative binomial instead of a poisson regression (Wooldridge [2013])

over the number of participants to the tender in investigated municipalities. An interesting outcome is that only convicted municipalities obtain an increase in their participation (columns 3 and 4). Since we only regress over contracts awarded through an adapted procedure, one explanation of this result could be that they may invite a larger pool of firms to participate to the tender, or may even stop to restrict competition at all. Another explanation is that surrounding firms receive a positive signal (which is to be more likely to win a contract) that the municipality is no longer corrupted since it is now under higher level of third-party scrutiny.

Columns 5 to 8 perform the same specification but over neighboring municipalities. In that case, we also observe that only municipalities with a convicted neighbor have a positive effect over competition (column 8). Neighbors of municipalities that were found not guilty have no significant effect over their participation.

Overall, we observe that only investigated municipalities that are eventually found guilty do attract more participants in their adapted procedures. The channel trough which competition is fostered is not totally clear. It could either result from a change in the number of invited bidders to the tender or be the consequence of firms more willing to participate to a tender in a municipality that is under scrutiny.

Interestingly, participation increases only for municipalities with an investigated neighbor that is eventually convicted. The possible explanations would be that either those municipalities are also corrupted, or just increase the number of invited firms to participate by fear of being unfairly suspected of corruption. Another possibility is that firms are more likely to win the tender since those that were involved in the corruption case do no longer participate to public procurements. Therefore, firms may be more willing to participate to public procurement.

Suspicion of corruption and localism

Since favoritism usually involves local firms, we assess the impact of investigation on localism. To this end, we calculate the distance between the municipality of the contracting authority and that of the contractor (see Table 2.11).

We expect our variable of interest *Suspect* to positively impact the distance between the contracting authority and the contractor.

Columns 1 to 4 of Table 2.15 assess the effect of investigation over the distance between the public buyer and the winning firm of the contract. We observe that municipalities being investigated for corruption do select more distant bidders compared to other municipalities in adapted procedures (column 2). This effects is especially driven by municipalities that are eventually found guilty (columns 3 and 4).

Results from columns 4 to 8 show that there is no significant effect over localism for municipalities with an investigated neighbor, whatever his guilt. Therefore, this result is not in accordance with our previous results, namely that munipalities react by adopting more adapted procedures, but only when they are neighbors to a guilty municipality only, and that they increase the participation to their tender only when the neighbor is guilty. Those results suggest that those municipalities may be involved in the same case of corruption as the investigated municipality.

Results from this section may invalidate this hypothesis. However, the localities of winning firms in neighboring municipalities may not significantly change either because they do not perceive localism to be a signal of corruption, or the pool of participating firms belongs to the same geographic area before and after investigation.

2.8 Robustness checks and placebos

2.8.1 Robustness checks

One weakness of our estimations is the control group we use. Indeed, we show in Table 2.9 that investigation of corruption has a significant and positive impact in the neighboring municipalities on their choice using a formal award mechanism (open auctions). This may make our control group dependent on the treatment group.

Therefore, we run a set of logit regressions similar to those from section 3.6, but we exclude the neighbors from the treatment group.

Estimates of the robustness check for the impact of investigation of corruption on the choice of the award mechanism are given in Table 2.16. Columns 1 and 2 show that the variable of interest, *Suspect*, is still not significant as long as municipality fixed effects are included. The same result is valid for the impact of being a municipality that is eventually found guilty (column 3 and 4). All our other estimates are very robust to this specification.

We also check the robustness of the negative binomial regression assessing the effect of investigation over the number of participants to the tender (Table 2.17). Our results are very robust when we remove the neighbors of investigated municipalities from our control group. Only the effect from the sector of supplies is no longer significant.

We perform the same robustness check for the impact of investigation over the localism (Table 2.18). Even though we find that *Suspect* is no longer significant in column 2, the coefficient *Suspect - Guilty* still shows a positive and strong significant effect.

2.8.2 Placebos

Our placebo test consists on randomly allocating the treatment to municipalities that have neither been investigated favoritism nor being neighbor of investigated municipalities. We perform this test 1000 times over two sets of regressions. First we assess the impact of being an investigated municipalities over the likelihood to use a formal procedure. Our coefficients are positive and significant at the 5 percent level of confidence for 5.5 percents of cases. Second, we perform a similar regression but we assess the effect over guilty municipalities only. Our coefficients are positive and significant at the 5 percent level of confidence for 5.6 percents of cases. We conclude that the placebo effect has no effect over the likelihood to adopt an formal procedure. The distributions of coefficients from the two specifications

are respectively displayed in Figures 2.6 and 2.7.

2.9 Conclusion

Using data on public procurement in French municipalities, we assess the impact of investigation of corruption on the choice of formal award procedures. We observe that investigated municipalities (i.e., those under investigation) do not react by changing their award procedures. One plausible explanation is that such municipalities have no interest in changing their behavior as long as investigations are pending. Behaviors that facilitate corruption have to be hidden, knowing the cost incurred in the event of detection. As soon as one municipality is investigated for corruption, the probability of being effectively convicted is independent of its adaptation. An adaptation might even be perceived as an element of proof that a certain aspect of the way contracts were awarded was improper. However, although investigated municipalities do not react by changing the way they award contracts formally, they nevertheless try to attract more bidders and reduce localism once under investigation. This is because the investigation may increase third party's scrutiny over the beahvior of the municipality, making it less likely to be corrupted anymore.

We draw two main conclusions from this section. On the one hand, investigated municipalities do not react by opting for more formal and rigid award mechanism. This result confirm our first proposition claiming that once under investigation, the probability of a municipality being effectively convicted is independent of its adaptation. On the other hand, neighbors of investigated muncipalities do react as they are less likely to use an adapted procedure where discretion is allowed. However, only neighbors of municipalities that are found guilty change their behavior. This finding suggests that responsive neighbor to investigation might be also involved in the case under investigation.

In addition, our results indicate that investigation has a positive effect on the use of formal procedures in neighboring municipalities. When under the spotlight, neigh-

bors experience “negative” externalities from an investigated municipality and have an incentive to adapt in order to reduce the probability of being detected or investigated. This is good news, considering that uncorrupted municipalities have no reason to adapt. Knowing that investigations and prosecutions of corruption in public procurement are rare, this means that investigations have a positive impact not only on the very few investigated municipalities but also on potentially corrupt neighboring municipalities.

2.10 Tables

Figure 2.1: The cost of corruption

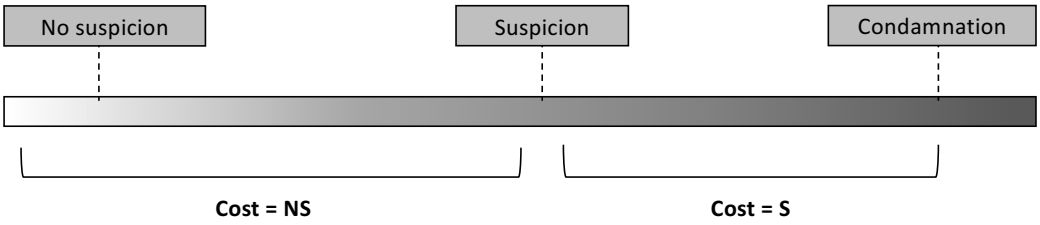


Table 2.1: Public procurement thresholds for local contracting authorities (2006-2015)

	Supplies and services	Work
2006-2007	210 000 €	5 270 000 €
2008-2009	206 000 €	5 150 000 €
2010-2011	193 000 €	4 485 000 €
2012-2013	200 000 €	5 000 000 €
2014-2015	207 000 €	5 186 000 €

Table 2.2: Main characteristics of the adapted and the open auctions procedures

	Adapted procedure (*procédure adaptée*)	**Open Auction**
EU Threshold	Below.	Below or above.
Is negotatiation possible ?	Yes (but not mandatory), over **all** aspects.	Not possible on any aspect.
Publicity	- If the value of the contract <90,000€: mandatory, but publication is not. Free choice of publicity support. - If the value of the contract >90,000€, should be published in an official journal.	Should always be published in an official journal.
Consultation documents	Could be limited to the main characteristics of the awarding mechanism, to the condition of the negotiation, and to the selection criteria of the submitted tenders. The redaction of technical specifications is not mandatory, but recommended.	Very detailed and specific.
Submission deadline	Free choice.	Minimum of 52 days.
Proof of the firm's financial capabalities	Not mandatory. The participation of new firms (less than 3 years) is possible since they can provide a bank statement rather than a three-year balance sheet.	At least the turnover from the past three years.
Candidates' experience	Can be requested.	Cannot be requested.
Weighting of awarding criteria	Not mandatory.	Mandatory.
Restricted pool of candidates	Possible.	Not possible.
Awarding commission	Not mandatory.	Mandatory.
Immediate notification to the rejected participants	Not mandatory.	Mandatory.
Standstill[1]	Not mandatory.	Minimimum of 16 days.
Publication of the award notice	Not mandatory.	Mandatory.

[1] The standstill is a suspensive deadline between the annoucement date of the awarding notice and the signature of the contract. It allows for the rejected candidates to contest the ways the awarding process was conducted.

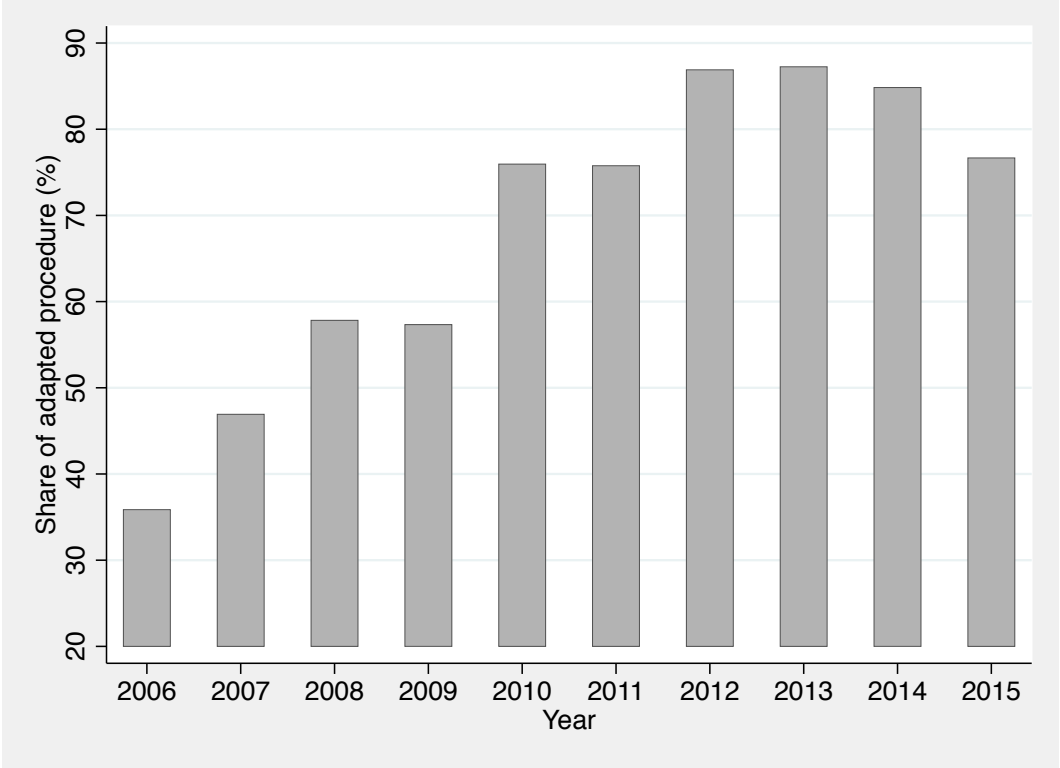
Source: Legifrance, Circulaire du 29 décembre 2009 relative au Guide de bonnes pratiques en matière de marchés publics, 2009, available at: https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000021570204
Direction des Affaires Juridiques, Les marchés à procédure adaptée, 2015, available at: URLhttps://www.economie.gouv.fr/files/directions_services/daj/marches_publics/conseil_acheteurs/fiches-techniques/mise-en-oeuvre-procedure/marches-procedures-adaptees.pdf
EDT, Vade-Medum MAPA, 2010, available at: http://www.achatpublic.info/sites/default/files/document/documents/guide_MAPA_ETD_1.pdf?from=base-documentaire&page=228

Table 2.3: Distribution of the award mechanisms - All contracting authorities

	Percent
Adapted procedure	69
Open auction	22
Negotiated procedure	3
Restricted auction	1
Others	5

Note: Includes all values of contract (below and above the EU threshold).

Figure 2.2: Share of adapted procedures for contract below the EU threshold in French municipalities (2006-2015)



Note: Share of adapted procedures over the total number of award notices at the municipal level for contracts below the EU formal threshold.

Table 2.4: Yearly distribution of call for tenders and award notices at the municipality level (2006-2015)

	Calls for tenders		Award notices	
Year	Freq	Percent	Freq	Percent
2006	89 958	10.97	10 161	15.8
2007	92 646	11.30	7 402	11.5
2008	76 555	9.34	6 345	9.9
2009	74 731	9.11	4 857	7.6
2010	80 977	9.87	6 305	9.8
2011	85 848	10.47	7 554	11.8
2012	74 398	9.07	6 354	9.9
2013	83 588	10.19	5 834	9.1
2014	78 022	9.51	4 699	7.3
2015	83 320	10.16	4 793	7.5
Total	820 043	100	64 304	100

Note: This table only considers contracts at the municipality level. Frequencies for the calls for tenders and the award notices include contracts both above and below the EU formal threshold. However, they are restricted to notices for which the contract value is clearly stated. Also, we exclude instances of purchase orders as well as contracts subject to a definite and a conditional value.

Table 2.5: Sample distribution by award mechanism (2006-2015)

	Calls for tenders		Award notices	
Award mechanism	Freq	Percent	Freq	Percent
Adapted procedure	647 519	79%	36 087	56%
Open auction	126 478	15%	23 017	36%
Negotiated procedure	15 083	2%	3 647	6%
Restricted auction	4 662	1%	1 209	2%
Other procedures	26 301	3%	344	1%
Total	820 043	100	64 304	100

Note: This table only considers contracts at the municipality level. Frequencies for the calls for tenders and award notices include contracts both above and below the EU formal threshold. However, they are restricted to notices for which the contract value is clearly stated. Also, we exclude instances of purchase orders as well as contracts subject to a definite and a conditional value.

Table 2.6: Sample distribution by type of products over the period 2006-2015

	Calls for tenders		Award notices	
Sectors	Freq	Percent	Freq	Percent
Public works	405 214	49.4	37 245	57.9
Supplies	115 060	14.0	7 098	11.0
Services	299 769	36.6	11 992	18.6
Total	820 043	100	64 304	100

Note: This table only considers contracts at the municipality level. Frequencies for the calls for tenders and award notices include contracts both above and below the EU formal threshold. However, they are restricted to notices for which the contract value is clearly stated. Also, we exclude instances of purchase orders as well as contracts subject to a definite and a conditional value.

Figure 2.3: Chronology of legal proceedings in France

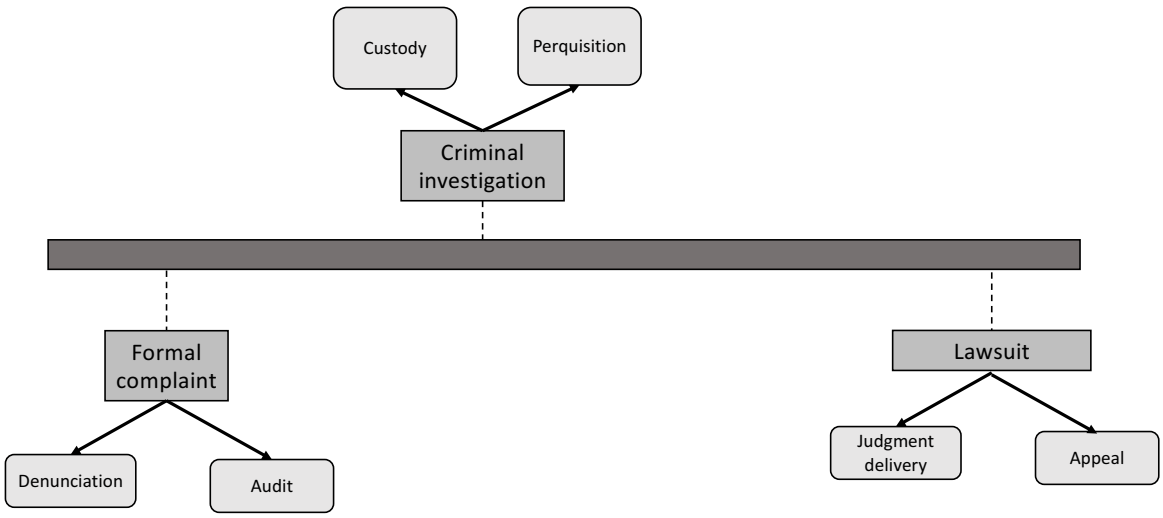
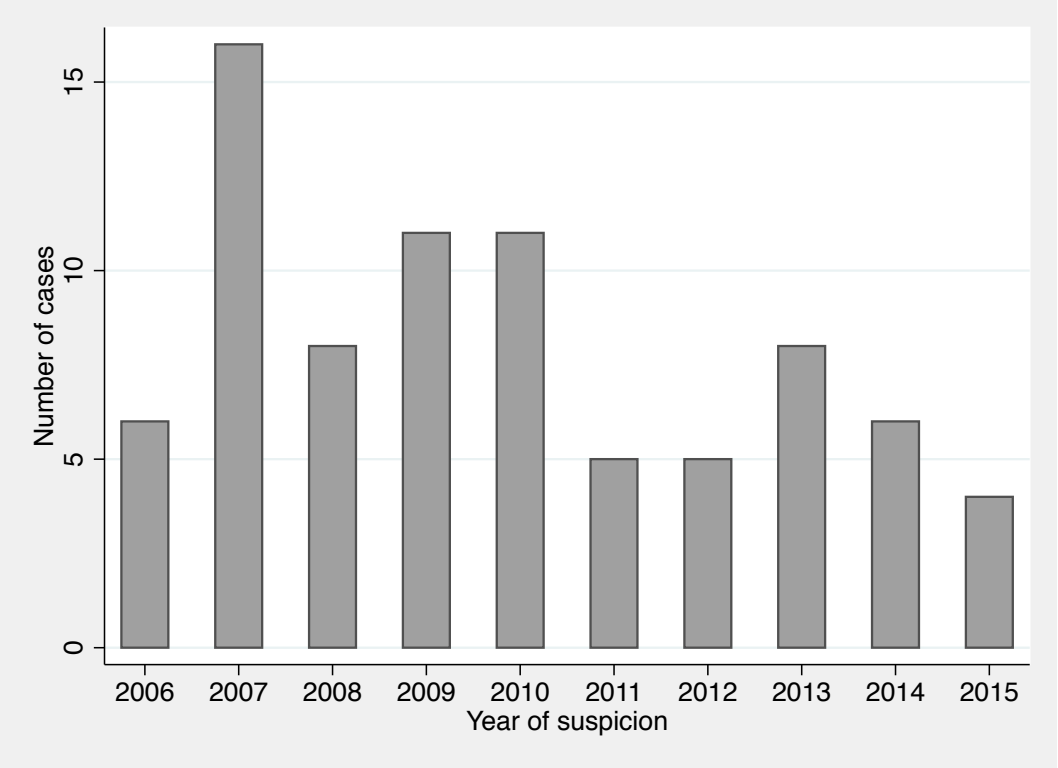


Figure 2.4: Distribution of cases of investigation in French municipalities (2006-2015)



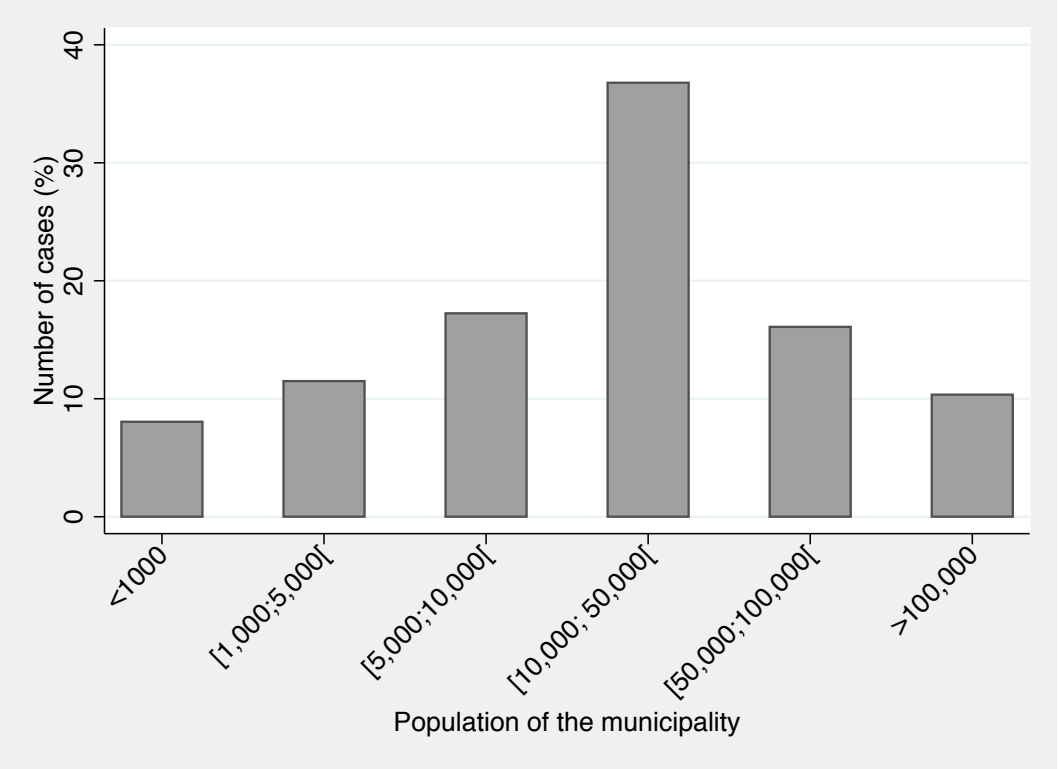
Note: Those cases were collected using an online platform collecting press articles from about 8,000 sources. We collected publicly published alleged or judged cases of favoritism in public procurement. We brushed up the local press and restricted our collection to cases of favoritism at the municipal level.

Table 2.7: Distribution of award mechanisms between 2006 and 2015

	Not investigated		**Investigated**	
	Freq	Percent	Freq	Percent
Adapted procedure	20700	65.74	2082	67.80
Open Auctions	10788	34.26	989	32.20
Total	31488	100.00	3071	100.00

Note: This table gives frequency for contracts *below* the EU formal threshold. This subsample represents the case where municipalities are able to choose between an adapted procedure and a formal one (open auctions). *Investigated* stands for municipalities where an official investigation for favoritism has been launched.

Figure 2.5: Distribution of the size of investigated municipalities (2006-2015)



Note: Those cases were collected using an online platform collecting press articles from about 8,000 sources. We collected publicly published alleged or judged cases of favoritism in public procurement. We brushed up the local press and restricted our collection to cases of favoritism at the municipal level.

Table 2.8: Summary statistics for the award mechanism dataset

	Not investigated			**Investigated**		
	Obs	Mean	Std.Dev.	Obs	Mean	Std.Dev.
Formal procedure	30395	0.34	0.47	3069	0.32	0.47
Total value	30395	282231.32	584412.23	3069	365234.23	741209.82
Expected participation	30395	5.33	3.29	3069	4.77	1.56
Divisions	30395	2.51	2.97	3069	1.86	2.13
Experience	30395	0.51	0.27	3069	0.52	0.18

Table 2.9: Choice of formal award mechanism - Investigated municipalities

	(1)	(2)	(3)	(4)
Investigation	−0.083	−0.002		
	(0.178)	(0.099)		
	[−0.017]	[−0.000]		
Expected participation	−0.064	−0.253***	−0.064	−0.253***
	(0.059)	(0.044)	(0.058)	(0.044)
	[−0.013]	[−0.001]	[−0.013]	[−0.001]
Value	0.657***	0.657***	0.657***	0.658***
	(0.028)	(0.015)	(0.028)	(0.015)
	[0.135]	[0.002]	[0.135]	[0.002]
Number of divisions	0.046	0.032	0.045	0.032
	(0.031)	(0.023)	(0.031)	(0.023)
	[0.009]	[0.000]	[0.009]	[0.000]
Experience	−2.987***	−0.472***	−2.992***	−0.477***
	(0.171)	(0.153)	(0.171)	(0.154)
	[−0.612]	[−0.001]	[−0.613]	[−0.001]
Services	1.013***	0.916***	1.013***	0.916***
	(0.066)	(0.041)	(0.066)	(0.041)
	[0.211]	[0.003]	[0.211]	[0.003]
Supplies	0.985***	0.938***	0.985***	0.938***
	(0.078)	(0.057)	(0.078)	(0.057)
	[0.204]	[0.003]	[0.204]	[0.003]
Investigation - Not guilty			−0.106	−0.069
			(0.197)	(0.107)
			[−0.021]	[−0.000]
Investigation - Guilty			0.113	0.391
			(0.276)	(0.260)
			[0.024]	[0.001]
Time fixed-effect	YES	YES	YES	YES
Municipality fixed-effect	NO	YES	NO	NO
Log-likelihood	-16516	-11138	-16515	-11136
pseudo-R^2	0.227	0.148	0.227	0.148
Obs	33464	30279	33464	30279

* p < 0.1, ** p < 0.05, *** p < 0.01. Clustered standard errors by municipality in parentheses.

Note: Logit regressions. The dependent variable is a dummy equal to one if the contract j of municipality i at time t is awarded through a formal procedure. Investigated municipalities are designated as such when an investigation for favoritism has been opened. The omitted category of reference for the sector is the public works.

Table 2.10: Summary statistics for the number of bidders dataset

	Not Investigated			**Investigated**		
	Obs	Mean	Std.Dev.	Obs	Mean	Std.Dev.
Number of bidders	8514	4.07	3.45	549	3.72	2.66
Division value	8514	105208.45	234033.86	549	161735.64	434629.82
Divisions	8514	5.02	4.89	549	4.45	4.35
Left	8514	0.41	0.49	549	0.56	0.50

Table 2.11: Summary statistics for the localism dataset

	Not Investigated			**Investigated**		
	Obs	Mean	Std.Dev.	Obs	Mean	Std.Dev.
Distance	7015	94.49	327.51	467	103.07	172.19
Participation	7015	4.16	3.39	467	3.82	2.77
Division value	7015	106377.17	235464.05	467	151775.14	405222.72
Divisions	7015	4.91	4.92	467	4.62	4.45
Left	7015	0.43	0.49	467	0.57	0.50

Table 2.12: Choice of formal award mechanism - Neighbors of investigated municipalities

	(1)	(2)	(3)	(4)
Neighbor	0.262	0.586**		
	(0.171)	(0.283)		
	[0.055]	[0.002]		
Expected participation	−0.064	−0.220***	−0.065	−0.220***
	(0.061)	(0.047)	(0.062)	(0.047)
	[−0.013]	[−0.001]	[−0.013]	[−0.001]
Total value	0.645***	0.633***	0.644***	0.633***
	(0.029)	(0.017)	(0.029)	(0.017)
	[0.132]	[0.002]	[0.132]	[0.002]
Number of divisions	0.066**	0.065***	0.067**	0.065***
	(0.033)	(0.025)	(0.033)	(0.025)
	[0.013]	[0.000]	[0.014]	[0.000]
Experience	−3.022***	−0.289*	−3.018***	−0.289*
	(0.179)	(0.165)	(0.177)	(0.165)
	[−0.619]	[−0.001]	[−0.618]	[−0.001]
Services	1.052***	0.940***	1.053***	0.940***
	(0.067)	(0.046)	(0.067)	(0.046)
	[0.221]	[0.003]	[0.221]	[0.000]
Supplies	0.970***	0.895***	0.980***	0.895***
	(0.079)	(0.063)	(0.079)	(0.063)
	[0.201]	[0.003]	[0.203]	[0.000]
Neighbor - Not guilty			−0.217	0.000
			(0.181)	(.)
			[−0.041]	[0.000]
Neighbor - Guilty			0.386*	0.586**
			(0.202)	(0.283)
			[0.083]	[0.000]
Time fixed-effect	YES	YES	YES	YES
Municipality fixed-effect	NO	YES	NO	YES
Log-likelihood	-14228	-9118	-14195	-9118
pseudo-R^2	0.241	0.159	0.242	0.159
Obs	29279	26177	29279	26177

* p < 0.1, ** p < 0.05, *** p < 0.01. Clustered standard errors by municipality in parentheses.

Note: Logit regressions. The dependent variable is a dummy equal to one if the contract j of municipality i at time t is awarded through a formal procedure. Neighbors are designated as such when an investigation for favoritism has been opened in a municipality located in the same county (*département*). The omitted category of reference for the sector is the public works.

Table 2.13: Effects of investigation over the number of bidders in investigated and neighboring municipalities - OLS regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Investigation	−0.403**	−0.041						
	(0.171)	(0.258)						
Division value	0.029	−0.014	0.031	−0.013	0.020	−0.014	0.037	−0.008
	(0.042)	(0.041)	(0.042)	(0.041)	(0.042)	(0.041)	(0.045)	(0.046)
Divisions	−0.028	0.042	−0.028	0.044	−0.030	0.042	−0.023	0.057
	(0.104)	(0.108)	(0.104)	(0.108)	(0.104)	(0.108)	(0.114)	(0.116)
Left	0.048	0.212	0.058	0.201	0.043	0.208	0.020	0.083
	(0.166)	(0.271)	(0.167)	(0.268)	(0.170)	(0.267)	(0.178)	(0.237)
Services	0.688***	0.770***	0.684***	0.767***	0.677***	0.768***	0.776***	0.843***
	(0.195)	(0.167)	(0.195)	(0.168)	(0.189)	(0.168)	(0.213)	(0.188)
Supplies	−0.426**	−0.496**	−0.426**	−0.490**	−0.426**	−0.498**	−0.364**	−0.446**
	(0.166)	(0.202)	(0.166)	(0.202)	(0.165)	(0.202)	(0.172)	(0.212)
Investigation - Not guilty			−0.484***	−0.353*				
			(0.160)	(0.200)				
Investigation - Guilty			0.450**	1.060***				
			(0.199)	(0.166)				
Neighbor					−0.143	0.199		
					(0.189)	(0.380)		
Neighbor - Not guilty							−0.685***	0.552
							(0.183)	(0.818)
Neighbor - Guilty							−0.074	1.053***
							(0.244)	(0.371)
Time fixed-effect	YES	YES	YES	YES	YES	YES	YES	YES
Municipality fixed-effect	NO	YES	NO	YES	NO	YES	NO	YES
Log-likelihood	-23914	-22878	-23912	-22876	-23916	-22878	-21841	-20856
R^2	0.014	0.016	0.015	0.017	0.014	0.016	0.016	0.017
Obs	9063	9063	9063	9063	9063	9063	8217	8217

* p < 0.1, ** p < 0.05, *** p < 0.01. Clustered standard errors by municipality in parentheses.
Note: OLS regression. The dependent variable is the number of bidders participating to the tender. The omitted category of reference for the type of procedure is the adapted one, and the one for the sector is the public works.

Table 2.14: Effects of investigation over the number of bidders in investigated and neighboring municipalities - Negative binomial regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Investigation	−0.101**	−0.009						
	(0.045)	(0.064)						
Division value	0.008	−0.001	0.009	−0.001	0.006	0.006	0.011	0.001
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)
Divisions	−0.005	−0.006	−0.005	−0.005	−0.006	−0.006	−0.004	−0.003
	(0.025)	(0.020)	(0.025)	(0.020)	(0.025)	(0.025)	(0.028)	(0.021)
Left	0.013	0.060	0.015	0.056	0.011	0.011	0.006	0.020
	(0.040)	(0.070)	(0.041)	(0.070)	(0.041)	(0.041)	(0.043)	(0.057)
Services	0.163***	0.174***	0.162***	0.173***	0.161***	0.161***	0.183***	0.189***
	(0.044)	(0.037)	(0.044)	(0.037)	(0.043)	(0.043)	(0.048)	(0.040)
Supplies	−0.112**	−0.127**	−0.112**	−0.126**	−0.112**	−0.112**	−0.095**	−0.111*
	(0.045)	(0.055)	(0.045)	(0.055)	(0.045)	(0.045)	(0.046)	(0.057)
Investigation - Not guilty			−0.124***	−0.091*				
			(0.043)	(0.049)				
Investigation - Guilty			0.101**	0.274***				
			(0.042)	(0.047)				
Neighbor					−0.034	−0.034		
					(0.047)	(0.047)		
Neighbor - Not guilty							−0.185***	0.122
							(0.050)	(0.221)
Neighbor - Guilty							−0.016	0.353***
							(0.059)	(0.087)
Time fixed-effect	YES	YES	YES	YES	YES	YES	YES	YES
Municipality fixed-effect	NO	YES	NO	YES	NO	YES	NO	YES
Log-likelihood	-20887	-19983	-20884	-19979	-20890	-20890	-19017	-18148
pseudo-R^2	0.004	0.048	0.005	0.048	0.004	0.004	0.005	0.051
Obs	9063	9063	9063	9063	9063	9063	8217	8217

* p < 0.1, ** p < 0.05, *** p < 0.01. Clustered standard errors by municipality in parentheses.
Note: Negative binomial regression. The dependent variable is the number of bidders participating to the tender. The omitted category of reference for the type of procedure is the adapted one, and the one for the sector is the public works.

Table 2.15: Effects of investigation over the location of the contractors in investigated and neighboring municipalities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Investigation	0.068	0.413***						
	(0.135)	(0.156)						
Investigation - Not guilty			−0.008	0.201**				
			(0.120)	(0.091)				
Investigation - Guilty			0.887***	1.200***				
			(0.165)	(0.093)				
Participation	0.030	0.040	0.028	0.039	0.029	0.040	0.052	0.074***
	(0.033)	(0.030)	(0.033)	(0.030)	(0.033)	(0.030)	(0.033)	(0.028)
Division value	−0.050**	−0.034*	−0.048**	−0.033	−0.050**	−0.033*	−0.063***	−0.047**
	(0.022)	(0.020)	(0.022)	(0.020)	(0.021)	(0.020)	(0.023)	(0.022)
Divisions	−0.154***	−0.150***	−0.154***	−0.149***	−0.155***	−0.151***	−0.168***	−0.163***
	(0.031)	(0.035)	(0.031)	(0.034)	(0.031)	(0.034)	(0.031)	(0.035)
Left	−0.089	0.369***	−0.080	0.357***	−0.095	0.353***	−0.061	0.275***
	(0.077)	(0.120)	(0.077)	(0.115)	(0.075)	(0.117)	(0.078)	(0.104)
Services	0.685***	0.660***	0.681***	0.658***	0.687***	0.666***	0.660***	0.628***
	(0.068)	(0.071)	(0.068)	(0.070)	(0.069)	(0.071)	(0.076)	(0.076)
Supplies	0.938***	0.908***	0.937***	0.909***	0.937***	0.911***	0.927***	0.898***
	(0.094)	(0.101)	(0.094)	(0.101)	(0.094)	(0.100)	(0.097)	(0.105)
Neighbor					−0.022	0.003		
					(0.088)	(0.188)		
Neighbor - Not guilty							−0.337	0.111
							(0.215)	(0.374)
Neighbor - Guilty							−0.035	0.240
							(0.103)	(0.330)
Time fixed-effect	YES	YES	YES	YES	YES	YES	YES	YES
Municipality fixed-effect	NO	YES	NO	YES	NO	YES	NO	YES
R^2	0.097	0.071	0.099	0.072	0.097	0.069	0.099	0.071
Obs	7482	7482	7482	7482	7482	7482	6797	6797

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Clustered standard errors by municipality in parentheses.
Note: OLS regression. The dependent variable is the distance between the contracting authority and the location of the contractor. The omitted category of reference for the type of procedure is the adapted one, and the one for the sector is the public works.

Table 2.16: Robustness - Regression over the use of formal procedure

	(1)	(2)	(3)	(4)
Investigation	0.001	0.169		
	(0.350)	(0.155)		
	[0.000]	[0.000]		
Expected participation	−0.073	−0.251***	−0.072	−0.250***
	(0.062)	(0.052)	(0.062)	(0.052)
	[−0.015]	[−0.001]	[−0.015]	[−0.001]
Total value	0.666***	0.664***	0.665***	0.664***
	(0.032)	(0.018)	(0.032)	(0.018)
	[0.136]	[0.002]	[0.136]	[0.002]
Divisions	0.028	0.017	0.029	0.017
	(0.037)	(0.027)	(0.037)	(0.027)
	[0.006]	[0.000]	[0.006]	[0.000]
Experience	−2.792***	−0.401*	−2.784***	−0.399*
	(0.186)	(0.174)	(0.187)	(0.174)
	[−0.571]	[−0.001]	[−0.569]	[−0.001]
Services	1.101***	0.989***	1.102***	0.989***
	(0.072)	(0.049)	(0.072)	(0.049)
	[0.230]	[0.002]	[0.231]	[0.002]
Supplies	1.029***	0.942***	1.031***	0.942***
	(0.088)	(0.070)	(0.088)	(0.070)
	[0.213]	[0.002]	[0.213]	[0.002]
Investigation - Not guilty			0.024	0.184
			(0.371)	(0.157)
			[0.005]	[0.000]
Investigation - Guilty			−0.287	−0.409
			(0.429)	(0.950)
			[−0.055]	[−0.001]
Time fixed-effect	YES	YES	YES	YES
Municipality fixed-effect	NO	YES	NO	NO
Log-likelihood	-12139	-7819	-12138	-7819
pseudo-R^2	0.235	0.154	0.235	0.154
Obs	24832	21766	24832	21766

* p < 0.1, ** p < 0.05, *** p < 0.01. Clustered standard errors by municipality in parentheses.

Note: Logit regressions. Our robustness check excludes the neighbors of investigated municipalities from the treatment group. The dependent variable is a dummy equal to one if the contract j of municipality i at time t is awarded through a formal procedure. Suspected municipalities are designated as such when an investigation for favoritism has been opened. The omitted category of reference for the sector is the public works.

Table 2.17: Robustness - Regression over the number of participants

	(1)	(2)	(3)	(4)
Investigation	−0.166***	−0.083		
	(0.049)	(0.137)		
Division value	0.013	0.000	0.013	0.001
	(0.011)	(0.011)	(0.011)	(0.011)
Divisions	0.024	0.014	0.024	0.015
	(0.026)	(0.023)	(0.026)	(0.023)
Left	0.050	0.033	0.052	0.035
	(0.049)	(0.081)	(0.049)	(0.080)
Services	0.212***	0.198***	0.214***	0.197***
	(0.043)	(0.043)	(0.044)	(0.043)
Supplies	−0.060	−0.058	−0.060	−0.058
	(0.051)	(0.064)	(0.051)	(0.065)
Investigation - Not guilty			−0.177***	−0.205**
			(0.049)	(0.092)
Investigation - Guilty			0.075	0.454***
			(0.082)	(0.073)
Time fixed-effect	YES	YES	YES	YES
Municipality fixed-effect	NO	YES	NO	YES
Log-likelihood	-15423	-14669	-15422	-14666
pseudo-R^2	0.006	0.054	0.006	0.054
Obs	6646	6646	6646	6646

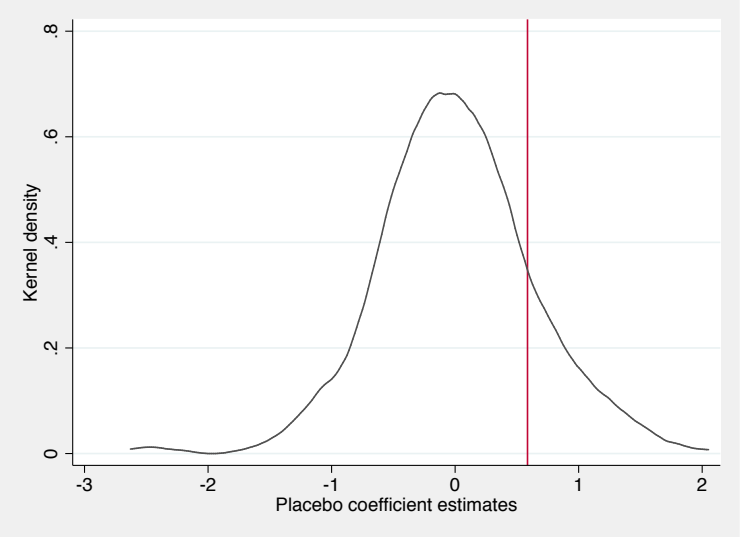
* p < 0.1, ** p < 0.05, *** p < 0.01. Clustered standard errors by municipality in parentheses.
Note: Negative binomial regression. Our robustness check excludes the neighbors of investigated municipalities from the treatment group. The dependent variable is the number of bidders participating to the tender. The omitted category of reference for the type of procedure is the adapted one, and the one for the sector is the public works.

Table 2.18: Robustness - Regression over localism

	(1)	(2)	(3)	(4)
Investigation	−0.127**	0.090		
	(0.060)	(0.114)		
Participation	−0.036	0.003	−0.036	0.002
	(0.028)	(0.029)	(0.028)	(0.029)
Division value	−0.088***	−0.064***	−0.087***	−0.063***
	(0.012)	(0.011)	(0.012)	(0.011)
Divisions	−0.025	−0.066**	−0.026	−0.066**
	(0.029)	(0.026)	(0.029)	(0.026)
Left	−0.044	0.010	−0.039	0.010
	(0.054)	(0.097)	(0.054)	(0.097)
Services	0.900***	0.795***	0.900***	0.794***
	(0.058)	(0.056)	(0.058)	(0.057)
Supplies	0.823***	0.910***	0.824***	0.909***
	(0.070)	(0.072)	(0.070)	(0.072)
Investigation - Not guilty			−0.163***	−0.007
			(0.051)	(0.109)
Investigation - Guilty			1.035***	1.052***
			(0.259)	(0.241)
Time fixed-effect	YES	YES	YES	YES
Municipality fixed-effect	NO	YES	NO	YES
R^2	0.116	0.078	0.117	0.078
Obs	17944	17944	17944	17944

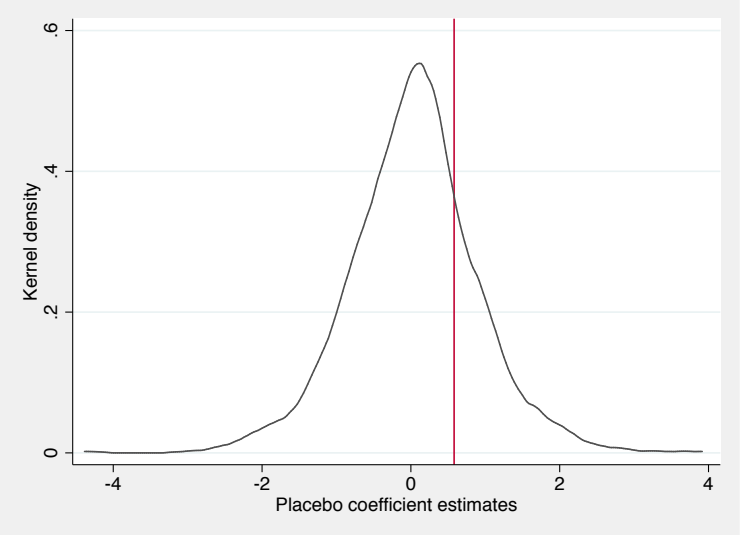
* p < 0.1, ** p < 0.05, *** p < 0.01. Clustered standard errors by municipality in parentheses.
Note: OLS regressions. Our robustness check excludes the neighbors of investigated municipalities from the treatment group. The dependent variable is the distance between the contracting authority and the location of the contractor. The omitted category of reference for the type of procedure is the adapted one, and the one for the sector is the public works.

Figure 2.6: Coefficients distribution placebo tests - Impact of being an investigated municipality over the probability to use a formal procedure (open auctions)



Note: Density of the predicted coefficients from the placebo regression. The vertical line represents the true value of the estimate.

Figure 2.7: Coefficients distribution placebo tests - Impact of being a guilty municipality over the probability to use a formal procedure (open auctions)



Note: Density of the predicted coefficients from the placebo regression. The vertical line represents the true value of the estimate.

CHAPTER 3

Buyer's discretionary power and the selection of efficient firms in public procurement[1]

3.1 Introduction

Public procurement is the process of purchasing goods or services by the public sector. Alone, it represents 12% of GDP and 29% of total government expenditures on average across OECD countries and approximately 14% of GDP in the European Union (see OECD [2017b]). Given the large sums of money involved, public procurement has the potential to pursue broad policy objectives. As stated by the OECD, *"[G]overnments are increasingly recognising the immense power of public procurement to solve global societal challenges, improve productivity and boost innovation, while ensuring value for money"*. Whereas the economic literature has extensively assessed the capability of public procurement to solve societal issues and to be a tool for innovation, its relationship with the productivity has been neglected so far. In particular, since there is a multiplicity of ways to award a contract to a firm, it is plausible that this relationship differs accordingly.

[1]This Chapter is based on a joint work with Ariane Charpin. We are grateful to Francesco Decarolis, Philippe Gagnepain, Stéphane Saussier, Giancarlo Spagnolo, and Carine Staropoli for their precious and helpful comments.

This paper compares the productivity of suppliers selected in competitive tenders organized by public buyers using two different types of award procedures. The first type is open auctions. In this procedure, buyers are highly constrained by accurate rules on how to organize the tender and select the supplier. The main benefit of this type of procedure is that it fosters transparency and competition (Bulow and Klemperer [1996]). In particular, when using open auctions, a supplier has to be selected without negotiation on precisely defined criteria. The second type of procedure we focus on are called adapted procedures. In this procedure, public buyers are endowed with a high degree of discretionary power in many aspects of the award (e.g. publicity, deadline), and are allowed to use negotiations. Another important aspect of the adapted procedure is the possibility to restrict competition to a specific number of invited bidders. This potential restriction aims at lowering screening costs. Also, limiting participation may make a particular type of firm more likely to participate and be selected in public procurement (e.g. Small and Medium firms, local suppliers). Finally, this procedure is characterized by a lower degree of transparency than open auction, but one of its main benefit is its possibility to adapt more easily to the specificities and circumstances of the procurement. An extensive literature addresses the question of which award mechanism yields the most efficient outcome in public procurement. Whereas the outcome has been measured through different aspects of the tender such as price, quality and renegotiation, the productivity of the selected supplier has been ignored.

We evaluate whether an award procedure which allows for discretionary power results in the selection of more or less productive firms than an award procedure that does not. The question we address is hence that of the effect of discretion on the selection of suppliers. If the selection of more productive firms is more likely to lead to lower costs and/or better quality outcomes, then it should result in a better value for money of the contract, which is the primary objective of public procurement. Second, if public procurement is to be used has a tool to enhance productivity and growth, it is worth determining whether some types of procedure allow to select more

efficient firms than others. The use of public procurement to foster productivity may be questionable if it is not cost-effective.

First, our main results indicate that the adoption of an adapted procedure makes the selection of an efficient supplier less likely, whatever the specification. This results in an inefficient allocation of public funds towards less efficient firms. The empirical contributions of the paper are first the policy implication of the result, namely that a selection procedure with discretionary power is potentially in contradiction with the main objective of public procurement, which is to get the best outcome at the lowest price, and with one potential broader objective of public procurement, which would be to promote productivity. Second, the data allows us to disentangle the role of some observed characteristics of the buyer, the contract and the economic environment in selecting a procedure. We find that the experience of the buyer, the complexity of the contract and the competitiveness of the environment are all positively associated with using open auctions.

The economic literature on how to organize public procurement is abundant. It is mainly interested in identifying the selection procedure that yields the best value for money. Auction theory shows that open auctions achieve the lowest ex-ante price (Bulow and Klemperer [1996], Cameron [2000], Decarolis [2014]) and impede corruption and favoritism by fostering transparency (Burguet and Che [2004]), which both suggest that open auctions achieve the best value for money in public procurement. This view was challenged by the theory of contracts where other aspects are considered. It shows that open auctions might not be the best option when contracts are particularly complex and are hence subject to unexpected events (Goldberg [1977]), when quality dimensions are not easily contractible (Manelli and Vincent [1995]) or to sustain reputational mechanisms and long-term relationships (Kim [1998], Spagnolo [2012]). In these cases, discretion could yield a better outcome. One of the most typical form of discretion a public entity is entitled with when awarding a contract is negotiation. Goldberg [1977] was the first author to argue that for complex transactions that might be subject to unexpected events, awarding a contract through negotiation may be more desirable than auctions. These findings are confirmed by

Manelli and Vincent [1995] who demonstrate that when non-contractible quality dimensions of the procured good are important, open auctions on contractible dimensions appear less desirable than negotiation. As a consequence, the choice of award mechanism is likely to be subject to a trade-off between transparency as well as lower ex-ante price, and ex-post performance. In seminal papers, Bajari and Tadelis [2001] and Bajari et al. [2009] test for the effect of contract complexity over the choice of award mechanism. Their results primarly show that complex transactions are more likely to be associated with the use of negotiations since the use of discretion could help the authority to facilitate the dialogue between the parties and make the contracts as complete as possible, thereby reducing the need for ex-post adaptations. Also, Bajari et al. [2009] show that negotiated projects are associated with a higher probability to be awarded to more reputable and experienced contractors. As highlighted in this paper, an important dimension through which discretion may yields higher benefits than open auctions is by setting relational contracts (long-term relationships) and reputational mechanisms (Spagnolo [2012]). More specifically, Coviello et al. [2017], analyze the effect of discretion - measured in terms of whether the buyer can decide who to invite to bid - over ex-ante and ex-post procurement outcomes. When focusing on the neighborhood of a discontinuity threshold, they find that using award mechanism involving discretionary power is likely to reduce the total duration of the works, to select larger firms and to reduce the number of firms submitting bids, thereby saving costs associated to bid screening. However, the use of discretion is found to have no significant effect over other outcomes such as the winning rebate, cost overrun and the probability that the project is awarded to a local firm. Finally, their results suggest that incumbents are more likely to be renewed if they had better performance in the past than the average (in terms of delay), and that their selection yields better than average performance when renewed.

The contribution of our paper is to complement this literature by looking at the ability of procedures, in particular procedure that gives discretionary power, to select

the most productive firms, that would potentially yield a better contract outcome in terms of price and/or quality. It also explores the possible determinants behind a buyer's decision to use open auctions or adapted procedure, in line with Bajari et al. [2009].

The analysis is performed using a unique dataset of public procurement contracts in France between 2005 and 2015. It takes advantage of the French regulatory framework for public procurement, which has allowed the use of flexible competitive bidding procedures and hence opened room for discretionary power in 2004. In most countries and organizations, the rules on which public procurement lays on aim at fostering transparency and efficiency. In this perspective, the use of competitive and transparent award procedures are promoted by international institutions (e.g. the World Bank, the OECD) and in many countries, public procurement rules set thresholds for contract value above which the public buyer must use open competitive procedures. In Europe, the European Commission set thresholds above which the use of strictly regulated open auctions is mandatory. Below these thresholds, national laws apply. In France, below the thresholds set by the European Commission, public buyers are allowed to choose between using a strictly regulated procedure consisting in an open auction, or a more flexible procedure offering discretionary power, named the adapted procedure. The latest procedure gives some freedom to the buyer on how to advertise and design the tender and how to select the winner, including the possibility of negotiation.

We combine two main sets of data. The first one is a collection of calls for tenders for public contracts procured in France between 2006 and 2015. It includes every call for tenders in France (i.e. around 80K observations per year) and contains information on the identity of the winning firm only for a sub-sample of contracts (i.e. around 14K observations per year). The range of goods and services and contract values they deal with is very broad. The second data set, Amadeus, is a panel of financial information of European firms. We use it to compute labor and total factor productivity of firms. We limit our estimation sample to contracts below the thresholds set by the European Commission so that in our sample, public

buyers are allowed to choose between the two types of procedure studied. Note that these contracts represent a high share of total public procurement: in construction works, they represent 40% of the total value in European procurement (see Palguta and Pertold [2017]). The threshold for public works is much higher than in other sectors (around €5 million versus around €0.2 million). The limitation of the sample to contracts below the thresholds has the implication of limiting the analysis to contracts of simple to moderate complexity for supplies.

Our econometric strategy must take into account the potential endogeneity of the choice of procedure. Indeed, we expect that some unobserved contract-specific and buyer-specific characteristics may affect both procedure and supplier selection, resulting in a potential correlation between the procedure chosen and the error term as a consequence of omitted variables (e.g. the degree of capture of the buyer, the specific knowledge of the buyer, etc.). To solve this concern for endogeneity, we instrument the choice of procedure and use a two-stage least square model. We first regress the choice of an adapted procedure over a set of explanatory variables and an instrument. Our identification strategy relies on an instrument that draws on Guasch et al. [2007]. We the prevalence of adapted procedures at the time the contract is signed among closeby buyers (i.e. buyers located in a close geographic area) as an instrument. It is highly correlated with the choice of the award procedure because of the inertia in adopting the new flexible procedure over time and the "spillover effect" of buyers located in a close geographic area. Many empirical papers demonstrate the significant influence of neighbors in organizational choices. In particular, Christoffersen and Paldam [2003] consider multiple cases of public services in Danish municipalities and find a strong diffusion effect from neighboring municipalities when choosing their mode of provision. This finding has been confirmed by Bel and Miralles [2003] and Miralles [2009] who also demonstrate the existence of such "spillover effect". This instrument does not impact the choice of a relatively more or less efficient company directly because it is unrelated to buyer and contract-specific characteristics. We are thus able to regress the level of productivity of the winning firm in a second step.

Our main result is that the adapted procedure leads to an inefficient allocation of public fund towards less efficient firms through the selection of less productive firms. The magnitude of the effect is large. This is, to our knowledge, the first time that this causal effect is identified using this identification strategy. Our results appear to be robust to several robustness checks which are presented in the paper.

The mechanism through which the adapted procedure could lead to the selection of less efficient firms are discussed in the last section of the paper. It could either be that firms select tenders depending on the award procedure or the pure effect of discretion, that is either the invitation of some specific firms, or the screening of firms. In the case of adapted procedure, if buyers only invite small or local companies who might be less productive, then this would distort competition by discriminating against some particular type of firms at the advertising stage and would drive the result. We demonstrate that the number of bidders is on average similar in both types of procedures, and that our main result is not driven by the adapted procedure selecting smaller, more recent or more local firms. This suggests that buyers do not invite only specific types firms to participate in adapted procedures. Our results could therefore be driven by productive firms not bidding in adapted procedures. However, there does not seem to be any reason why a firm that participates to open auctions would not do so in the case of adapted procedures. This is confirmed by Baltrunaite et al. [2018], who compares the pools of bidders in open auctions and a procedure with discretion, and finds that the composition of pool of bidding firms in terms of observables does not change. We therefore conclude that our result is driven by the pure effect of discretion in the screening of firms. Plausible explanations are that, on average, the benefits of using open auctions (lower biding price) dominate its potential drawbacks (incomplete contracts with poor quality and risk of costly renegociations). Also, keeping the pool of participants unchanged, a more discretionary regime allows public buyers to select the desired winner more easily. In this case discretion would be used to manipulate competition among tendering firms, to the benefit of less productive firms for some reason.

The rest of this chapter is organized as follow. In section 3.2, we review the related

literature. In section 3.3, we present the institutional framework. In section 3.4, we describe the data. In section 3.5, we present the empirical strategy. In section 3.6, we present the main results and then assess the robustness of these results. We open a discussion in section 3.7. Finally, we draw a conclusion in section 3.8.

3.2 Literature

This chapter contributes to extend the strand of the literature related to the use of discretion on the performance of public procurement. Overall, this literature uses contract outcomes (price rebates, delays, renegotiations...) as a measure of efficiency of different kinds of selection procedures. On one side, the conventional view is that open auctions are an efficient mechanism for selecting firms because they make the selection of the lowest cost bidder more likely, thereby reducing the winning price (Bulow and Klemperer [1996]). Using a standard auction model, the author shows that using a simple auction almost always yields a better outcome than through negotiation with one less buyer. However, as Goldberg [1977] argue, when complex transactions are likely be subject to unexpected events, awarding a contract trough negotiation may be more desirable than auctions. Manelli and Vincent [1995] illustrates the benefit of negotiation over open auctions under certain circumstances. In particular, when non-contractible quality dimensions of the procured good are important, open auctions on contractible dimensions appear less desirable than negotiation. Therefore, the choice of award mechanism is likely to be subject to a trade-off between transparency as well as lower ex-ante price, and ex-post performance.

An extensive empirical literature has been dedicated to assess the performance of auctions in public procurement and emphasizes the merit of discretion. The most commmon way through which a buyer may use discretionary power when awarding a contract is through the possibility to use negotiation. In particular, the literature shows some evidence that it improves ex-post contract performance. As Cameron [2000] shows, discretion yields to a reduction in breaches of contract. The author

tests for the potential existence of a compromise between price and ex-post performance by using a data set of long-term power contracts that electric utilities have awarded. She finds that the use of an open and transparent mechanism yields a price reduction of 18% but also an increase in the probability of contract breach by more than 50%. Second, discretion may reduce cost-overruns and time delays. More specifically, Coviello et al. [2017], analyze the effect of discretion -measured in terms of whether the buyer can decide who to invite to bid - over ex-ante and ex-post procurement outcomes. When focusing on the neighborhood of a discontinuity threshold, they find that using award mechanism involving discretionary power is likely to reduce the total duration of works, to select larger firms and to reduce the number of firms submitting bids, thereby saving costs associated to bid screening. However, the use of discretion is found to have no significant effect over other outcomes such as the winning rebate, cost overrun and the probability that the project is awarded to a local firm. Also, one important dimension of discretion is that it may facilitate the establishment and use of relational contracts (long-term relationships) and reputational mechanisms. As discussed by Spagnolo [2012], "there are several reasons why complementing explicit contracts with reputational mechanisms based on ex-post evaluations of contractor performance may improve the governance of procurement transactions. These are linked to the inability of explicit contracts to describe or of the court system to verify important aspects of the procurement transactions at reasonable cost, but also to the high costs of enforcing explicit contracts through litigation". This aspect is confirmed by Coviello et al. [2017] who find that increased discretion makes an incumbant more likely to be awarded the contract when renewed. Finally, their results suggest that incumbents are more likely to be renewed if they had better performance in the past than the average (in terms of delay), and that their selection yields better than average performance when renewed. In addition, another potential dimension of discretion which is the possibility to restrict the number of bidders is also shown to be beneficial to the buyer in non-complex contracts by reducing the costs related to the selection of the supplier. Chever et al. [2017] demonstrate that the restriction of competition for small value contracts aims at sharing out contracts among pre-qualified firms of

good repute and does not result in higher prices. Overall, their results suggest that restricted auctions, while economizing on transaction costs, preserve a high level of competition between the 'happy few' firms selected to post a bid.

However, discretion could be detrimentally used by a public authority to favor a particular firm and reap-off some personal benefit. As Baltrunaite et al. [2018] show, in Italy, tenders using negotiation are more likely to select "politically" connected firms, namely those having a local politicians among its administrators or shareholders. In the same vein, Palguta and Pertold [2017] observe that, in Spain, discretion - through the restriction of ex-ante competition - makes firms with an anonymous untraceable owners more likely to win the contract. On the opposite, Bandiera et al. [2009] exploit a policy experiment in the Italian public procurement system and concludes that public buyers endorsed with more discretionary power are more efficient and are not more corrupt than more regulated ones, thereby generating less waste overall. They show that administrative inefficiency (e.g. buyer's lack of skills or excessive regulatory burden) appears to be a more important source of waste than corruption.

To sum up, the literature shows that open auctions which leave no room for discretion lead to lower prices than procedures involving some forms of discretion. However, discretion enables to lower ex-ante screening costs when contracts are simple and more likely to reduce ex-post renegotiation costs when contracts are complex and likely to be incomplete through the use of negotiation Concerning corruption, evidence are mixed on whether discretion fosters corruptive behaviors.

Unlike most studies focusing on outcomes of discretion in public procurement, our efficiency measure is not one or multiple dimensions of the contract outcome. Instead, we use the productivity of the selected firm. We believe that the productivity measure reflects the ability of the firm to meet the terms of the contract at the best price. It can be though of as an indirect measure of price and quality. The closest work to ours, Baltrunaite et al. [2018], also focuses on the supplier selection side.

Using a difference-in-differences empirical approach, the paper investigates the effect of discretion on supplier selection, focusing on productivity. They use information on public work contracts tendered by Italian municipalities, and use as an identification strategy the introduction a reform in Italy where negotiation is allowed under a specific value threshold. They find that broader discretion leads to a decrease of winning firms' ex-ante productivity. To explain whether this result comes from distortion in the screening of candidates introduced by discretion or by a change in pool between selection procedures, they compare the pools of bidders in both types of procedures. They find that discretion leads to a significant drop in the number of participants, while the composition of the pool of bidding firms in terms of observables does not change. They interpret the effect as a distortion in the screening of candidates, not a different pool. Even though our paper shares some similarities, there are two main differences. First, our definition of discretion is broader since it is not limited to negotiation. Instead, in France, the buyer may be granted some discretionary power in terms of, for example, restriction of competition, deadline to receive the offers, and publicity support. Second, we do not compare the outcomes of a tender before and after a reform, but instead use a two-step procedure where we first assess the determinants of the adoption of an award procedure where discretionary power is allowed, and second we determine to what extent the use of such procedure makes the selection of an efficient supplier more likely.

3.3 The institutional context

The French law on public procurement is primarily based on the European procurement directive. As our procurement data cover the period from 2006 to 2015, our institutional framework is based on the EU Directive 2004/18 of March 31, 2004, as well as on the 2006 French Code for public procurement[1]. To mitigate the risk of corruption in public procurement, the European Commission (EC) sets value thresholds above which public authorities have to use a formal procedure, which consists of

[1]We are not concerned with the new European Directives on Public Procurement voted on in 2014 (2014/24/UE and 2014/25/UE) and adopted into French law in 2016.

an open auctions without negotiation (Table 3.2). The use of negotiated procedures is not allowed, except in certain specific cases set by the EC. For every contract below this threshold, national laws apply while still respecting the pillar principles set by the EU, namely, equal treatment, non-discrimination, and transparency.

In France, public buyers may in this case use what is called an adapted procedure (*procédure adaptée*). Its main objective is to give a high degree of discretion and flexibility to the buyer in order to find out the most efficient way to procure goods and services involving low complexity, where complexity is associated with the degree of contractual incompleteness Tadelis [2012]. Indeed, projects that are more complex are usually more difficult to execute (Bajari et al. [2009], Chong et al. [2014]). In this procedure, "ways and means are freely chosen by the public buyer and should adapt to the nature and characteristics of the needs, the number or location of firms that are likely to participate to the tender, and to the circumstances of the procurement"[2]. The buyer is in particular free to define the advertising and competitive processes that are the most proportionate to the purpose, amount and circumstances of the purchase (see Table 3.1 for a detailed presentation of the characteristics of this procedure, as well as a comparison with the open auctions procedure).

The main benefits of this procedure are the possibility to directly negotiate, the possibility to adjust the deadlines to the constraints (nonexistence of a minimal number of days to submit an offer), the possibility of not specifying the weights associated to selection criteria ex ante, the possibility to choose the most appropriate publicity support, a freedom of choice regarding the contracting formalism, and the possibility to directly contact the firms to submit an offer. Also, public buyers have the possibility to select the contractor based on his experience. It is noteworthy that, in case of negotiation, the buyer has the possibility to restrict competition to a limited number of candidate firms. He is even advocated to do so since negotiating with too much candidates is a waste of time and thereby, a cost. It is estimated that it is difficult for a small public buyer to directly negotiate with more than two

[2]Article 28 of the French Code for public procurement.

or three candidates.[3] The restriction of competition to a pool of bidders should be notified in the call for tenders.

This flexibility should lower the administrative burden of organizing a tender, thereby resulting in lower ex-ante procurement costs compared to the rigid open auctions procedure. The other ambition of this procedure is to facilitate the access of firms that are not able to participate to tenders above the formal thresholds, in particular new entrants and SMEs. Indeed, formalized procedures require a three-year balance sheet of the firms, a document that new entrants are not able to provide. On the opposite, the adapted procedure accepts a simple official bank statement. Additionally, new entrants and SMEs are often not used to formal procedures, which results in disproportionally high costs for them. Finally, it is recommanded that the public buyer does not ask for an excessive number of documents, in particular to SMEs.

It is noteworthy that, below the formal thresholds, the authority is not compelled to use an adapted procedure. It has the possibility of using a formal one. In practice, below the European thresholds, French municipalities use both the adapted procedure and open auctions. Ultimately, below the European thresholds, French municipalities might decide to use a very flexible award procedure in terms of degree of discretion (the adapted procedure) or a formal one (an open auctions). As the adapted procedure is considered less costly for simple contracts, we should observe only this type of award procedure below formal thresholds if we strictly refer to an economic point of view.

However, it appears that public buyer often opt for a formal procedure instead of an adapted one by fear of any legal risk.[4] This type of procedure has been first introduced in 2004, and it has been increasingly used since (Figure 3.1). Whereas they represented less than 40% of award procedures for contracts below the EU threshold in 2006, they represented almost 80% of them in 2015 at the municipal

[3]Direction des Affaires Juridiques (French Legal department), Les marchés à procédure adaptée, available at: https://www.economie.gouv.fr/files/directions_services/daj/marches_publics/conseil_acheteurs/fiches-techniques/mise-en-oeuvre-procedure/marches-procedures-adaptees.pdf

[4]EDT, Vade-mecum Mapa, available at: http://www.achatpublic.info/sites/default/files/document/documents/guide_MAPA_ETD_1.pdf?from=base-documentaire&page=228, 2010.

level.

First, the adapted procedure entails much greater legal uncertainty than open auctions. The procedural flexibility associated with this procedure is limited by the pillars set by the EC namely, transparency, freedom of access, and equal treatment of candidates. Given the flexibility allowed by the procedure, it is very difficult for public buyers to be sure to comply with these obligations. For example, the adapted procedure allows a negotiation phase. At the drafting stage of the consultation document, the question for public buyers is whether the modalities under which the negotiation is going to take place are defined precisely enough to comply with the principles of public procurement. Public buyers may wonder whether it is possible to specify only that negotiation is going to be allowed or whether they should precisely define the modalities of the negotiation. During the negotiation, other questions arise such as how to ensure the traceability of the exchanges between the companies and the buyer. Once the selection of the operator has been made, the period before the signature of the contract is also a source of great uncertainty for buyers because the case law is unclear on whether a time limit between the notification to unsuccessful candidates and the signature of the market should be respected. Because of the legal uncertainty associated with the adapted procedures, some buyers prefer to resort to open auctions, to avoid the risk of legal claims and the costs associated with the procedure (Spiller [2008]; Chong et al. [2014]). The challenging of contracts before a court is costly and time consuming, and may cause the elected official to leave its public position and to be prosecuted (Spiller [2008]). Second, public buyers could feel reluctant to use the adapted procedure to avoid any suspicion of corruption. The adapted procedure indeed introduces discretion at several stages of the procedure, from the advertising to the way the choice of the operator is made. Spiller [2008] shows that when a third party competes with the public buyer in another political market, the former may behave opportunistically by challenging the probity of the latest. In this case, contracts would more likely to leave room for discretion.

3.4 Data

3.4.1 Datasets

This study combines data from several datasets. Measures of productivity of firms were computed using the Amadeus database, which contains financial information on European firms. They were then matched with a database of both calls for tenders and award notices of public procurement contracts from 2006 and 2015[5].

Amadeus

We compute labor productivity and total factor productivity using the Amadeus database. Amadeus is a firm-level database compiled by Bureau van Dijk which contains financial information on European firms. It includes all the balance sheets and P&L items, such as value-added, turnover, total assets, intangibles assets, etc. over a period of ten years for each firm. We compute TFP focusing on companies of a certain minimum size, that is discarding companies of operating revenue less than EUR 1 million, total assets less than EUR 2 million, or number of employees less than 15. The reason is that we do not have access to data on these small companies.

The original dataset includes 2,612,450 observations and contains identifiers to track firms over time between 2006 and 2015. Key variables such as employment and materials are often missing in the database because private firms are not required to report them. The sample size is hence reduced by keeping only firm-year observations which contain the relevant variables to estimate production functions. It is further reduced by performing the following operations. We deleted firm-year observations with negative or zero value-added and materials and negative values of capital defined as tangible assets, number of employees and wages. We removed firm-year observations with extreme variations in ratios between production function variables (capital stock per employee and value-added per employee in the 1^{st} or 99^{th} percentiles). We removed firms with growth rate of value-added, material, labor or

[5]We thank InfoPro Digital for producing and gracefully offering us these data.

wages greater than 500%, 200% and 200% respectively. We also replaced firm-year observations in the 1^{st} or 99^{th} percentiles of their distributions with missing values. At the end, we removed the top and bottom 1% of the productivity distribution and re-estimated the productions functions without these extreme observations.

In the end, we are left with a ten-year unbalanced panel of 1,252,194 companies on which we estimate TFP. We observe the maximum of 142,219 firms in 2014 and the minimum 106,962 in 2006. Descriptive statistics on the sample are presented in Appendix A.

Since the Amadeus database does not contain information on the quantities of output and inputs, TFP was computed estimating revenue-based production functions. Following the standard practice in the literature, all variables entering the production function were deflated using industry specific indices. We used indices provided in the EU KLEMS database. All these indices are specific to France and available at the two-digits NACE level. Value-added was deflated using the gross value-added price index, wages were deflated using an index of the compensation of employees, capital, defined as tangible assets, was deflated using the gross fixed capital formation index and materials, which correspond to intermediate consumption, were deflated using the intermediate inputs price index.

Public Procurement

The original dataset includes every call for tenders by municipalities, associations of municipalities, counties and regions in France between 2006 and 2015 (i.e., approximately 80K observations per year). We were able to collect award notices (name of the selected company) only for a sub-sample of contracts (i.e., for approximately 14K observations per year).

For each tender, the dataset provides information on the identity of the winner and its final bid, the procedure and criteria used to select the winner (award mechanism), the number of bidders, the object of the tender, the sector of the tender (supplies, work, etc.) and the identity of the buyer. It contains public tenders relative to all

goods and services that are bought by municipalities, associations of municipalities, counties and regions. The range of goods and services the public buyer deal with is very broad, as is the range of contract values.

The identity of the firm that won the tender is used, along with the information on its location, to match this data together with the Amadeus database in order to get the measures of productivity of the winning contractor, as well as other relevant financial information.

3.4.2 Variables

Variable of interest

The database contains two main types of award mechanisms, open auctions and adapted procedures. Hence we create a dummy variable that takes the value of one if a public buyer decided to award the contract through an adapted procedure and zero if it chose an open auction. This variable, *adapted procedure*, is the variable of interest throughout the analysis.

Outcomes

We measure the outcome of the awarding procedure using both labor and total factor productivity. Labor productivity is computed by diving value-added by the number of workers. Value-added corresponds to sales from which materials are deducted so that our measure of efficiency is not influenced by the purchase of intermediate inputs. If sales were used instead, labor productivity would indeed rise simply because of a firm buying more material per worker. Total factor productivity (TFP) is computed by estimating production functions relating output to inputs of firms at the industry level, using the approach of Levinsohn and Petrin [2003] (and the approach of Wooldridge [2009] as a robustness check). More information on the estimation of production functions is given in Appendix B.

Since the TFP of firms changes over time and levels of productivity might differ across industries, the outcome variables do not consist in absolute measures of pro-

ductivity of firms. We are rather interested in comparing the productivity of the selected firms with the productivity of firms within the same industry at a given time. We hence define relative measures of productivity, where the productivity of a firm is compared to the distribution of productivities of firms that belong to the same industry (defined at the broad NACE 2 level presented in Table B.1) in a given year.

The measure of the relative efficiency that we use is the proportional distance a firm is from the technological frontier, measured by the productivity of the firm with the highest TFP within an industry by year. This measure was proposed by Aghion et al. [2015] to compute a technological spread within each industry. Formally, we compute:

$$m_{it} = (TFP_{Ft} - TFP_{it})/TFP_{Ft} \tag{3.1}$$

where F denotes the firm with the highest TFP in the industry in year t and i denotes nonfrontier firms. $0 \leq m_{it} \leq 1$ and $m_{Ft} = 0$. Note that depending on the distribution of TFPs within an industry and at a given year, the average of m_{it} across all firms in the industry can be either low, which indicates that in this industry firms are technologically close to the frontier or high, which indicates a large technological gap with the frontier.

Control variables

The regressions includes some control variables to account for the characterics of the industry, the buyer, and the contract.

First, since our relative measure of efficiency m_{it} is industry and year specific, we control for the industry of the winning firm by including dummies corresponding to the broad NACE 2 levels presented in Table B.1 in Appendix B and year fixed effects.

Second, we account for some observable characteristics of the buyer. We consider his type (whether it is a region, a county (French *département*), a municipality or a

group of municipalities) through the variable *buyer type* , its size, represented by the population (*Population*), and its experience toward public procurement in general, as measured by the total number of tenders organized by the buyer in the past year (*Experience*). To control for the time-invariant characteristics of the buyers, one strategy would be to include buyers fixed-effects in the regressions. However, doing so would eliminate the variation in our data and it implies including a very large number of fixed-effects in the regressions (more than 1000), which can be problematic in nonlinear models (incidental parameter problem). Additionally, we believe that characteristics of buyers which are likely to affect procedure and firm selection are likely to be time- and contract-specific (a buyer favors the incumbent for a given contract or has no expertise in a given industry), we hence do not include buyers fixed-effects in the analysis.

Third, we control for contract-specific characteristics such as the sector of activity of the contract (*Sector*) which is divided between public works, services, supplies, and expertise in our dataset, the expected number of participants to the tender (*Expected number of bidders*), defined for each buyer as the average number of bidders participating to a tender during the past year in a particular category of project (CPV[6] level). We also account for the number of divisions of the contract[7] (*Number of divisions*), which even though it is determined by the buyer when the tender is designed, public procurement rules encourage its maximal division. Finally, we also control for the total value of the contract (*Total value*) and the value of the relevant division (*Division value*). Note however that these values do not correspond to estimations of the values of the contracts by the buyer but to winning bids. They are therefore likely to be affected by the selection procedure, hence being less accurate quality controls. Contrary to many countries where the buyer's initial cost estimates are provided in the calls for tender (e.g. in Italy), this information is not publicly available in France. Since we do not have other measures of the values of the con-

[6]The common procurement vocabulary (CPV) establishes a single classification system for public procurement aimed at standardizing the references used by contracting authorities and entities to describe procurement contracts.

[7]We use the terminology of Bajari et al. [2009]. In europe, division of contracts are also designated by the term *allotment*.

tract, we include them in some regressions to see their effect on the coefficient of interest.

3.4.3 Descriptive statistics on the estimation sample

The final sample is restricted to tenders with contract values that are under the EU formal thresholds (hereafter, the *threshold*). Indeed, to award these contracts, public buyers have the possibility to choose between an adapted procedure, that give them discretionary power, and an open auction, that is strictly regulated and supposedly leaves no room for discretion. Above the threshold, buyers have to use open auctions, there is no other possibility[8]. We thus exploit the degree of discretion the public buyer has under the formal threshold when choosing the award procedure. Thresholds depend on the object of the tender (public works or not). They are presented in Table 3.2 by sector and period of time. The final estimation sample contains 6,801 observations, where each observation corresponds to a given contract awarded to a specific firm for which we have at least a value of TFP.

Table 3.3 shows that the range of industries of firms included in the sample is very broad, with 60% of observations in the construction industry, 11% in manufacturing, 11% in trade, repair of automobile and motorcycles, and 9% in activities of administrative and support services. The adapted procedure is used in 54% of tenders in the construction industry, 42% in manufacturing, 44% in trade, repair of automobile or motorcycles and 41% in activities of administrative and support services. Mean total value of tenders are particularly high in construction (€768, 980), for example compared to the manufacturing industry (€474, 020). This fact is not surprising given that firms belonging to the construction industry are more likely to win tenders classified as public works, for which the thresholds authorizing the use of adapted procedures are higher than in other sectors. The average technological gap (measured as the mean of the distances to the productivity frontier) ranges from 0.81 in the activities of administrative and support services industry to 0.40 in the agriculture, forestry and fishing industry. In the former industries, the technological

[8]Except in some very specific and limited circumstances.

gap between companies within the industry is high, while it is much lower in the latter.

Table 3.4 presents summary statistics on the main variables of the analysis. 50% of tenders award the contract using an adapted procedure, as opposed to an open auction. The average distance to the frontier amounts to around 0.73 (*mit TFP*). The average value of divisions is €145,800 and the average total value of tenders is €598,352.

Table 3.5 compares the average values of the main variables of the analysis for tenders awarded through adapted procedures and tenders awarded through open auctions. The expected number of bidders, the population, and the experience of the buyer constitutes variables that are fairly similar across groups. What differs the most are the total value of tenders and the value of divisions, which are both much higher when open auctions are used. The average relative productivity of the selected firm (*mit TFP*) is similar across the two groups. The test of the null hypothesis of no difference in productivity between the two types of procedures is reported in Table 3.6. Results support the hypothesis that open auctions select more efficient firms than adapted procedures. This analysis does not control for projects observable characteristics which differ across the subsample of projects awarded through open auctions and those awarded through adapted procedures. It also does not take into account buyers characteristics that influence both procedure and supplier selection.

3.5 Empirical strategy

We empirically test whether the use of an adapted procedure makes the selection of a more efficient firm more likely than the use of an open auction mechanism. The ideal experiment would be to assign selection procedures randomly to contracts and compare the productivity of the firms selected with each type of procedure. The model we want to estimate is the following:

$$Y_{ibt} = \alpha + \beta adapted\_procedure_{ibt} + \delta' X_{ibt} + \epsilon_{ibt} \tag{3.2}$$

where Y_{ibt} is the relative productivity of the selected firm in tender i organized by buyer b in year t, $adapted\_procedure_{ibt}$ is a dummy variable equal to one if the award procedure is an adapted procedure and zero if it is an open auction, X_{ibt} are a set of controls including year and industry fixed-effects, ϵ_{ibt} is an error term and α, β and δ are parameters to estimate, with β the effect of using an adapted procedure.

Estimation of equation 3.2 allows to control for a number of observable characteristics of buyers and contracts which are likely to impact both the award procedure and supplier selection such as the sector of the tender (public works, supplies) or the experience of the buyer with tenders.

However, estimating our specification through OLS would yield biased estimates of the coefficients in the regression because some unobserved factors, in particular unobserved characteristics of the buyer and of the contract, might influence both the choice of the award mechanism and of the supplier, resulting in omitted variables. More specifically, these unobserved factors will likely be buyer-specific, like the presence of corruption or favoritism, knowledge of the industry or the capability of the buyer to select an efficient supplier.

To address this issue, our strategy is to instrument the award mechanism. A good instrument must fulfill two conditions. First, it must be related to the endogenous explanatory variable. Second, it should not be correlated with the unobserved factors mentioned above (corruption, favoritism, effort, skills, etc.).

3.5.1 Identification

Our explanatory variable of interest *Adapted procedure* is likely to be correlated with factors that we are not able to observe and that are absorb by the error term of equation 3.2, potentially leading to an omitted variable bias in the OLS regression.

In particular, we might not be able to consider specificities of the buyer that may influence the decision to use an adapted procedure and the selection of a firm, such as his experience and his skills. For example, if the public buyer is bribed by an inefficient firm, something that we do not observe, he will be more likely to use an adapted procedure as it gives him a higher degree of discretion, thereby facilitating corruptive behavior. As a consequence, the OLS estimate is likely to suffer from an upward bias. On the contrary, a downward bias might be caused by the public buyer having no knowledge about a particular industry and consequently choosing to use an open auction and at the same time selecting a low-productive firm. Therefore, the direction of the potential bias we might face is ambiguous.

The instrument should be correlated with the choice of the award procedure but should not influence whether the selected firm is relatively more productive than firms belonging to the same industry, other than through the procedure. We construct an instrument that draws on Guasch et al. [2007][9], namely the share of adapted procedure used by different buyers at the time the contract is signed (*Prevalence*). The construction of the variable excludes the share of adapted procedure of the public buyer we consider. Il also only accounts for public buyers located in the same county as the one we consider.

Recall that the endogeneity concern comes from the correlation between procedure choice and unobserved variables that are likely made of buyer-specific and contract-specific effects. The instrument is valid because the choice of a procedure is correlated across different buyers in the same county through some aspects that are independent of buyer- or contract-specific effects. According to Kelman [2005], public buyers are prone to resist change so that new procedures such as the adapted procedure may take time to be adopted. Examples would hence be the existence of a spillover effect over buyers in closeby geographical areas due to common reasons

[9]Guasch et al. [2007] instruments specific contract clause in procurement using *"the average prevalence, at the time of contracting, of the same clause in the same sector and in different countries (Instrument 1) and in different sectors and different countries (Instrument 2)"*. The rational for Instrument 2, that is for looking at different sectors, is because some operators might be present in the same sector in different countries, thereby introducing some correlation through operator-specific effects. Since we are not worried by firm-specific effects in our specification, we do not make a distinction by sector.

for the adoption of the adapted procedure, such as the publication of a guidebook on how to use the adapted procedure[10].

3.5.2 Two-step estimation

The causal model of interest is given in equation 3.2, where $adapted\_procedure_{ibt}$ is a dummy variable for the award procedure use in tender i organized by buyer b in year t. The variable of interest is a dummy endogenous variable. The 2SLS first stage is

$$adapted\_procedure_{ibt} = \pi_0 + \pi_1' X_{ibt} + \pi_2' Z_{ibt} + \xi_{ibt} \tag{3.3}$$

a linear regression of $adapted\_procedure_{ibt}$ on a constant, covariates and a vector of instruments, Z_{ibt}.

Because $adapted\_procedure_{ibt}$ is a dummy variable, the conditional expectation function associated with the first stage is nonlinear and should be estimated using a nonlinear model such as a logit model. Therefore, the procedure to estimate the model has to be implemented in two steps to avoid the risk of biasing the estimation with an incorrect nonlinear first stage (see Angrist and Pischke [2009] and Wooldridge [2009]). The procedure consists first in estimating equation 3.3 by using a logit, then use the predicted value $\widehat{adapted\_procedure_{ibt}}$ as an instrument for $adapted\_procedure_{ibt}$ in equation 3.2 in a conventional 2SLS-IV procedure.

Identification comes from the fact that the vector of instruments Z_{ibt} is correlated with the endogenous dummy variable but has no effect on the outcome other than through the choice of the award procedure. The regressions also control for additional explanatory variables, which potentially impact procedure and firm selection. These explanatory variables are included both in the logit regression which estimates

[10] An example is the guidebook of adapted procedure, published by the county Somme in 2011. This guidebook is likely to make buyers located in this county understand better the adapted procedure and hence use it more, independently of their characteristics or of contract-specific characteristics.

equation 3.3 and in the conventional 2SLS procedure that estimates equation 3.2 (both in the first-stage and in the equation of interest).
We can now rewrite equation 3.3 as follow:

$$\begin{aligned} adapted\_procedure_{ibt} &= \pi_0 + \pi_1 Prevalence_{bt} \\ &+\pi_2 ln(population)_{bt} + \sum_{s=2}^{6} \pi_{3s} buyer\_type_{sbt} \\ &+\pi_4 ln(experience)_{bt} + \pi_5 ln(number\_of\_divisions)_{ibt} \\ &+ \sum_{p=2}^{4} \pi_{6p} Sector_{pibt} + \pi_7 ln(expected\_participation_{ibt}) \\ &+ \sum_{p=2}^{19} \pi_{8p} Industry_{pib} + \sum_{j=2007}^{2015} \pi_{9j} d_j + \xi_{ibt} \end{aligned} \tag{3.4}$$

and equation 3.2 as:

$$Y_{ibt} = \alpha + \beta adapted\_procedure_{ibt} + \delta' X_{ibt} + \epsilon_{ibt} \tag{3.5}$$

where X_{ibt} includes all the variables of equation 3.4 but the instrument $Prevalence$. We estimate equation 3.4 with a logit model and obtain a predicted $\widehat{adapted\_procedure}_{ibt}$. We then use this variable as an instrument for $adapted\_procedure_{ibt}$ in a conventional 2SLS-IV procedure.

Standard errors are likely to be correlated over firms in equation 3.5, hence standard errors are clustered at the firm level. The clustered-standard errors shown in the Tables are the standard-errors reported by Stata in the IV-2SLS estimations. As explained in Wooldridge [2009][11], the usual 2SLS standard-errors and test statistics are indeed asymptotically valid. To make sure that standard-errors were correct, we also computed them using a bootstrap procedure. The standard-errors obtained, which are not reported in the paper, were slightly lower than the one reported by our initial IV-2SLS estimation.[12]

[11] Page 623.
[12] Command ivreg2 in Stata.

3.6 Results

3.6.1 Determinants of the choice of a procedure

Table 3.7 provides results from estimating the likelihood of adopting an adapted procedure using a logit regression. Each column represents the first-stage estimates of different specifications over the sample used in the second step estimation.

The first line of the Table 3.7 (*Prevalence*) shows that the correlation between the instrument and the procedure is strong and significant at the 1% level in all specifications. The prevalence of adapted procedures among buyers located in the same county as the buyer significantly increases the likelihood to opt for an adapted procedure. In column (1), which corresponds to the regression in which we control only for observed characteristics of buyers and time and industry fixed-effects, the coefficient of the instrument (*Prevalence*) is 0.749, with a standard-error of 0.125. Computing marginal effects for a buyer which is a city, in year 2014, and at mean values of *Population* and *Experience* for cities in 2014 (respectively 83,429 inhabitants and 84 tenders) and with a firm in the construction industry, an increase in prevalence of adapted procedures among other buyers by 10 points increases the likelihood to choose an adapted procedure by 1.7 percentage points. When we control also for contracts characteristics, adding the number of divisions in column (3) and the sector of the contract in column (4), results are almost unchanged. Adding the values of the contract and of the division (column (5)), which, as explained in section 3.4.2, can be affected by the procedure because they represent an outcome of the procedure, and controlling for the expected number of bidders (column (6)), which reduces the sample size, does not change the results either.

We observe that factors related to the characteristics of buyers have an important role in the choice of the procedure. Buyers that are more experienced with tenders in general (*Experience*) are more likely to use open auctions than adapted procedures. This result directly corroborates with Chong et al. [2014], who explain

that experienced buyers use auctions more frequently because they are more able to specify the characteristics of the contract to be procured. It is also in line with Bajari et al. [2009], who explains that specialists of the construction industry argue that competitive bidding is more often used by buyers who are more experienced because the open auctions procedure is more complex. Table 3.7 also shows that regions are more likely to use adapted procedures than cities, while counties and groups of cities (*Agglomeration community* and *Urban community*) are less likely.

Regarding the two variables that approximate for the complexity of the contract namely, the number of division and the value of the contrats (Bajari et al. [2009]), we first see in Column (3) that more divided contracts are less likely to be awarded through adapted procedures than less divided contracts. In column (5), we observe that the final total value of the contract also negatively influences the likelihood of using an adapted procedure. Values of contracts are included in one specification to check whether the estimates are impacted by a proxy for contract complexity. However, we should repeat that values are bad control here because they constitute outcomes of the procedure (final bid of the winner). Since both the number of division of a contract and the value of a contract are usual proxies used to control for contract complexity, these results are in contradiction with the predictions of the theoretical literature and with the result of Bajari et al. [2009] that more complex contracts are awarded through procedures involving discretion in the private sector. A plausible explanation is that adapted procedures are promoted because they are less costly to organize than open auctions. Therefore, when buyers consider the ex-ante costs associated with organizing and completing a tender, and compare it to the total cost of the project, ex-ante costs represent a high share of small value contracts, leading buyers to opt for the adapted procedure. Also, this result may be driven by the need to avoid suspicions of corruption or favoritism for contracts of higher total values (Spiller [2008], Moszoro and Spiller [2012]). Our results indeed confirms the result of Chong et al. [2014] that more expensive projects are awarded via auctions, which is explained by the need to avoid suspicions of corruption or favoritism in public procurement, especially in more expensive projects.

Column (4) takes into account the sector of the tender (*Expertise*, *Supplies* and *Services*), using the public works sector as the group of reference. The use of an adapted procedure is significantly less likely for sectors others than the public works. As contracts in this sector usually require to specify more dimensions and contingencies than for other sectors, the use of an adapted procedure may therefore be helpful, particularly if there is a phase of negotiation.

Regarding the competitive environment, column (5) indicates the higher the number of potential bidders the lower the likelihood of using an adapted procedure (*Expected number of bidders*). This can be explained by the fact that less potential bidders makes the use of discretion more attractive (Bajari et al. [2009]).

3.6.2 Impact of the award mechanism on supplier selection (TFP of selected suppliers)

Main results

In Table 3.8, we examine the effect of using an adapted procedure on productivity. We start by estimating equation 3.5 by OLS, regressing the relative productivity of the selected firms on the procedures and controls for some observed characteristics of the buyers, as well as year and industry dummies. Column (1) shows that the adapted procedure is positively associated with the distance to the industry frontier, suggesting that adapted procedures select on average less efficient firms. The effect is small, the coefficient being 0.006 (standard error 0.003).

In order to infer something on the causality between procedure and supplier selection, we focus on our IV-2SLS estimates. We exploit the variation in the prevalence of adapted procedures among other buyers to predict the procedure selected by the buyer. Overall, our results indicate that the adoption of an adapted procedure significantly increases the distance to the frontier, meaning that this awarding mechanism selects less efficient operators, whatever the specification. The power of the instrument is confirmed by the weak identification test, where the Kleibergen-Paap

statistic is well beyond the threshold suggested by Stock et al. [2002] and Stock et al. [2002]. The 2SLS coefficients are positive and significant at the 5% level.

In column (2), which corresponds to the regression in which we control only for observed characteristics of buyers and time and industry fixed-effects, the coefficient is equal to 0.056, with a standard error of 0.023. When we control also for contracts characteristics, adding the number of division in column (3) and the sector of the contract in column (4), results remain almost unchanged (coefficients respectively of 0.052 (standard error 0.021) and 0.055 (standard error 0.021)). Adding the values of the contract and of the division, which, as explained in section 3.4.2, are bad controls because they can be affected by the procedure, lowers the coefficient and its significance (column (5)). Finally, controlling for the expected number of bidders, which reduces the sample size, does not change the result (coefficient 0.06 and standard error 0.019).

Our main finding is in line with Baltrunaite et al. [2018], who find that increasing public buyer's discretion leads to the selection of firms with lower productivity. It is also consistent with the idea that open auctions is the most efficient mechanism to reveal the actual costs of the participating firms (Manelli and Vincent [1995]; Burguet and Che [2004]), with productive firms bidding lower amounts and therefore winning tenders organized through open auctions. If we consider that more productive firms are able to complete the contracts at the lowest total cost for the buyer (including ex-post adaptation costs) and providing the expected quality, then, on average, open auctions seem desirable. In a wider perspective for the economy, open auctions also direct public money towards productive firms, which helps promoting productivity, at the level of the economy.

To understand the magnitude of the result, we look at the distribution of the m_{it} in the Amadeus sample in the industry that represents most of the observations of our estimation sample, namely the construction industry. We focus on the year 2014 that has the largest number of observations in the Amadeus sample. The distribution of the m_{it} is graphed in Figure 3.3. It has a mean of 0.79 and a standard-deviation of

0.056. The coefficient of interest estimated (0.056 in column (2) of Table 3.8) hence corresponds to a change in the m_{it} of one standard deviation. The implication is that the adapted procedure moves the relative productivity of the selected firm quite a lot down the distribution compared to open auction. Put differently, if we consider that the firm selected using an auction procedure is at the mean of the distribution of productivities, using an adapted procedure comparatively selects a firm that is in the first decile of the distribution of productivities.

Our regressions also shows that as contracts get more divided (*Number of divisions*), less efficient firms are selected. The interpretation of this result could be that buyers are less performing into selecting suppliers when they have to screen bids for more divisions. We also observe that time-invariant characteristics of the buyers such as status or size do not impact the selection of a more productive firm, which is consistent with the idea that buyers perform differently depending on the tender at hand and not on their general characteristics.

Heterogeneity by sector

In Table 3.9, we look at whether the effects of the adapted procedure are heterogeneous across different types of tenders, where types correspond to sectors, namely public works (76% of the estimation sample), expertise and studies (3%), supplies (11%) and services (10%). Public works correspond to construction, renovation and maintenance of public buildings. Expertise and studies correspond mainly to support for project management in construction and diverse studies. Supplies include any equipment, food or product. Services include printing of documents, public transport, cleaning services, insurance services, gardening services, etc.

Columns (2), (3) and (4) show that the effect of the adapted procedure is heterogeneous across sectors. The baseline coefficient (*Adapted procedure*), shows the effect in public works. It is similar to the average effect, which is not surprising since public works constitute almost 80% of observations in the sample (coefficient 0.051 with standard error of 0.023 in column (2)). Column (2) shows that the effect of the adapted procedure is negative and significant in expertise (coefficient of -0.011) and

in services (coefficient of -0.066), meaning that in these sectors, the adapted procedure selects more productive firms than in public works. The effect for supplies is not significantly different from the one estimated for public works, the effect of the adapted procedure is hence positive and significant.

These results are difficult to interpret. If we consider that more productive firms are able to complete the contracts at the lowest total cost for the buyer (including ex-post adaptation costs) and providing the expected quality, the result for expertise and services is consistent with the idea that when goods and services are customized to the need of the buyer, which is the case in the sectors of studies and services, introducing discretion can lead to better overall outcomes. Additionally, since supplies are usually associated with low-complexity, the fact the open auction is a better selection mechanism is also consistent with the literature. However, public works are considered to be more complex contracts and yet, the effect is positive, meaning that the adapted procedure is a worst selection mechanism then open auction in terms of productivity of the selected supplier.

3.6.3 Robustness checks

We test the robustness of our main results using different specifications. We first modify the variable of interest by using labor productivity and measures of TFPs computed using the approach proposed by Wooldridge [2009] instead of the approach of Levinsohn and Petrin [2003] (see Tables 3.10 and 3.11). We then estimate the model using a fractional probit for the equation of interest (equation 3.5) and a probit for the equation of the determinants of the choice of procedure (equation 3.4). This model takes into account the fact that the dependent variable m_{it} is between 0 and 1 and is estimated in one step.

In Table 3.10, firm's productivity is measured using the labor productivity rather than the TFP. Results show that the effect of our main variable of interest *Adapted procedure* is of similar magnitude and significance level as the estimates from Table 3.8. In Table 3.11, TFP was calculated with the method which was developed

by Wooldridge [2009]. Our results demonstrate a very strong robustness since our explanatory variable shows very strong similarities both in terms of sign, magnitude and significance.

Finally, we look at the results obtained using a different model, namely a fractional probit model where the two equations are estimated simultaneously in one stage. This model is commonly used when the dependent variable is continuously defined over an interval between zero and one, which is the case of our dependent variable m_{it}. Results are displayed in Table 3.12. Our results demonstrate a strong robustness to this type of specification both in terms of sign and significance. Computing marginal effects at means yields a marginal effect of adapted procedure of 0.019 in column (1), which is in magnitude smaller than the effect estimated using the main model.

3.7 Discussion

The mechanism through which the adapted procedure leads to the selection of less efficient firms could either be that firms select the tenders they participate in depending on the awarding procedure, or the pure effect of discretion that either comes from the restriction to a pool of specific invited firms or from a buyer engaging in screening of the firms.

The choice of the procedure may influence the number and characteristics of participating firms. Given the cost associated to keeping up with new tenders and the fact that the adapted procedure allows buyers to choose where to advertise, the number of bidders could be reduced in adapted procedures. Additionally, the adapted procedure allows for the ex-ante selection of a pool of invited firms to participate to the tender, which would also result in the restriction of competition in adapted procedures. On the other side, as explained before, we should expect more SMEs and young firms to participate in adapted procedures because ex-ante costs associated with submitting bids are lower in adapted procedures than in formalized procedures.

As an attempts to disentangle between the autoselection effect of firms into a procedure or discretion of the buyer, we assess the effect of the procedure over the number of participants in the tender. In a second step, we compare the characteristics of the winning firms. Unfortunately, since our dataset only indicates the identity of the winner, we are not able to analyse the characteristics of the other participants to the tender.

3.7.1 Adapted procedure and number of bidders

In Table 3.13, we examine the effect of using an adapted procedure on the number of bidders. We start by estimating the equation using a Poisson regression, regressing the number of bidders on the procedures and controls for some observed characteristics of the buyers and the tender, as well as year-dummies. This specification is standard when the dependent variable is a count one (and the dependent variable is not over dispersed). Column (1) shows that the adapted procedure is not associated with the number of bidders. The effect is indeed small and non statistically significant (coefficient -0.042 standard error 0.029).

In order to infer something on the causality between procedure and number of bidders, we focus on our Poisson-2SLS estimate. First, the competitive environment is likely to influence the choice of an awarding mechanism, yielding concerns in concerns for the presence of reverse causality. In particular, using open auctions generates more benefits when the degree of competition is high. Also, it is highly possible that our specification suffers from an omitted variable bias. Some unobserved factors explaining the adoption of an adapted procedure could also be correlated with the number of bidders, in particular contract-specific characteristics. Therefore, we use a two-step procedure where we first regress the choice of the procedure over a set of explanatory variables. In a second step, we run an IV Poisson using the same instrument as in the main analysis. Column (2) shows that there is no significant effect of using an adapted procedure over the total number of participants to the tender.

We therefore conclude that our main result, namely that adapted procedures select less efficient firms, is not driven by a change in the size of the pool of bidders.

3.7.2 Adapted procedure and characteristics of winners

The dataset does not allow us to examine the characteristics of bidders between types of selection procedure because we do not have any information on all bidders. We are only able to look at the effect of procedure on supplier selection using observable characteristics of suppliers. The idea is to examine whether the differences in productivity observed in open auctions and adapted procedures come from observable characteristics of firms.

As for the examination of productivity, we are concerned that our specification suffers from an endogeneity problem. Therefore, the coefficients reported in this section are estimated using a two-step procedure with the prevalence of adapted procedures among other buyers as the instrument. Results from the IV regressions are displayed in Table 3.14. It shows that using an adapted procedure does not lead to the selection if a firm with a higher turnover (column (1)), more profits (column (2), younger (column (3)) or closer to the buyer in distance (column (4)), since none of the coefficients are significant at the 10% minimum level.

Since one of the main objectives of the implementation of adapted procedures is to foster the entry of SMEs and new firms in the public procurement market, we expect these types of firms to be more likely to win in this procedure. This is not the case in our dataset. A plausible explanation is that our dataset almost exclusively contains SMEs since the 95th percentile of the distribution of turnovers in the sample is €37 millions, SMEs being usually characterized as companies with turnovers below €50 million. Moreover, the minimum age of the firms observed in the sample is 3.5 years so that it does not contain new entrants namely, firms that are selected in a tender during their first year of activity.

The results displayed in Table 3.14 indicate that the difference in productivity observed among winning firms does not come from buyers targeting some firms with

specific observable characteristics (small companies, new entrants or local companies) with the use of adapted procedures. Combined with the fact that the number of bidders is similar in both types of procedures, this suggests that buyers do not restrict the pool of bidders to some firms with specific observable characteristics in adapted procedures.

Therefore, the effect that we observe may either come from pure discretion in the screening process or firms self-selecting into the type of procedure they participate to. Our result would come from the later explanation if the pools of bidders in adapted procedures were composed of less productive firms than in open auctions. However, it is difficult to figure out any reason why a firm that participates to open auctions would not do so in the case of adapted procedures. This is confirmed by Baltrunaite et al. [2018], who compares the pools of bidders in open auctions and a procedure with discretion, and finds that the composition of the bidding firms pool in terms of observables does not change. Hence we interpret our results as the pure effect of discretion, in particular the screening process of firms by buyers.

3.8 Conclusion

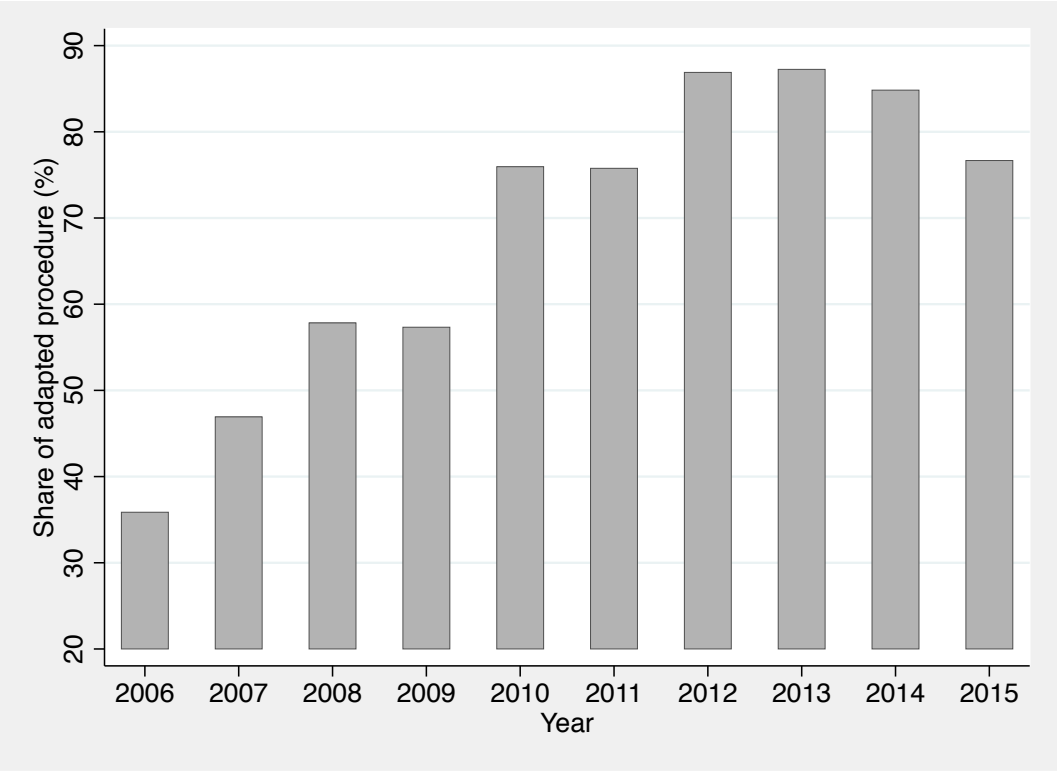
This paper compares the productivity of suppliers selected in competitive tenders organized by public buyers using two different types of procedures. We evaluate whether an award procedure that allows for discretionary power results in the selection of more or less productive firms than an award procedure that does not. The question we address is hence that of the effect of discretion over the selection of suppliers.

Our main result, which is robust to several specifications and tests presented in the paper, indicate that the adoption of an adapted procedure significantly increases the distance to the efficiency frontier, meaning that this awarding mechanism selects less efficient operators, resulting in an inefficient allocation of public funds towards less efficient firms. We provide evidence in the last section of the paper that it is driven by the pure effect of discretion in the screening of firms.

We conclude that if the selection of more productive firms is more likely to lead to lower costs and/or better quality outcomes, discretion is in contradiction with the primary objective of public procurement, which is to get the best outcome at the lowest price. The other implication of the result is that discretion is also in contradiction with one potential secondary objective of public procurement, which would be to promote productivity. We also show that the experience of the buyer, the complexity of the contract and the competitiveness of the environment are all positively associated with the use of open auctions.

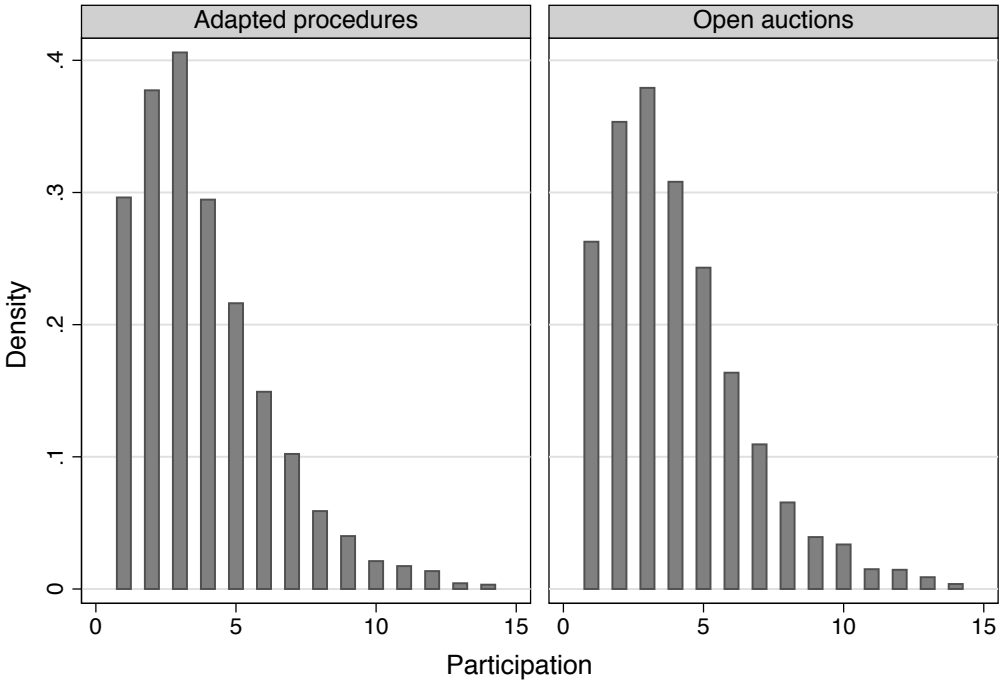
3.9 Figures and tables

Figure 3.1: Share of adapted procedures for contract below the EU threshold in French municipalities (2006-2015)



Note: Share of adapted procedures over the total number of award notices at the municipal level for contracts below the EU formal threshold.

Figure 3.2: Density of participation to the tender between procedures



Note: For tenders with less than 15 participants

Table 3.2: Public procurement thresholds for sub-central contracting authorities (2006-2015)

	Supplies and services	Work
2006-2007	210 000 €	5 270 000 €
2008-2009	206 000 €	5 150 000 €
2010-2011	193 000 €	4 485 000 €
2012-2013	200 000 €	5 000 000 €
2014-2015	207 000 €	5 186 000 €

Table 3.3: Sector distribution - Main estimation sample

Sector	Number of obs.	Share of sample	Share of adapted procedure	Mean total value of tender	Mean relative TFP
Accommodation and catering	20	0.00	0.50	81,453	0.48
Activities of administrative and support services	581	0.09	0.41	592,707	0.81
Agriculture, forestry and fishing	29	0.00	0.24	280,070	0.40
Arts, entertainment and recreation	52	0.01	0.62	250,461	0.72
Construction	4053	0.60	0.54	768,980	0.75
Education	12	0.00	0.92	99,438	0.71
Financial and insurance activities	27	0.00	0.37	119,227	0.56
Information and communication	79	0.01	0.42	134,388	0.70
Manufacturing industry	729	0.11	0.42	474,020	0.71
Other service activities	21	0.00	0.57	85,511	0.61
Specialized, scientific and technical activities	279	0.04	0.51	171,326	0.78
Trade, repair of automobiles and motorcycles	764	0.11	0.44	199,927	0.61
Transport and storage	76	0.01	0.39	96,807	0.74
Water production and distribution, sanitation, waste management and pollution	79	0.01	0.43	193,571	0.46

Table 3.4: Sector distribution - Main estimation sample

Variable	Number of obs.	Mean	Std.dev.	Min	Max
Adapted procedure	6,801	0.50	0.50	0.00	1.00
Number of divisions	6,801	5.30	4.69	1.00	19.00
Experience	6,801	140.15	126.14	1.00	858.00
Division value (euros)	6,801	145,799.53	288,189.81	1,000.00	4,960,000.00
mit TFP	6,801	0.73	0.10	0.09	0.87
Expected number of bidders	4,109	4.86	4.31	1.00	71.00
Population	6,801	119,806.76	161,928.20	54.00	861,676.00
Prevalence	6,801	0.68	0.25	0.00	1.00
Total Value (euros)	6,801	598,352.19	877,736.19	25,162.69	4,993,044.00

Table 3.1: Main characteristics of the adapted and the open auction procedures

	Adapted procedure (*procédure adaptée*)	**Open Auction**
EU Threshold	Below.	Below or above.
Is negotatiation possible ?	Yes (but not mandatory), over **all** aspects.	Not possible on any aspect.
Publicity	- If the value of the contract <90,000€: mandatory, but publication is not. Free choice of publicity support. - If the value of the contract >90,000€, should be published in an official journal.	Should always be published in an official journal.
Consultation documents	Could be limited to the main characteristics of the awarding mechanism, to the condition of the negotiation, and to the selection criteria of the submitted tenders. The redaction of technical specifications is not mandatory, but recommended.	Very detailed and specific.
Submission deadline	Free choice.	Minimum of 52 days.
Proof of the firm's financial capabalities	Not mandatory. The participation of new firms (less than 3 years) is possible since they can provide a bank statement rather than a three-year balance sheet.	At least the turnover from the past three years.
Candidates' experience	Can be requested.	Cannot be requested.
Weighting of awarding criteria	Not mandatory.	Mandatory.
Restricted pool of candidates	Possible.	Not possible.
Awarding commission	Not mandatory.	Mandatory.
Immediate notification to the rejected participants	Not mandatory.	Mandatory.
Standstill[1]	Not mandatory.	Minimimum of 16 days.
Publication of the award notice	Not mandatory.	Mandatory.

[1] The standstill is a suspensive deadline between the annoucement date of the awarding notice and the signature of the contract. It allows for the rejected candidates to contest the ways the awarding process was conducted.

Source: Legifrance, Circulaire du 29 décembre 2009 relative au Guide de bonnes pratiques en matière de marchés publics, 2009, available at: https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000021570204
Direction des Affaires Juridiques, Les marchés à procédure adaptée, 2015, available at: URLhttps://www.economie.gouv.fr/files/directions_services/daj/marches_publics/conseil_acheteurs/fiches-techniques/mise-en-oeuvre-procedure/marches-procedures-adaptees.pdf
EDT, Vade-Medum MAPA, 2010, available at: http://www.achatpublic.info/sites/default/files/document/documents/guide_MAPA_ETD_1.pdf?from=base-documentaire&page=228

Table 3.5: Comparison of tenders with adapted procedure and open auction

	Adapted procedures Mean	**Open auctions** Mean
Division value (euros)	115,722.23	175,850.31
Experience	121.66	158.63
Number of divisions	5.23	5.37
Population	122,236.12	117,379.54
Prevalence	0.73	0.62
Total Value (euros)	470,294.22	726,297.25
mit TFP	0.74	0.72
Expected number of bidders	4.51	5.22

Table 3.6: Test of differences in relative TFP means

	Mean(Open_auction)	**Mean(Adapted_procedure)**	**Diff.**	**Std.Error**
mit (TFP)	0.72	0.74	-0.02^{***}	0.0024

Table 3.7: First-stage regressions

	(1)	(2)	(3)	(4)	(5)
Prevalence	0.749***	0.758***	0.752***	0.776***	0.786***
	(0.125)	(0.127)	(0.127)	(0.132)	(0.170)
	[0.187]	[0.189]	[0.188]	[0.194]	[0.196]
ln(Population)	−0.009	−0.009	−0.010	−0.031	0.051
	(0.033)	(0.034)	(0.034)	(0.034)	(0.045)
	[−0.002]	[−0.002]	[−0.003]	[−0.008]	[0.013]
Type: county	−0.294***	−0.319***	−0.324***	−0.345***	−0.323***
	(0.079)	(0.079)	(0.079)	(0.082)	(0.104)
	[−0.073]	[−0.079]	[−0.080]	[−0.085]	[−0.080]
Type: region	0.560***	0.589***	0.591***	0.653***	0.796***
	(0.122)	(0.122)	(0.122)	(0.124)	(0.149)
	[0.136]	[0.143]	[0.143]	[0.158]	[0.190]
Type: agglomeration community	−0.279***	−0.335***	−0.337***	−0.269***	−0.222*
	(0.090)	(0.092)	(0.092)	(0.095)	(0.129)
	[−0.069]	[−0.083]	[−0.084]	[−0.067]	[−0.055]
Type: municipalities community	−0.043	−0.043	−0.027	0.081	1.047***
	(0.147)	(0.148)	(0.149)	(0.155)	(0.310)
	[−0.011]	[−0.011]	[−0.007]	[0.020]	[0.242]
Type: urban community	−0.373***	−0.454***	−0.470***	−0.289**	−0.147
	(0.136)	(0.137)	(0.138)	(0.142)	(0.165)
	[−0.092]	[−0.112]	[−0.116]	[−0.072]	[−0.037]
ln(Experience)	−0.253***	−0.278***	−0.277***	−0.251***	−0.224***
	(0.044)	(0.045)	(0.045)	(0.046)	(0.074)
	[−0.063]	[−0.069]	[−0.069]	[−0.063]	[−0.056]
ln(Number of divisions)		−0.273***	−0.300***	−0.036	0.029
		(0.030)	(0.031)	(0.053)	(0.069)
		[−0.068]	[−0.075]	[−0.009]	[0.007]
Sector: expertise			−0.472**	−1.077***	−1.170***
			(0.218)	(0.224)	(0.322)
			[−0.116]	[−0.255]	[−0.272]
Sector: supplies			−0.479***	−1.110***	−1.243***
			(0.124)	(0.135)	(0.210)
			[−0.118]	[−0.262]	[−0.286]
Sector: services			−0.599***	−1.188***	−1.402***
			(0.124)	(0.133)	(0.207)
			[−0.146]	[−0.278]	[−0.315]
ln(Division_value)				−0.039	−0.013
				(0.036)	(0.047)
				[−0.010]	[−0.003]
ln(Total_value)				−0.515***	−0.632***
				(0.045)	(0.059)
				[−0.129]	[−0.158]
ln(Expected number of bidders)					−0.173***
					(0.064)
					[−0.043]
Constant	−2.410***	−2.192***	−1.983***	4.412***	4.139***
	(0.555)	(0.560)	(0.561)	(0.686)	(1.452)
Log-likelihood	-3964	-3923	-3908	-3738	-2232
pseudo-R^2	0.159	0.168	0.171	0.207	0.215
Obs	6801	6801	6801	6801	4103

* p < 0.1, ** p < 0.05, *** p < 0.01. Logit estimates. The dependent variable is whether the awarding procedure is an adapted procedure or an open auction. All columns include year dummies and industry dummies. The omitted category of reference for the type of buyer is the city and the one for the sector are public works. Robust standard-errors are reported in parentheses. Marginal effects are reported in brackets.

Table 3.8: Second-stage regressions

	(1) OLS	(2) IV-2SLS	(3) IV-2SLS	(4) IV-2SLS	(5) IV-2SLS	(6) IV-2SLS
Adapted procedure	0.006**	0.056**	0.052**	0.055***	0.030*	0.060***
	(0.003)	(0.023)	(0.021)	(0.021)	(0.017)	(0.019)
ln(Population)	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Type: county	−0.002	0.001	0.002	0.002	0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Type: region	0.004	−0.002	−0.003	−0.004	0.000	−0.007
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Type: agglomeration community	0.004	0.006	0.009**	0.009**	0.008**	0.011**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Type: municipalities community	0.000	0.000	0.001	0.000	0.001	−0.004
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)
Type: urban community	−0.012**	−0.008	−0.004	−0.004	−0.003	−0.007
	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.008)
ln(Experience)	−0.000	0.002	0.003	0.004	0.002	0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
ln(Number of divisions)			0.015***	0.015***	0.013***	0.014***
			(0.002)	(0.002)	(0.002)	(0.003)
Sector: expertise				0.004	−0.004	0.012
				(0.007)	(0.007)	(0.011)
Sector: supplies				−0.011	−0.019*	0.010
				(0.010)	(0.010)	(0.017)
Sector: services				−0.003	−0.011	0.008
				(0.009)	(0.009)	(0.012)
ln(Division_value)					−0.003**	−0.001
					(0.001)	(0.002)
ln(Total_value)					−0.002	0.000
					(0.002)	(0.003)
ln(Expected number of bidders)						0.002
						(0.002)
Constant	0.390***					
	(0.032)					
Obs	6801	6801	6801	6801	6801	4103
Weak identification test		66.06	74.88	83.15	131.82	98.14

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the relative productivity of the firm which was selected m_{it} . All columns include year dummies and industry dummies. The omitted category of reference for the type of buyer is the city and the one for the sector are public works. Column (1) is estimated by OLS and columns (2) to (6) represent the IV-2SLS estimates. The Stock-Yogo weak ID test critical values: 10% maximal IV size is 16.38. Standard-errors are clustered at the firm level.

Figure 3.3: Distribution of mit in the Amadeus sample (construction industry in 2014)

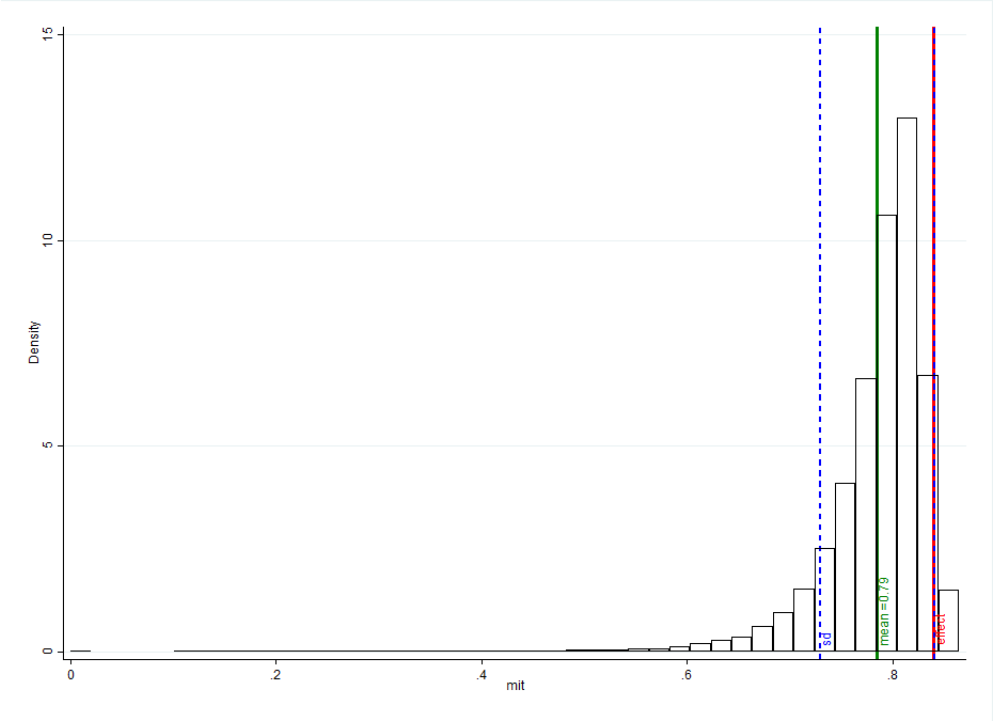


Table 3.9: Second-stage regressions - Heterogeneous effect by sector of the contract

	(1) OLS	(2) IV-2SLS	(3) IV-2SLS	(4) IV-2SLS	(5) IV-2SLS
Adapted procedure	0.008***	0.051**	0.054***	0.034**	0.058***
	(0.003)	(0.023)	(0.020)	(0.016)	(0.018)
Adapted procedure x Expertise	−0.002	−0.062***	−0.048***	−0.051***	−0.045
	(0.008)	(0.020)	(0.016)	(0.018)	(0.031)
Adapted procedure x Services	−0.023*	−0.117***	−0.070***	−0.093***	−0.115***
	(0.013)	(0.036)	(0.026)	(0.029)	(0.042)
Adapted procedure x Supplies	0.004	−0.046	−0.019	−0.041	−0.045
	(0.013)	(0.051)	(0.045)	(0.039)	(0.067)
ln(Population)	−0.001	−0.002	−0.001	−0.002	−0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Type: county	−0.002	−0.002	0.000	−0.001	−0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Type: region	0.003	−0.003	−0.004	−0.001	−0.005
	(0.005)	(0.007)	(0.006)	(0.006)	(0.007)
Type: agglomeration community	0.004	0.005	0.008*	0.007*	0.012**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Type: municipalities community	0.001	0.000	0.000	0.001	0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)
Type: urban community	−0.013**	−0.013**	−0.007	−0.007	−0.010
	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)
ln(Experience)	0.001	0.003	0.004	0.003	0.005*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
ln(Number of divisions)			0.014***	0.012***	0.013***
			(0.002)	(0.002)	(0.003)
Sector: expertise	−0.008	0.020*	0.023**	0.016	0.026
	(0.009)	(0.012)	(0.010)	(0.012)	(0.022)
Sector: supplies	−0.022**	0.000	−0.004	−0.003	0.025
	(0.011)	(0.021)	(0.019)	(0.017)	(0.025)
Sector: services	−0.006	0.035***	0.024**	0.025**	0.045**
	(0.008)	(0.013)	(0.011)	(0.012)	(0.018)
ln(Division_value)				−0.003**	−0.000
				(0.001)	(0.002)
ln(Total_value)				−0.002	0.000
				(0.002)	(0.003)
ln(Expected number of bidders)					0.002
					(0.002)
Constant	0.398***	0.387***	0.373***	0.440***	0.443***
	(0.032)	(0.033)	(0.032)	(0.040)	(0.046)
Obs	6801	6801	6801	6801	4103
F-stat	49	39	43	41	30

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the relative productivity of the firm which was selected m_{it} . All columns include year dummies and industry dummies. The omitted category of reference for the type of buyer is the city and the one for the sector are public works. Column (1) is estimated by OLS and columns (2) to (5) represent the IV-2SLS estimates. Standard-errors are clustered at the firm level.

Table 3.10: Robustness - Labor productivity

	(1) OLS	(2) IV-2SLS	(3) IV-2SLS	(4) IV-2SLS	(5) IV-2SLS	(6) IV-2SLS
Adapted procedure	0.000	0.052***	0.049**	0.050**	0.026*	0.018
	(0.002)	(0.019)	(0.019)	(0.019)	(0.015)	(0.017)
ln(Population)	−0.001	0.001	0.001	0.001	0.000	0.000
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Type: county	0.006**	0.012***	0.012***	0.012***	0.010***	0.011***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
Type: region	0.002	−0.000	−0.001	−0.001	0.000	0.004
	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)
Type: agglomeration community	0.004	0.008*	0.009**	0.009**	0.007*	0.009*
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Type: municipalities community	0.003	0.004	0.004	0.004	0.004	−0.006
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.012)
Type: urban community	0.005	0.009	0.010*	0.010*	0.008	0.008
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
ln(Experience)	−0.001	−0.001	−0.001	−0.000	−0.001	−0.004*
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ln(Number of divisions)			0.006***	0.006***	0.006**	0.003
			(0.001)	(0.001)	(0.002)	(0.002)
Sector: expertise				0.010	0.008	0.017*
				(0.009)	(0.008)	(0.010)
Sector: supplies				−0.003	−0.004	0.001
				(0.006)	(0.006)	(0.007)
Sector: services				−0.003	−0.004	0.003
				(0.006)	(0.006)	(0.007)
ln(Division_value)					0.001	0.001
					(0.002)	(0.001)
ln(Total_value)					−0.000	0.001
					(0.002)	(0.003)
ln(Expected number of bidders)						0.002
						(0.002)
Constant	0.872***	0.851***	0.848***	0.849***	0.852***	
	(0.018)	(0.021)	(0.021)	(0.021)	(0.033)	
Obs	3941	3396	3396	3396	3396	1984
F-stat	11.80	8.00	9.42	8.72	9.57	3.26
Weak identification test		40.75	41.26	42.11	71.52	38.29

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the relative productivity of the firm which was selected m_{it} . All columns include year dummies and industry dummies. The omitted category of reference for the type of buyer is the city and the one for the sector are public works. Column (1) is estimated by OLS and columns (2) to (6) represent the IV-2SLS estimates. The Stock-Yogo weak ID test critical values: 10% maximal IV size is 16.38. Standard-errors are clustered at the firm level.

Table 3.11: Robustness - TFP estimated with Wooldridge's approach

	(1) OLS	(2) IV-2SLS	(3) IV-2SLS	(4) IV-2SLS	(5) IV-2SLS	(6) IV-2SLS
Adapted procedure	0.006**	0.051**	0.046**	0.050**	0.028*	0.055***
	(0.002)	(0.022)	(0.020)	(0.020)	(0.016)	(0.018)
ln(Population)	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Type: county	−0.002	0.001	0.002	0.002	0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Type: region	0.003	−0.002	−0.003	−0.003	0.000	−0.006
	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)
Type: agglomeration community	0.003	0.005	0.008*	0.008**	0.007**	0.011**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Type: municipalities community	−0.000	−0.000	−0.000	−0.000	0.001	−0.005
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)
Type: urban community	−0.011*	−0.007	−0.003	−0.003	−0.003	−0.006
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
ln(Experience)	0.000	0.002	0.003	0.003	0.002	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ln(Number of divisions)			0.014***	0.014***	0.012***	0.013***
			(0.002)	(0.002)	(0.002)	(0.002)
Sector: expertise				0.003	−0.004	0.011
				(0.007)	(0.007)	(0.010)
Sector: supplies				−0.011	−0.018*	0.009
				(0.010)	(0.010)	(0.016)
Sector: services				−0.003	−0.011	0.007
				(0.009)	(0.009)	(0.012)
ln(Division_value)					−0.003**	−0.000
					(0.001)	(0.001)
ln(Total_value)					−0.002	0.000
					(0.002)	(0.003)
ln(Expected number of bidders)						0.002
						(0.002)
Constant	0.416***	0.410***	0.398***	0.402***	0.467***	0.472***
	(0.031)	(0.031)	(0.031)	(0.032)	(0.039)	(0.043)
Obs	6801	6801	6801	6801	6801	4103
F-stat	46.89	46.39	48.76	45.16	44.15	32.35
Weak identification test		66.06	74.88	83.15	131.82	98.14

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the relative productivity of the firm which was selected m_{it} . All columns include year dummies and industry dummies. The omitted category of reference for the type of buyer is the city and the one for the sector are public works. Column (1) is estimated by OLS and columns (2) to (6) represent the IV-2SLS estimates. The Stock-Yogo weak ID test critical values: 10% maximal IV size is 16.38. Standard-errors are clustered at the firm level.

Table 3.12: Robustness - Fractional probit (main equation)

	(1)	(2)	(3)	(4)	(5)
Adapted procedure	0.057***	0.057***	0.055***	0.041**	0.063**
	(0.018)	(0.017)	(0.017)	(0.018)	(0.030)
ln(Population)	−0.002	−0.001	−0.001	−0.003	0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.007)
Type: county	−0.003	0.000	−0.000	−0.001	−0.003
	(0.011)	(0.011)	(0.011)	(0.011)	(0.013)
Type: region	0.008	0.005	0.004	0.007	0.001
	(0.016)	(0.016)	(0.016)	(0.016)	(0.018)
Type: agglomeration community	0.009	0.017	0.016	0.017	0.028*
	(0.011)	(0.011)	(0.011)	(0.011)	(0.015)
Type: municipalities community	−0.010	−0.007	−0.006	−0.004	−0.004
	(0.016)	(0.016)	(0.015)	(0.015)	(0.037)
Type: urban community	−0.030*	−0.019	−0.020	−0.013	−0.022
	(0.018)	(0.017)	(0.017)	(0.017)	(0.022)
ln(Experience)	−0.001	0.002	0.002	0.003	0.002
	(0.006)	(0.005)	(0.005)	(0.005)	(0.007)
ln(Number of divisions)		0.041***	0.040***	0.040***	0.045***
		(0.004)	(0.005)	(0.007)	(0.007)
Sector: expertise			0.006	−0.013	0.013
			(0.019)	(0.019)	(0.027)
Sector: supplies			−0.037	−0.060**	−0.007
			(0.025)	(0.024)	(0.041)
Sector: services			−0.024	−0.042*	−0.010
			(0.024)	(0.023)	(0.030)
ln(Division_value)				−0.010***	−0.003
				(0.004)	(0.004)
ln(Total_value)				−0.011**	−0.012*
				(0.005)	(0.007)
ln(Expected number of bidders)					−0.001
					(0.007)
Constant	−0.335***	−0.378***	−0.365***	−0.102	−0.020
	(0.092)	(0.091)	(0.094)	(0.102)	(0.104)
Obs	7972	7972	7972	7937	4616

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the relative productivity of the firm which was selected m_{it} . All columns include year dummies and industry dummies. The omitted category of reference for the type of buyer is the city and the one for the sector are public works. The fractional probit and the probit are estimated at the same time using the cmp Stata command. Standard-errors are clustered at the firm level.

Table 3.13: Regression over the number of participants

	(1) Poisson	(2) IV-Poisson
Adapted procedure	−0.042	0.067
	(0.029)	(0.396)
ln(Population)	0.010	0.010
	(0.022)	(0.021)
Type: county	0.045	0.051
	(0.051)	(0.057)
Type: region	−0.041	−0.056
	(0.064)	(0.087)
Type: agglomeration community	0.032	0.038
	(0.048)	(0.056)
Type: municipalities community	−0.079	−0.078
	(0.070)	(0.070)
Type: urban community	0.013	0.024
	(0.079)	(0.098)
ln(Experience)	−0.046	−0.041
	(0.028)	(0.032)
Sector: expertise	0.227***	0.230***
	(0.054)	(0.055)
Sector: supplies	−0.191***	−0.179***
	(0.038)	(0.058)
Sector: services	−0.165***	−0.152**
	(0.040)	(0.066)
Constant	2.059***	2.018***
	(0.194)	(0.255)
Obs	6801	6801

* p < 0.1, ** p < 0.05, *** p < 0.01. The dependent variable is the number of bidders. All columns include year dummies. The omitted category of reference for the type of buyer is the city and the one for the sector are public works. Column (1) is estimated by Poisson and column (2) represent the IV-Poisson estimates. Standard-errors are clustered at the buyer level.

Table 3.14: Effect of the selection procedure on firm's characteristics

	(1) ln(turnover)	(2) ln(profit)	(3) Age (in years)	(4) ln(distance)
Adapted procedure	−0.389	−0.495	0.806	−0.585
	(0.366)	(0.437)	(4.497)	(0.476)
ln(Population)	−0.002	0.006	−0.004	−0.047*
	(0.035)	(0.032)	(0.333)	(0.025)
Type: county	0.034	0.004	−1.291*	0.221***
	(0.064)	(0.081)	(0.698)	(0.070)
Type: region	−0.123	−0.084	−0.944	0.663***
	(0.093)	(0.117)	(1.120)	(0.109)
Type: agglomeration community	0.004	−0.049	0.474	0.033
	(0.060)	(0.083)	(0.796)	(0.078)
Type: municipalities community	−0.051	0.005	−0.653	0.082
	(0.086)	(0.117)	(1.128)	(0.103)
Type: urban community	0.370***	0.214	−0.066	−0.000
	(0.137)	(0.139)	(1.765)	(0.133)
ln(Experience)	0.003	0.031	0.318	0.041
	(0.037)	(0.044)	(0.416)	(0.039)
Sector: expertise	−0.098	0.009	−4.123***	0.011
	(0.116)	(0.176)	(1.308)	(0.196)
Sector: supplies	0.381***	0.179	2.138	0.670***
	(0.104)	(0.144)	(1.385)	(0.119)
Sector: services	0.166	0.071	−0.319	0.499***
	(0.104)	(0.142)	(1.140)	(0.108)
Constant	14.780***	10.810***	30.842***	4.041***
	(0.361)	(0.448)	(4.333)	(0.348)
Obs	6801	6137	6801	5938
F-stat	4.10	5.16	6.08	17.90
Weak identification test	55.86	61.64	55.86	44.46

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is ln(turnover) in column (1), ln(profit) in column(2), age in years in column (3) and ln(distance) in column (4). All columns include year dummies and industry dummies. The omitted category of reference for the type of buyer is the city and the one for the sector are public works. All columns represent the IV-2SLS estimates. The Stock-Yogo weak ID test critical values: 10% maximal IV size is 16.38. Standard-errors are clustered at the firm level.

APPENDIX A

Descriptive Statistics on the Amadeus sample

In the main analysis presented in the paper, we use measures of TFP computed using an unbalanced sample of 1,252,194 firms covering the period 2005-2016. Table A.1 presents the sectoral distribution of firms in this sample. Table A.2 provides summary statistics on key variables used in the estimations of the production functions.

All variables entering the production functions were deflated using industry specific indices. We used indices provided in the EU KLEMS database. All these indices are specific to France and available at the two-digits NACE level. Value-added was deflated using the gross value-added price index, wages were deflated using an index of the compensation of employees, capital, defined as tangible assets, was deflated using the gross fixed capital formation index and materials, which correspond to intermediate consumption, were deflated using the intermediate inputs price index.

Table A.1: Sector distribution of firms in Amadeus - Main estimation sample

Sector	Number of firms in 2014	Mean value-added	Mean wages	Mean capital	Mean materials
Agriculture, forestry and fishing	1,424	7,862	5,759	9,542	18,364
Mining industry	277	7,119	6,397	13,037	21,702
Manufacturing industry	22,835	24,871	18,626	11,029	58,632
Water production and distribution; sanitation, waste management and pollution	1,087	19,657	14,210	15,890	49,959
Construction	20,327	11,115	9,693	2,096	26,405
Trade; repair of automobiles and motorcycles	53,809	9,963	7,030	3,254	54,650
Transport and storage	7,192	19,171	15,334	7,457	36,146
Accommodation and catering	7,570	8,624	6,133	6,481	10,226
Information and communication	3,462	28,695	19,953	4,383	34,877
Financial and insurance activities	2,707	55,887	38,365	29,417	134,786
Real estate activities	1,053	5,986	5,553	3,912	9,391
Specialized, scientific and technical activities	8,673	23,683	17,142	5,229	34,626
Activities of administrative and support services	5,413	22,977	17,396	4,492	25,708
Education	784	14,151	11,620	4,060	13,414
Human health and social action	3,670	23,178	17,328	7,221	18,154
Arts, entertainment and recreation	1,034	18,725	12,621	11,191	17,446
Other service activities	902	13,191	9,962	4,265	13,637

Table A.2: Statistics on the Amadeus dataset - Main estimation sample

Variable	Number of observations	Mean	SD	Min	Max
Capital (Euros)	1,252,194	5,730	20,046	5	365,344
Number of employees	549,819	40	76	1	2,823
Wages (Euros)	1,252,194	12,411	24,717	84	292,936
Materials (Euros)	1,252,194	45,150	105,905	883	1,453,487
Value-added (Euros)	1,252,194	16,522	32,859	718	483,629

APPENDIX B

Measures of total factor productivity

Total factor productivity (TFP) is computed estimating production functions relating outputs to inputs of firms. In the standard theory, the inputs considered are capital (which includes for example buildings) and factors of productions such as number of workers and materials. The outputs are either a measure of value-added or a measure of revenues of the firm. In this paper, we estimate value-added production functions so that our measure of TFP reflects the contribution of each firm to the economy, holding factors inputs constants.

We estimate the Cobb-Douglas production function presented in equation B.1 for each industry, industries being defined according to the the broad structure of the NACE Rev.2 industry classification presented in Table B.1.

$$Y_{it} = A_{it} L_{it}^{\beta_l} K_{it}^{\beta_k} \tag{B.1}$$

where Y_{it} is the value-added of firm i at time t, L_{it} is labor, K_{it} is capital and A_{it} is the Hicksian neutral efficiency level of firm i in period t. β_l and β_k are parameters to estimate. The value-added and capital measures are measured in values. Labor is measured by wages.

Taking logs we obtain equation B.2:

Table B.1: Broad structure of NACE Rev. 2

Section	Title
1	Agriculture, forestry and fishing
2	Mining and quarrying
3	Manufacturing
4	Electricity, gas, stream and air conditioning supply
5	Water supply; sewerage, waste management and remediation activities
6	Construction
7	Wholesale and retail trade; repair of motor vehicles and motorcycles
8	Transportation and storage
9	Accommodation and food service activities
10	Information and communication
11	Financial and insurance activities
12	Real estate activities
13	Professional, scientific and technical activities
14	Administrative and support service activities
15	Public Administration and defence; compulsory social security
16	Education
17	Human health and social work activities
18	Arts, entertainment and recreation
19	Other service activities
20	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use

$$y_{it} = \alpha + \beta_l l_{it} + \beta_k k_{it} + w_{it} + \eta_{it} \tag{B.2}$$

where $y_{it} \equiv ln(Y_{it}), l_{it} \equiv ln(L_{it}), k_{it} \equiv ln(K_{it})$ and $ln(A_{it}) = \alpha + w_{it} + \eta_{it}$. α measures the mean efficiency level across firms, w_{it} is firm i's productivity in year t and η_{it} is the idiosyncratic error of firm i in year t. The key difference between w_{it} and η_{it} is that w_{it} affects firms' input demand so it refers to factors predictable by the firm (such as managerial ability) whereas η_{it} does not. η_{it} includes unexpected deviations from the mean due to measurement errors, unexpected delays or other unexpected situations.

There is a large and active empirical literature that estimates production functions. This literature shows that the use of OLS is inappropriate. The main problem with OLS is that of simultaneity. OLS treats labor, capital and material as exogenous variables, meaning that they are determined independently of productivity. However if firms observe some productivity shocks which are not observed by the econometrician and that this affects decisions concerning input levels (hiring), estimated coefficients are biased. The literature shows that firm-level fixed effects do not solve the problem because time-varying productivity shocks can affect firm's input decisions. Several procedures have been proposed in the literature to overcome this problem (see for instance Olley and Pakes [1996], Blundell and Bond [2000] or Levinsohn and Petrin [2003]). To solve the simultaneity problem, we resort to the procedure suggested by Levinsohn and Petrin [2003], which estimates the production function in two steps and uses intermediate inputs (materials and energy) as a proxy for unobserved productivity. This procedure extends the procedure of Olley and Pakes [1996], which relies on investment to proxy for unobserved productivity shocks. To test the robustness of our results, we also use the more recent approach proposed by Wooldridge [2009], which combines the two steps used in the Olley and Pakes [1996] or Levinsohn and Petrin [2003] methods into one single step using GMM and thereby allows to overcome some potential identification issues related to the approaches of Olley and Pakes [1996] and Levinsohn and Petrin [2003].

Another difficulty in the estimation of production functions comes from entry and exit of firms, which potentially creates a selection bias. The bias comes from the fact that firms decide the allocation of inputs in a given period conditional on their survival and that firm with a higher capital stock will be able to survive with a lower productivity level, which creates a bias in the capital coefficient. Olley and Pakes [1996] proposed a method to take into account this bias. However in the Amadeus dataset, firms are automatically removed if they do not report information during the last five years. We are not able to distinguish exit from the sample from exit from the economy. We are hence not able to account explicitly for exit in the analysis. However very small changes in the production function coefficients are generally found after implementing the correction for the selection bias (see Loecker [2011] and Van Beveren [2012]).

The estimation of production functions also faces a difficulty referred to as the omitted price problem. Most datasets, including Amadeus, do not report either value-added or capital in value or firm-level prices, hence deflated value-added and capital are used as measures of output and input. The use of deflated value-added means that unobserved differences in prices that deviate from the industry average price are buried in the residual term. In practice, there is a high correlation between these two measures as shown by Foster et al. [2008] which has data on plant level input and output prices. It is hence unclear whether using measures in volume would make too much of a practical difference to our results.

We consider alternative ways to estimate TFP : we use the approaches by Levinsohn and Petrin [2003] and Wooldridge [2009]. We estimate TFP by industry (defined at the broad NACE 2 level). Results of the coefficients on labor and capital obtained for each industry using the 10-year unbalanced panel, to which we apply the Levinsohn Petrin approach, are reported respectively in Figures B.1 and B.2. Depending on the industry, coefficients on labor obtained lie between 0.70 and 0.85 while coefficients on capital fall between 0.01 and 0.08.

Figure B.1: Coefficients on ln(labour)

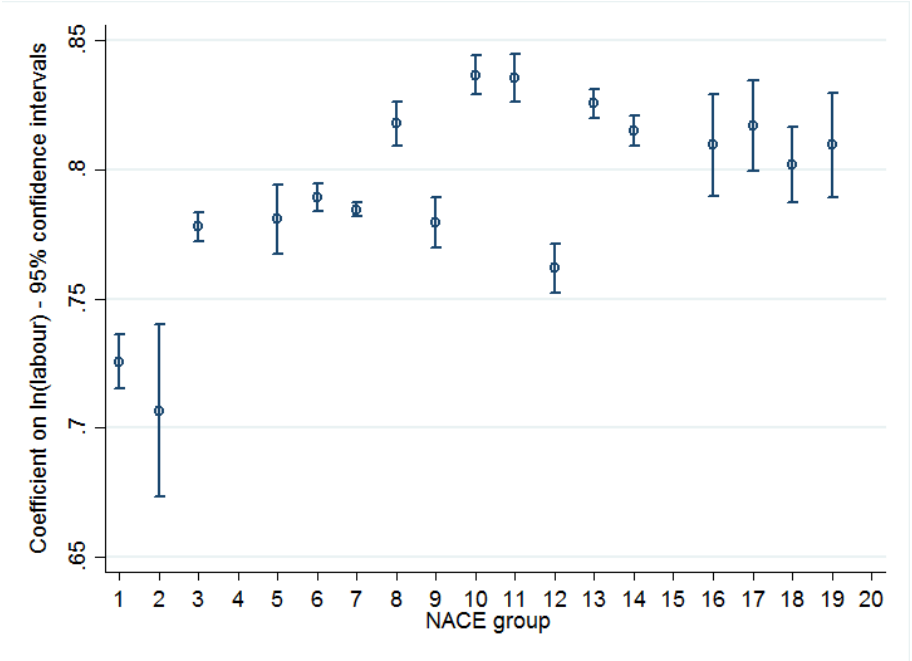
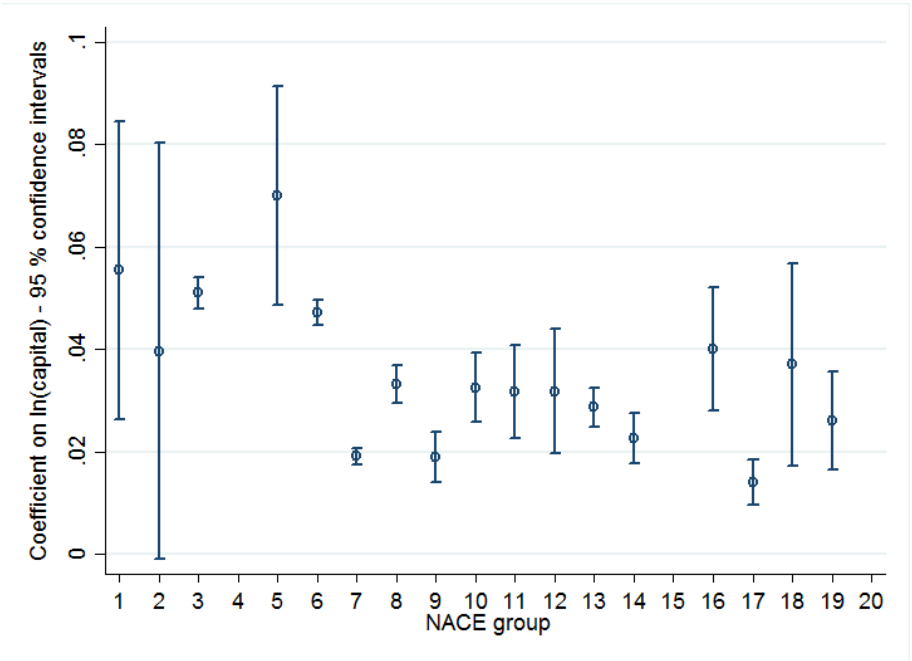


Figure B.2: Coefficients on ln(capital)



General Conclusion

The use of discretion in public procurement is a wide concept that may take place at different stages of the procurement process. The economic literature has widely investigated the benefits and limitations of using discretion in public procurement. The degree of discretionary power should therefore be the result of a balance between its potential advantages (e.g. better adaptation to specific circumstances and needs, reduction of ex-post renegotiations, etc...) and its limitations (e.g. corruption, personal agenda...). This dissertation focuses on two dimensions of discretion.

First, a public authority uses discretion when deciding to switches from one to another organizational mode of provision of a public service. The economic literature identifies three classes of factors explaining the organizational choices namely, economic efficiency (Williamson [1985], Levin and Tadelis [2010]), fiscal restrictions (López-de Silanes et al. [1997], Brown and Potoski [2003]), and political interests as well as ideological bias (Picazo-Tadeo et al. [2012]; Sundell and Lapuente [2012]; Gradus et al. [2014]; Beuve et al. [2018]). Even though the literature has extensively attempted to analyze the determinants of privatization, there is usually no clear consensus about the extent to which each class of factor is determinant in the choice of governance, and a few studies has been exclusively devoted to switches from one regime to another for a public authority, in particular switches from private to public management (remunicipalizations). Chapter 1 of this dissertation contributes to fill this gap by investigating the determinants of remunicipalization and more broadly the question of organizational switches in the distribution of water services in France.

Second, when a public authority decides to procure a good or a service by contracting out with a private entity, it shall select the contractor that will be in charge of the procurement. In this case, discretionary power could be granted to the authority. Its use is valuable when contracts are particularly complex and are hence subject to unexpected events (Goldberg [1977]), when quality dimensions are not easily contractible (Manelli and Vincent [1995]) or to sustain reputational mechanisms and long-term relationships (Kim [1998], Spagnolo [2012]). Corruption in public procurement is possible to the extent that there exists some room for discretion. Due to the hidden dimension of corruption in public procurement, there are few empirical papers devoted to this topic. Various aspects of corruption in public procurement have been considered, but no study has been dedicated to examine the impact of investigation of corruption over the use of discretionary power when awarding a contract. Chapter 2 of this dissertation focuses on this aspect by empirically examining investigated cases of corruption that took place in France. Finally, whereas the economic literature has extensively assessed the capability of public procurement to solve societal issues and to be a tool for innovation, its relationship with the productivity has been neglected so far. Since there is a multiplicity of ways to award a contract to a firm, it is plausible that this relationship differs accordingly. An extensive literature addresses the question of which award mechanism yields the most efficient outcome in public procurement. Whereas the outcome has been measured through different aspects of the tender such as price, quality and renegotiation, the productivity of the selected supplier has been ignored. Chapter 3 is dedicated to evaluate whether an award procedure which allows for discretionary power results in the selection of more or less productive firms than an award procedure that does not.

This General Conclusion first briefly summarizes the main findings of this dissertation, discusses their implications, the limitations of the results, and the areas for future research.

Summary of Main Findings

In Chapter 1 of this dissertation, we focus on the determinants of switches in the mode of provision of a public service. The objective of this chapter is to assess the extent to which this decision to switch is influenced by economic efficiency reason rather than political and fiscal ones. By gathering information on the 1998-2015 period concerning the way that more than 4 200 French municipalities are organizing their water services, at contract renewal time, we identified nearly 300 remunicipalization cases. We also identified more than 200 cases of privatization. We use an endogenous switching regression model in a two-stage probit estimation to obtain consistent estimators that account for the existence of potential endogeneity. Our efficiency indicators consist on measuring the extent of an overprice and an overleak, as calculated as the difference between the price (resp. leak) actually observed in a municipality and a counterfactual price (resp. leak) that would have prevailed under another mode of provision. Our results show that remunicipalization and privatization decisions are determined by expectations about what would be the evolution of price and leaks after the organizational change takes place. It is also influenced by other factors, such as the tendency to switch from one regime to another one in neighboring municipalities and to a less extent by local unemployment. We do not find any significant effect from the ideology. Our findings show that remunicipalizations fostered by a mixture of efficiency concerns and mimetism. The contribution of this first chapter can therefore be summarized as follows:

Conclusion 1*: The decision to switch from one mode of provision of a public service to another (remunicipalizations and privatizations) is mainly driven by expectations about what would be the evolution of price and leaks after the organizational change takes place. A tendency to switch from one regime to another one in neighboring municipalities also strongly influences this decision.*

The results from this chapter illustrates that the decision to switch is driven by economic efficiency reason so that discretion appears to contribute to the efficiency

of public procurement in this case.

In Chapter 2, we examine the effect of investigation of corruption in public procurement, as defined by the opening of a judicial investigation, on procurement award mechanisms in municipalities. First, we compare the degree of discretionary power used in award procedures before and after a investigation is publicly raised in the local press. Corruption is more likely when a public authority uses an award procedure that allows for discretionary power. To this end, we identify procurement contracts with value below the European thresold where, in France, public buyers have the possibility to use of an "adapted procedure" (*procédure adaptée*) that offers degree of discretionary power. In this case, the public buyer has the possibility to award a contract either though an open auctions (limited discretion) or an adapted procedure. Second, we assess whether investigation of corruption triggers any change in the competitive environment (i.e., the number of participants to the tender) and in the location of winning firms (i.e., the choice of a local firm) when discretion is involved. All these potential effects of investigation are considered for both the investigated municipalities but also for the neighboring municipalities, the latter being not under investigation. To this end we use a differences-in-differences strategy to compare behaviors between investigated (resp. neighbors of investigated municipalities) and non-investigated municipalities (resp. non-neighbors of investigated municipalities) before and after an investigation happens. Our results indicate than an investigated municipality does not react by using less adapted procedures. However, it appears that only neighbors of municipalities that are eventually found guilty change their behavior as they are less likely to use an adapted procedure, thereby giving discretionary power to the buyer. This finding suggests that responsive neighbors to investigation might be also involved in the case under investigation. Finally, when awarding a contract using adapted procedures, we observe that only investigated municipalities that are eventually found guilty do attract more participants as well as more distant (i.e. less local) bidders compared to other municipalities.

***Conclusion 2**: A municipality investigated for corruption does not react by using less award procedures that allow for discretionary power. Only neighbors of munici-*

palities that are eventually found guilty change their behavior as they are less likely to use such a procedure, suggesting that responsive neighbors to investigation might also be involved in the case under investigation. Although investigated municipalities do not react by changing the way they award contracts, they nevertheless appear to attract more bidders and reduce localism once under investigation.

In addition, the results indicate that investigation has a positive effect on the use of formal procedures in neighboring municipalities. When under the spotlight, municipalities may experience "negative" externalities from the investigation of a neighboring municipality, and have an incentive to adapt in order to reduce the probability of being detected or investigated. If those municipalities are actually also corrupted the results are good news, considering that uncorrupted municipalities have no reason to adapt. Knowing that investigations and prosecutions of corruption in public procurement are rare, this means that investigations have a positive impact not only on the very few investigated municipalities but also on potentially corrupt neighboring municipalities.

In Chapter 3, we evaluate whether an award procedure which allows for discretionary power results in the selection of more or less productive firms than an award procedure that does not. The question we address is hence that of the effect of discretion on the selection of suppliers. If the selection of more productive firms is more likely to lead to lower costs and/or better quality outcomes, then it should result in a better value for money of the contract, which is the primary objective of public procurement. Second, if public procurement is to be used has a tool to enhance productivity and growth, it is worth determining whether some type of procedure allow to select more efficient firms than others. The use of public procurement to foster productivity may be questionable if it is not cost-effective. The econometric strategy takes into account the potential endogeneity of the procedure choice. Indeed, it is expected that some unobserved contract-specific and buyer-specific characteristics may affect both procedure and supplier selection, resulting in a potential correlation between the chosen procedure and the error term as a consequence of omitted variables (e.g. the degree of capture of the buyer, the specific knowledge of the buyer,

etc.). To solve this concern for endogeneity, we instrument the choice of procedure and use a two-stage least square model. Our main results indicate that the adoption of an adapted procedure makes the selection of an efficient supplier less likely, whatever the specification. This results in an inefficient allocation of public funds towards less efficient firms. We extend our analysis to explain the mechanism that boils down to our results. We conclude that the selection of less productive firms in adapted procedure is explained by a misuse of discretionary power when screening bids.

***Conclusion 3**: An award procedure which allows for discretionary power (adapted procedure) results in the selection of less productive firms than an award procedure that does not (open auctions). The selection of less productive firms in adapted procedure is explained by a misuse of discretionary power when screening the bids.*

This chapter concludes on the fact that if the selection of more productive firms is more likely to lead to lower costs and/or better quality outcomes, discretion is in contradiction with the primary objective of public procurement, which is to get the best outcome at the lowest price. The other implication of the result is that discretion is also in contradiction with one potential secondary objective of public procurement, which would be to promote productivity.

Limitations and Areas for Future Research

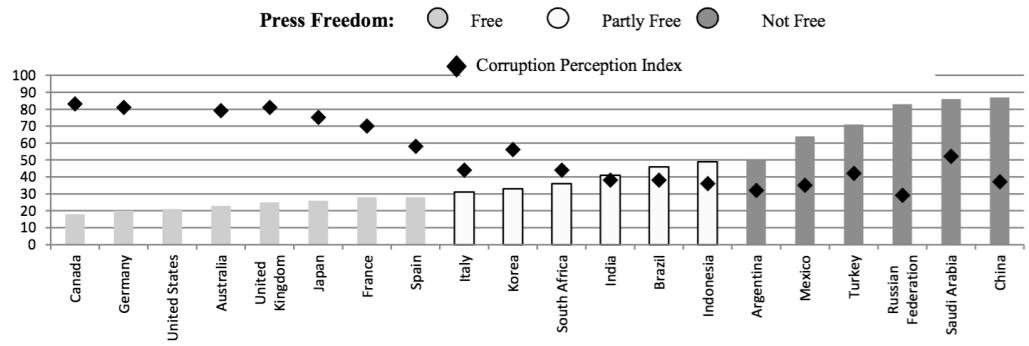
This dissertation is a series of pure empiral works that are based on public procurement data. This research would have not been possible without access to open data. Since open data is constantly improving in terms of availability and quality, these empirical works may be developped in the future. Indeed, one limitation of this dissertation is the lack of some specific data on public procurement.

At the digital era, one stake of public procurement is to increase its transparency and efficiency through the development of open data. In particular, by improving trans-

parency and accountability, government performance, national competitiveness and social engagement, open data could be a powerful tool against corruption (OECD [2017a]).

One expected consequence of the use of open data is to improve transparency and accountability of governments. Since information is easier to collect and process, third-parties (citizens, NGOs, etc...) are therefore more able to monitor the decisions and expenditures of public buyers. When under more third-party scrutiny, public buyer may be more likely to make a better use of public funds (Spiller [2008]). In particular, engaging in corruptive behavior may be more risky due to this potentially higher level of scrutiny. Whistleblower have a key role in detecting misconducts in public procurement. A strong correlation between the freedom of press and corruption levels exists since perceived corruption appears to be lower in countries with a higher degree of press freedom (Figure 3.3).Transparency and accountability of public procurement may also be improved through a higher degree of public disclosure of procurement agents' private interest. In the OECD countries, this level of disclosure is low, achieving an average of 20% (Figure 3.4). In a few countries, among which France and Norway, there is no available information about it. The availability of such details is essential for detecting corrupting behaviors and phenomenons of revolving doors (Barbosa and Straub [2017]). Having this type of information in France, would constitute an important improvement of Chapter 2 since we would be able to investigate the relationship between the use of an award procedure that allows for discretionary power and the connection between the investigated entity with private firms to whom the contract has been awarded.

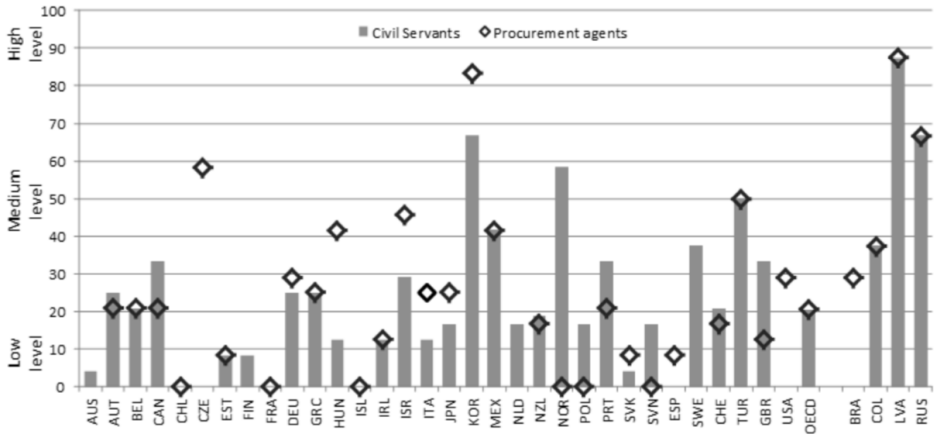
Figure 3.3: Level of corruption and press freedom



Source: OECD [2016]

Note: The corruption perception index indicates the perceived level of public sector corruption in a given country. It ranges on a scale from 0 (high corruption) to 100 (low corruption). The freedom of the press score ranges from 0 (best) to 100 (worst) based on three categories (legal, political and economic environment).

Figure 3.4: Level of disclosure and public availability of private interests (2014)

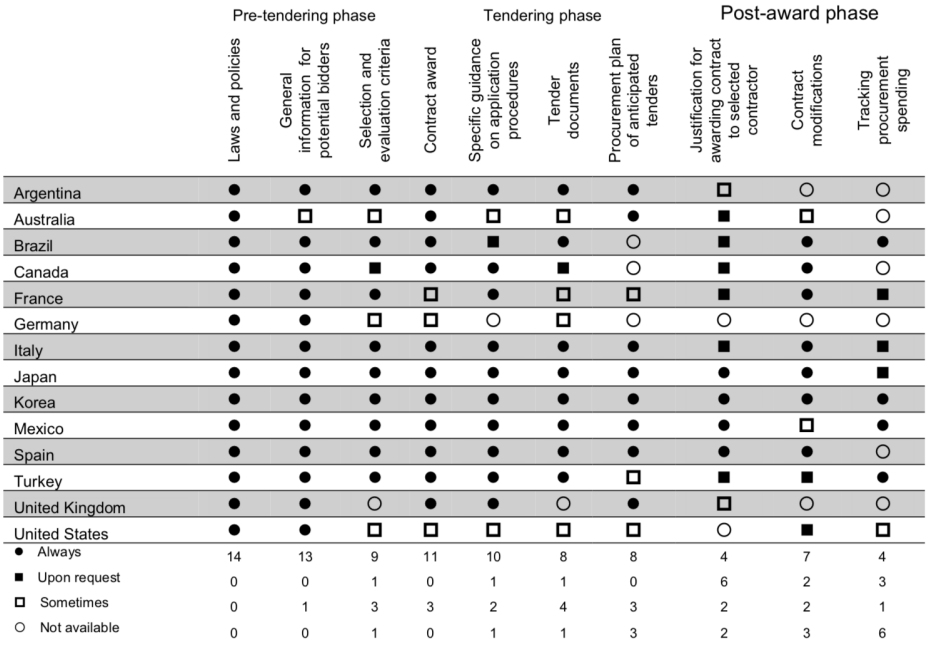


Source: OECD [2016]

We observe many inequalities in terms of public procurement data availability in the OECD countries (Figure 3.5). Overall, data related to both pre-tendering and tendering phases are always publicly available, except for Australia, France, Germany and the United States, where those essential information are not systematically pro-

vided (sometimes not at all). More notable differences between the OECD countries appear for the availability of post-award phase data. It is noteworthy that Figure 3.5 indicates that in France, contract modifications are always disclosed. However, after an in-depth research and discussion with many procurement specialists and agencies, there is actually no publicly available information on contract modifications in France. Having this information would be particularly valuable since contract renegotiations, especially when purely opportunistic, represent one of the biggest issue associated with the award of public contract.

Figure 3.5: Public availability of procurement information at the central level of government (2010)



Source: OECD [2011b]

One important issue is that even though governments would open the access to procurement data, they are often incomplete or require a high degree of processing. In France, procurement data are incomplete because they are not systematically reported (award notices), they do not cover all procurement process (no data on contract renegotiations), and many crucial information are missing. On the later point, data that would ensure transparency and accountability of procurement would

be (i) the identity and bid value of all participants to the tender, (ii) the initial estimated value of the contract, (iii) the nature of renegotations if any, and (iv) details on what the adapted procedure consists on.

First, the identity of all participants to the tender would be useful to improve Chapters 2 and 3. In Chapter 2, having this information would help to point out whether firms that are involved in the investigated corruptive scheme do also participate to the tenders of neighboring municipalities that do react to the investigation. This would also help to examine whether the pool of participants change after an investigation is opened. In Chapter 3, this would help to explain why we do observe that discretions yields a worst outcome in term of selection of an efficient supplier. One assumption we have to make in this Chapter is that participants to adapted procedures and open auctions are of similar types. Even though this assumption lays on the economic literature (Baltrunaite et al. [2018]), it is not undoubtable that this is the case in France.

Second, having the inital estimated value of the contract would improve Chapter 2 in the sense that we would be able to assess whether the value threshold as been maniuplated by the public buyer in order to use an adapted procedure, and potentially for facilitating corruption.

Third, having ex-post outcome of the contract would improve Chapter 3 as we might compare in a final step the ex-post outcomes between an adapted procedure and open auctions. In particular, it is possible that, even though an adapted procedure is less likely to select an efficient firm, it may however be less subject to costly renegotations since there could be a phase of negotiation, and the public buyer may rely on relational contracts.

Finally, more transparency about how the adapted procedure takes place would greatly improve Chapters 2 and 3. In particular, we do not have any information whether there is a phase of negotiation and a restriction in the pool of bidders.

Even though public procurement data are now accessible, the provided information,

even though are a good basis, would need further improvements and a higher degree of transaprency for an in-depth academic work, in particular to detect corruption and collusion in public procurement in France.

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Abstract

The use of discretion in public procurement is a concept that may take place at different stages of the procurement process. The economic literature has widely investigated the benefits (e.g. better adaptation to specific circumstances and needs) and limitations (e.g. corruption, political agenda) of using discretion in public procurement. This dissertation focuses on two dimensions of discretion. First, a public authority has to decide whether to provide a public service in-house or privately. This dissertation empirically investigates the determinants of both remunicipalizations (a switch from private to in-house provision) and privatizations (a switch from public to private provision) for the water distribution services in France. This decision to switch appears to be mainly driven by economic efficiency reasons. Also, a tendency to switch from one regime to another one in neighboring municipalities influences this decision. Second, this dissertation focuses on public buyer's discretionary power towards the award mechanism. The economic literature acknowledges that even though discretion may yield a better value for money when awarding a contract, it may also facilitate corruption. This dissertation analyzes the impact of investigation for corruption over the degree of buyer's discretion used. As a matter of fact, a municipality investigated for corruption does not react by using less award procedures that allow for discretionary power. Only neighbors of municipalities that are eventually found guilty react as they are less likely to use such a procedure, suggesting that responsive neighbors to investigation might also be involved in the case under investigation. Finally, this dissertation addresses the question of the effect of discretionary power over the likelihood to select a productive supplier. It follows that an award procedure that allows for discretionary power leads to the selection of less productive firms than an award procedure that does not. This result is explained by a misuse of discretionary power when screening the bids.

Résumé

L'usage de la discrétion est un concept large qui peut intervenir à plusieurs étapes de la commande publique. La littérature économique s'est largement penchée sur l'étude des bénéfices (par exemple, une meilleure adaptation aux circonstances et besoins) et des limites (par exemple, corruption, agenda politique) de l'usage de la discrétion dans la commande publique. Cette thèse se concentre sur deux dimensions de la discrétion. Tout d'abord, une autorité publique doit choisir entre fournir un service public elle-même (une régie) ou par voie de délégation de service public (DSP). Cette thèse détermine empiriquement quels sont les facteurs décisifs des remunicipalisations (passage d'une DSP à une régie) et des privatisations (passage d'une régie à une DSP) au sein du service public de la distribution d'eau potable en France. La décision de passer d'un mode de fourniture à l'autre s'explique principalement par la recherche d'efficacité économique, même si la tendance des communes voisines à privatiser et remunicipaliser expliquent aussi cette décision. Ensuite, cette thèse se concentre sur le pouvoir discrétionnaire d'un acheteur public lorsque celui-ci doit attribuer un marché public. La littérature économique reconnait que la discrétion peut permettre d'obtenir un meilleur rapport qualité-prix, mais son usage peut aussi faciliter la corruption. Cette thèse analyse l'effet des enquêtes pour faits de corruption sur le degré de pouvoir discrétionnaire utilisé pour attribuer un marché. Il apparaît qu'une municipalité sous enquête ne réagit pas en adoptant moins de pouvoir discrétionnaire. Seuls les voisins à des communes qui sont reconnues coupables de corruption réagissent, suggérant ainsi leur possible implication dans le cas enquêté. Enfin, cette thèse soulève la question de l'effet du pouvoir discrétionnaire sur la probabilité d'attribuer le marché à une entreprise plus productive. Il en résulte qu'une procédure d'attribution offrant un pouvoir discrétionnaire à l'acheteur public conduit à la sélection d'une entreprise moins efficace qu'une procédure sans ce pouvoir. Ce résultat s'explique par un mauvais usage du pouvoir discrétionnaire lors de la sélection des offres.

Keywords: Award Procedure, Corruption, Discretion, Privatization, Productivity, Public procurement, Remunicipalization.

Mots-clefs: Procédure d'attribution, Corruption, Discrétion, Privatisations, Productivité, Marchés publics, Remunicipalisation.