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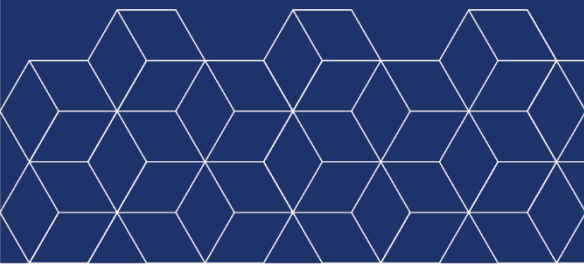
Municipal procurement, productivity and dynastic management: Evidence from Italian firms

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ABSTRACT

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This paper analyzes the impact of public procurement contracts tendered by municipalities on the productivity. To this end, we combine firm-level information on Italian firms with administrative records on the universe of public procurement contracts in the period 2010-2018. We strengthen our analysis by using an instrumental variable approach that exploits the unexpected exemption of households from paying municipal property tax on their first homes, which occurred in Italy in 2008. Then we find that, ceteris paribus, a higher per capita value of public procurement contracts at the municipal level leads to higher productivity. In addition, the positive relationship between procurement and productivity is significantly weakened for firms with dynastic top management, suggesting a potential misallocation of public resources, and a consequent negative impact on productivity.

KEYWORDS: public procurement, enterprise policy, firm productivity, dynastic management
JEL CODES: H57, D24, G34

L'articolo analizza l'effetto degli appalti pubblici municipali sulla produttività delle imprese. A tal fine si utilizza un dataset che integra i dati sull'universo dei contratti di appalto (fonte ANAC) con le informazioni sulle caratteristiche delle imprese (fonte RIL) e quelle sui bilanci certificati (fonte ORBIS). L'analisi econometrica mostra i seguenti risultati. Primo, un aumento del valore pro-capite degli appalti finanziati a livello comunale induce un incremento significativo della produttività del lavoro. Secondo, la relazione positiva tra appalti locali e produttività è indebolita quando a capo delle imprese vi è un management dinastico, espressione della famiglia proprietaria. Questi risultati tengono conto dei problemi di endogenità e reverse causality nelle relazioni oggetto di studio.

PAROLE CHIAVE: *appalti pubblici, politica aziendale, produttività d'impresa, imprese a gestione familiare*
CODICI JEL: H57, D24, G34

1.   Introduction

After the last few decades, in which economies fell off the cliff several times due to the Great Recession and the recent Covid-19 pandemic, there has been a renewed interest in studying the effect of demand-side policies to sustain businesses and prevent general crises. Public procurement (PP) refers to the purchase of goods and services from private companies by the public sector. Governments frequently use PP to deliver public services and implement policies, such as supporting small and medium-sized enterprises (SMEs) and stimulating innovation. For the OECD as a whole, PP expenditure as a share of GDP has increased from 11.8% in 2007 to 12.9% in 2021 (OECD 2023). This dynamic is pronounced also for OECD-EU countries, where PP has increased from 13.7% of GDP in 2019 to 14.8% in 2021, driven by the Recovery and Resilience Facility under the European Economic Recovery Plan. Given its importance in terms of the share of 'G' it represents and the fact that governments use it strategically, it is crucial to assess the impact of PP on business outcomes. Despite the growing interest in PP as a demand-side policy, the literature on the effect of PP on economic outcomes has followed some specific paths, leaving some important gaps. In this paper, we try to fill some of these gaps and analyze some aspects of PP that have not received due attention.

First, previous contributions on the economic effects of PP have taken either a macroeconomic perspective (see Nekarda and Ramey 2011; among others), focusing on aggregate shocks (government spending), or a microeconomic perspective of the single firm that wins a PP contract (see Coviello *et al.* 2022; among others). While studies in the first group focus on general equilibrium effects across industries, studies in the second group focus only on the *direct* effects of PP. In this paper, we examine the effect that municipal PP has on the productivity of all firms located in the municipality that the local government wants to preserve, not just the winners of the tenders. Indeed, as we will explain in section 2.2, positive effects may spill over across firms located in the same municipality. Second, most of the existing literature is concerned with the countercyclical effects of PP, such as smoothing declines in input demand and increasing firm survival rates during economic downturns. In contrast, we examine the effect of local PP on the productivity of firms located in the municipality. This is key to understanding whether PP contracts effectively support a stable growth trajectory of firms located in a municipality, not only through *direct* effects on PP contract winners, but also through *indirect* effects such as stable demand shifts, infrastructure provision and spillovers from research and development (R&D), training activities and management practices adopted by winners. Third, the empirical literature on the role of PP contracts on firm productivity has so far yielded mixed results (Chang 2017; Hoekman and Sanfilippo 2020; Shin and Lee 2021; Cappelletti and Giuffrida 2021). This may be due to the different returns that this policy may have for heterogeneous firms. In this paper, we propose and test that the effect of PP on firm productivity may well depend on the type of governance, in particular the dynastic control of the firm, which occurs when the top management belongs to the owning family. Family norms and values, such as maintaining control of the firm and building a family legacy, may incentivize dynastic managers to pursue firm survival at all costs. This may create more incentives to invest resources in building long-lasting kinship networks that extend across politics and business to gain preferential access to public resources, including PP contracts (Bertrand and Schoar 2006). These incentives do

not apply to firms led by non-dynastic managers. In this paper, we investigate the heterogeneous effect of municipal PP on firm productivity when the type of governance moderates its effect.

We build an original database obtained by merging different data sources. We merge mandatory survey-based and balance sheet firm-level data on a sample of Italian limited liability companies with the administrative records of the universe of contracts tendered by Italian municipalities in the period 2010-2018. By estimating the effect of the per capita total value of municipal PP on the productivity of firms geographically located in the municipal area, we are able to assess the *total* effect of PP on the productivity of firms locally exposed to this policy.

Two main results emerge. First, a higher per capita value of PP contracts tendered by a municipality in a given year is, on average, associated with significantly higher labor productivity of firms located in that municipality. Second, the positive impact of local PP on productivity is reduced in the case of dynastic top management running the typical firm located in the municipality, suggesting a potential misallocation of public resources and a consequent lower impact on overall productivity. Our estimation strategy is strengthened by an instrumental variable approach that exploits the unexpected exemption of households from paying municipal property tax on their first home, which occurred in Italy in 2008 and heterogeneously affected the ability of municipalities to tender procurement contracts in the subsequent years.

The remainder of the paper is organized as follows. Section 2 reviews the related literature on public procurement, firm productivity, and corporate governance. Section 3 provides information on the original database collected for this paper and presents some descriptive analysis. Section 4 describes the econometric analysis and results. Section 5 provides some concluding remarks.

2.   Related literature

2.1   *Public procurement as a demand-side policy to sustain firms*

Public procurement (PP) refers to the purchase of goods and services by the public sector from the private sector. Governments use it to address grand challenges (Costantini *et al.* 2015; Crespi and Guarascio 2019; Uyarra *et al.* 2020), to deliver public services that affect the quality of life and well-being of citizens (OECD 2023), and to implement policies to support businesses. PP is a component of the broader public expenditure item ('G'), which is a tool of fiscal policy that has generated considerable debate about its optimal level and role in guiding the economy (Ramey 2011; 2019). Indeed, after the last few decades, there has been an increased interest in studying the effects of demand-side policies to support businesses and prevent general crises.

So far, the literature on the effects of PP on economic performance has taken two main perspectives. A first strand of the literature on demand-side policies has taken a macroeconomic perspective (see Nekarda and Ramey 2011; among others). The aggregate analyses conducted by these works are certainly relevant from a policy perspective, but they involve certain assumptions, such as the representative firm, general equilibrium mechanisms across sectors, and a difficulty in identifying exogenous demand shocks. Another strand of literature has taken the microeconomic perspective of the single firm that wins a PP contract, thus focusing only on the *direct* effects of being awarded a PP contract. In this literature, most of the focus has been on the role of PP for innovation (Aschhoff and Sofka 2009; Czarnitzki *et al.* 2020; Stojčić *et al.* 2020), while evidence of the role PP plays for other

business outcomes has only recently flourished. Some works have analyzed the effect of PP on the demand for inputs by contract winners, namely capital (Coviello *et al.* 2022; Hebous and Zimmermann 2021) and labor (Gugler *et al.* 2020; Srhoj and Dragojević 2023). With regard to capital demand, these studies have shown that the award of a PP contract can foster investment by both easing winners' financing constraints and making irreversible, industry-specific investments profitable[1]. As for labor demand, firms that are awarded a PP contract generally increase their demand for labor[2]. Other works in the same strand of literature have taken a different perspective and studied the effect of PP on business growth (Fadic 2020; Ferraz *et al.* 2015; Lee 2021). These studies have found a positive effect of PP contracting on asset, employment, and output growth[3]. However, significant differences emerge among studies in terms of the persistence of the growth effect, which could be related to differences in the auction mechanism and types of PP contracts awarded[4]. In addition, some studies have focused on the role that PP has on firm survival (Chang 2017; Cappelletti and Giuffrida 2021), showing that firms that won a PP contract showed a higher survival rate in subsequent years than their competitors who did not win a contract[5]. Having considered the counter-cyclical effects of PP contracts on winning firms, in section 2.2 we ask whether PP contracts actually support higher productivity of firms.

2.2.   *Local public procurement and productivity: direct and indirect effects*

On average across OECD countries, the largest share of PP spending is at the sub-national level (61.2% in 2021), and this is even more so in the case of Italy, where the share of sub-national governments

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[1] Hebous and Zimmerman (2021) found that winning a US federal procurement contract in the period 1999-2018 increased capital investments of financially constrained firms with no effects on unconstrained firms' investments. Symmetrically, Coviello *et al.* (2022) showed that a negative shock in demand via a drop in procurement that affected Italian municipalities greater than 5,000 inhabitants since 2008 caused firms more exposed to PP (greater share of revenues from procurement of affected municipalities) to cut capital.

[2] Gugler *et al.* (2020) showed that a positive demand shock made Austrian construction firms that won a public procurement auction in the period 2006-2009 raise their labor demand (employment) but this effect was confined only before (and not during) the recent economic crisis. Authors explain this asymmetric behavior of winning firms before and during the crisis with an increased competition during the crisis in terms of bidders of public procurement auctions, which forced them to be more efficient. Srhoj and Dragojević (2023) showed that winning a PP contract has a small positive impact on a firm's short-run employment due to runners-up winning more PP contracts and runners-up substituting for more market revenue in the year after losing a PP contract.

[3] These studies put forward that, apart from easing financial constraints and making investments in irreversible capital profitable, PP fosters firm growth by helping firms in creating a private customer capital and assuring learning-by-doing dynamics within the firm.

[4] Fadic (2020) and Ferraz *et al.* (2015) studied the effect of PP on firm growth in two Southern American countries, respectively Ecuador and Brazil. While Fadic (2020) found only a temporary (1-year) effect of winning a PP contract on wage and fixed assets growth of Ecuadorian firms in the period 2009-2012, Ferraz *et al.* (2015) found a more persistent effect of winning a government contract on growth of employment, sales and value-added. These different results may be related to the different nature of the procurement processes set-up in the two countries. Indeed, PP studied by Fadic (2020) for Ecuadorian firms implies small monetary contracts directed towards SMEs, while that is not the case for Brazilian firms analyzed by Ferraz *et al.* (2015).

[5] Chang (2017) studied the effect of PP on SMEs in the Republic of Korea, by using establishment-level data of manufacturing and mining sectors in the period 2009-2011. Cappelletti and Giuffrida (2021) focused on the role that PP have on firm survival of Italian limited liability companies in the period 2008-2018 and showed that the survival rate of winners relative to marginal losers is 70% higher after two year and half of the median contract expiration.

(regions, provinces and municipalities) in procurement spending has reached around 74.7% in 2021 (OECD 2023).

PP contracts tendered by municipal governments may have positive *direct* effects on the productivity of contract winners and, *indirectly*, on the productivity of non-winners located in the same territory, through different channels. In order to assess the role of PP contracts tendered by the local government on the productivity of local firms, it is useful to distinguish theoretically between the effect on the firms that win a PP contract, i.e. the *direct* effect, and the effect on the other firms that may benefit (or be harmed) from PP by being located close to the winners of a PP contract, i.e. the *indirect* effect. The total effect of PP on the productivity of local firms is made up of *direct* and *indirect* effects.

As for the *direct* effects, winning a PP contract has positive effects on firms' demand for inputs (capital and labor) through a positive demand shock. This implies investments and an increase in employment, which can have a positive impact on productivity if the technology is characterized by increasing internal returns. At the same time, fulfilling a PP contract can help firms build a customer base in the private market or, by acting as collateral, access external financing (credit) at a lower cost (di Giovanni *et al.* 2022). Indeed, winning a PP contract can act as a signal to private customers and creditors about the reliability and solvency of the company that won the contract. This, in turn, can increase firms' efficiency in the case of increasing internal returns and by ensuring that the firm has the resources to make productive investments. Moreover, by reducing market uncertainty, winning a PP contract may encourage firms to invest in (risky) R&D, thereby increasing firm productivity. In addition, the winner may need to implement new (to the firm) and more efficient management practices to deliver the outcome of the contract to the public sector. Adopting these practices may be costly (Bloom and Van Reenen 2007), but it may be worth bearing these costs if the opportunity of large and stable demand is secured by winning a PP contract. Winners may benefit from a learning-by-doing dynamic that fosters productivity growth through self-perfection, especially if government demand is stable over time. However, participation in PP auctions may lead managers to focus their attention (Ocasio 1997) on opportunities that arise in the public sector rather than those that arise in the private (market) sector, and this may have some negative effects on productivity. First, firms may need to make sunk investments in understanding and complying with the rules for participating in PP auctions (Grajzl *et al.* 2023). Second, and closely related to the first reason, these firms may become increasingly dependent on public sector demand (Cohen and Malloy 2016; Josephson *et al.* 2019) and may even escape market competition. Third, if PP opportunities are mainly aimed at satisfying government priorities (i.e., securing employment for certain territories, or the survival of certain types of firms and selected industries), while providing little incentive for firms to adopt better technologies, management practices and to choose inputs and outputs optimally, the direct effects on productivity may be null or even negative. Finally, firms that are more dependent on doing business with the public sector may begin to devote time and resources to building political connections (Goldman *et al.* 2013; Baltrunaite *et al.* 2021) in order to gain preferential access to public resources.

At the local level, there may also be *indirect* effects on firms located close to the winners. First, increased spending on PP ensures higher and more stable demand not only for the winners, but potentially also for their local suppliers through input-output relationships. In the case of increasing internal returns, which characterize the technology of local suppliers, this can raise average local productivity. However, this positive *indirect* effect may not occur if the winners start to source inputs from other territories because of the technological or economic requirements contained in the PP contract. Second, investments in R&D and new management practices made by the winners in order to

meet the commitments contained in the PP contract may spill over to closely localized firms, through business-to-business relations and the mobility of workers between firms. Finally, when PP contracts involve the provision of infrastructures, they can increase the productivity of all enterprises located in the geographical area in which they are built by reducing transportation and communication costs. Admittedly, a negative *indirect* effect on local productivity can occur through inefficient allocation of resources (Bessonova 2023). If PP contracts are not awarded in a fully competitive manner and political connections play a role, less productive firms may have access to stable demand from the public sector. This may ensure the growth and survival of less efficient firms, which may limit the growth of market shares of the most efficient firms and have a negative impact on local aggregate productivity.

As for the empirical evidence on the *direct* effect of PP contracts on winners, a small number of papers have examined the role of PP on winners' productivity, and the results are mixed. Using data on Korean firms in the manufacturing and mining sectors from 2008 to 2011, Chang (2017) found that two years after winning a PP contract, firms had lower productivity than their counterparts. Shin and Lee (2021) found that Korean manufacturing firms that won PP contracts 'for innovation' between 2013 and 2017 had greater productivity growth in the following year than firms that won 'general' PP contracts. Grajzl *et al.* (2023) showed that PP acts as a moderator in the relationship between government's grants and firm performance in Slovenia in the period 2015-2019: in particular, PP diminishes the impact of grants on winners' productivity. Hoekman and Sanfilippo (2020), by analyzing a sample of about 4100 firms in 19 countries in sub-Saharan Africa in 2010, found that firms that sell more of their output to government entities tend to have higher levels of productivity. The authors disentangle the role of public procurement along different dimensions of firm heterogeneity. In particular, the positive association between procurement and productivity is stronger for domestic, small, and manufacturing firms.

As for Italy, the empirical evidence on the *direct* effect of PP contracts on the productivity of the winners is limited, but has gained momentum in recent years. Cappelletti and Giuffrida (2021) found that in the period 2008-2018, Italian firms that won a PP contract had no significant productivity difference (either *ex ante* or *ex post*) from all other firms. Moreover, the authors found that the survival rates of PP auction winners are significantly higher compared to runners-up and third-placed firms, and that this effect persists for about three years. This evidence sheds light on a possible detrimental effect of PP on aggregate productivity through an inefficient allocation of resources away from the most productive firms. Using data on public works tendered by Italian municipalities in the period 2009-2013, Baltrunaite *et al.* (2021) showed that more discretion given to public administrators in selecting winners reduces the (*ex ante*) labor productivity of the winning firm, confirming that PP may create a potential misallocation of public funds with a consequent negative *indirect* effect on aggregate productivity.

Overall, there could be both *direct* and *indirect* effects of PP contracts on the productivity of firms geographically located in a municipal territory. These effects may have the same or opposite sign and may strengthen or weaken each other. The total effect is not easy to predict theoretically and comes down to empirical analysis.

By estimating the effect of the total value of PP contracts tendered by Italian municipalities on the productivity of firms geographically located in the municipal territory, in this paper we assess the *total* effect of PP on the productivity of firms geographically exposed to this policy. We are not aware of any systematic analysis that provides empirical evidence of the *total* effect – consisting of the *direct*

effects on the winners and the *indirect* effects on firms located near the winners – of municipal PP on the productivity of firms located there. This is the first contribution of this paper.

2.3   *Local public procurement and productivity: the mediating role of corporate governance*

The empirical evidence, which has mostly analyzed the *direct* effect of PP on firm productivity, has produced mixed results at best.

While PP contracts can be expected to provide a stimulus to firm productivity in the form of increased and stable demand, a positive signal to private customers and creditors, a reduction in uncertainty, and thus greater incentives to invest in R&D and better management practices, these benefits may be offset by some detrimental factors. As suggested in section 2.2, management's attention may be diverted to doing business with the public sector (generally interested in securing employment for certain areas or the survival of certain firms), rather than responding to market opportunities that drive firms to improve efficiency, technology, and management practices. Firms participating in PP auctions may make sunk investments in complying with the rules for participation in procurement auctions. Furthermore, PP contracts may provide stable cash flows to (financially) unconstrained and efficient firms without producing 'additional' positive effects on productivity.

We expect that when family firms with dynastic management (i.e., managed by a member of the family that owns the firm) are awarded PP contracts, they are more likely than others to follow the path characterized by these detrimental factors. In fact, family firms are generally characterized by norms and values that distinguish them from their non-family counterparts (Bertrand and Schoar 2006), and are recognized as important sources of social and relational capital and as key players in the local development[6]. However, these norms and values can lead to efficiency distortions if the founder's utility depends, among other things, on maintaining control within the family and building a family legacy through firm survival at all costs. Indeed, family owners may be incentivized to select apical managers within the family, i.e. a dynastic management, rather than the best manager in the market (Pérez-González 2006; Bennedsen *et al.* 2007; Lemos and Scur 2019).

Different theories have proposed the benefits and costs of selecting a top manager who is a member of the owner family. The stewardship theory has suggested that a dynastic top management may perform better than a non-dynastic one because family ties are associated with high trust and relationships with a longer time horizon (Davis *et al.* 1997). Conversely, the agency cost theory emphasizes the potential conflicts of interest between the family and minority shareholders (Shleifer and Vishny 1997). According to this theory, top dynastic managers are expected to be oriented towards a redistribution of rents from workers or minority shareholders to the family, excessive compensation to those running the firm, and so on. Thus, dynastic management may be more prone than external management to divert resources from improving efficiency, technology, and management practices to private benefits, with negative consequences for the firm's economic performance.

Moreover, due to their longer time horizon and deeper knowledge of local markets and institutions, dynastic managers may be more likely to develop informal relationships (Morck *et al*. 2015) with local

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[6] The economic literature on the role of culture and institutions has examined how formal and informal local networks (including families, firms, and political institutions) influence the transmission of social norms, civic consciousness, and cultural traits, which in turn translate into long-term economic development (Guiso *et al.* 2016; Alesina and Giuliano 2015).

administrators, politicians, employer and worker unions, and municipal electoral bodies. From this perspective, and to ensure firm survival at all costs, firms with dynastic management may invest more resources than their counterparts in political connections and gain preferential access to public resources, including PP contracts (Bertrand and Schoar 2006; Goldman *et al.* 2013), which ensure stable demand and, indirectly, access to external finance.

If PP contracts are not awarded in a fully competitive manner and political connections play a role, less productive but 'connected' firms may have preferential access to a relevant and stable public sector demand, leading to a misallocation of resources and a negative impact on aggregate productivity. Moreover, if the involvement of family firms with dynastic management in PP leads to a lock-in of these firms to prioritize doing business with the public sector instead of competing in the market, PP contracts may not be an opportunity to increase productivity but a 'buffer' against market exit (Chang 2017; Cappelletti and Giuffrida 2021).

The role of corporate governance in potentially mediating the effect of PP on firm productivity seems key in a country like Italy. Indeed, the empirical evidence shows that family firms are common in many developed economies (La Porta *et al*. 1999; Faccio and Lang 2002). Conversely, a distinctive feature of Italy is that more than 80% of family firms are run by managers who are expressions of the owner family and are selected through dynastic ties rather than competitively recruited in the market (Bugamelli *et al*. 2018).

A second relevant contribution of this paper is to investigate the differentiated effect of municipal PP on the productivity of firms located there, which may well depend on the type of governance of the firms that have access to PP contracts. In particular, we expect the *total* effect of PP on productivity to be negatively moderated by the fact that the firm is characterized by dynastic management.

3.   Data

3.1   Data source and definition of variables

The empirical analysis is based on a unique database that combines three different sources of information. Public procurement data are obtained from the administrative records of the universe of public procurement contracts tendered in Italy, collected by the *Autorità Nazionale Anticorruzione* (ANAC)[7]. Firm-level characteristics on governance, workforce and strategies are obtained from *Rilevazione longitudinale Imprese e Lavoro* (RIL), a mandatory survey conducted periodically by the *Istituto Nazionale per l'Analisi delle Politiche Pubbliche* (Inapp) on a large representative sample of Italian non-agricultural private sector firms[8]. Balance sheet data for the quasi-universe of Italian limited liability companies are retrieved from Bureau Van Dijk's ORBIS.

As for public procurement, ANAC makes available in open access a comprehensive data repository with administrative information on all contracts put out to tender in the period 2007-2021: indeed, contracting authorities are obliged by the law to report to ANAC the relevant information about these

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[7] See <https://bitly.ws/VqLY>.
[8] Inapp is part of the Italian National Statistical System (SISTAN). RIL has been recently used in a number of recent scientific papers such as Bratti *et al*. (2021), Dosi *et al*. (2021), and Belloc (2022). For more details on RIL questionnaire, sample design and methodological issues, see: <https://bitly.ws/VqSD>.

contracts. We take some operational choices. We select tenders exceeding the base auction value (starting price) of 40,000 euros. The reason for this choice is twofold. First, only this type of contract is subject to a statutory information requirement. For tenders with a value of more than 40,000 euros, information is public about the contracting authority, the number of bidders, the winning contractor(s), the base auction and awarded values of the contract (if different), the number of lots (i.e. smaller contracts into which the tender may be divided), the subject of the contract (e.g., works, services or supplies). Second, by focusing on contracts of a certain value, we focus on the most relevant part of public procurement and, in principle, be able to capture larger effects on firm productivity. Moreover, we use the awarded value as the main monetary measure for each contract: should the awarded value not to be available, we take the base auction value. Another important operational choice is that we select contracts tendered by Italian municipalities and other bodies with similar functions, such as the *Centrali Uniche di Commitenza*[9]. There are several reasons for this choice. First, in the case of Italy, the share of subnational governments (regions, provinces, and municipalities) in procurement spending has reached about 74.7% in 2021 (OECD 2023). Second, we believe that municipalities are an appropriate level of analysis where the *total* (*direct* plus *indirect*) effect of PP on firm productivity can be assessed. Third, from an empirical point of view, we will adopt as an exogenous shock a legislative change that occurred in 2008 (see section 4.2) and that affected the investment capacity of Italian municipalities, in order to make an argument about the direction of causality in our analysis[10].

Inapp has conducted the latest waves of the RIL survey in 2010, 2015 and 2018. Each survey covers about 30000 Italian partnerships and limited liability companies operating in the non-agricultural private sector, stratified by size, industry and location. As the RIL is multi-scope, it contains a very rich set of information on firm characteristics, allowing us to control for important sources of firm heterogeneity. Most variables refer to the end of year *t-1* and some refer to the period from *t-1* to *t-3*. Based on the information contained in RIL, we construct proxies for: firm size, firm age, number of plants, managerial (education, gender, and relationship to the firm's owner) and workforce characteristics (education, occupation, and training), internationalization, and innovation strategies. Using the tax code, we merge the information contained in RIL with Bureau Van Dijk's ORBIS, which contains comprehensive information on the balance sheets of Italian limited liability companies. In particular, we use information on turnover, value added, book value of tangible and intangible assets, costs of raw materials, intermediate goods and services to construct our measure of labor productivity

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[9] In a robustness check (see section 4.5) we insert as a control variable, the total value of contracts put out to tender by all the other public contracting bodies (national, regional or provincial) that affect the municipal territory, irrespective of their aim (i.e. museums, schools, hospitals etc.) or territorial scope.

[10] Since the focus of this work is on the role of municipal contracts in the productivity of firms, we have excluded those public contractors that operate in a number of 'special sectors'. Indeed, due to their national scope (EU Directive 2014/25), it is not possible to attribute the impact of the contracts they tender down to the municipal level, which is precisely the level of analysis of local procurement in this work. In most cases in these sectors, the localization of the contract reflects the location of the contracting party's headquarters, rather than the area in which the contract will manifest its effects.

(value added per employee), the capital-labor ratio (the total value of physical assets per employee) and to estimate total factor productivity (TFP, see section 4.5)[11].

Based on the literature on the determinants of PP at the local level, we recover some relevant characteristics of the municipalities, starting from the information contained in the *Atlante Statistico dei Comuni*, maintained by Istat[12]. In particular, we control for the municipal population per square kilometer and the share of manufacturing firms operating in the municipality. In addition, we exploit two relevant characteristics of local institutions. First, we include a proxy for the efficiency of courts by including the annual workload disposal rate of municipal civil courts for first instance judgments. To construct this variable, we used as a data source the archive of the Italian Ministry of Justice, which provides information on the performance of Italian courts in terms of cases filed, pending, and resolved in each year: we focus only on civil courts of first instance[13]. Second, we include an index of corruption of the province (NUTS 3) to which the municipality belongs, derived from Nifo and Vecchione (2014)[14].

Finally, in section 4.2, we address the endogeneity due to reverse causality and measurement error in the key explanatory variables by exploiting the 2008 entry into force of the exemption from the municipal property tax (*Imposta comunale sugli immobili*, ICI) on the first home of Italian households. To this end, we collected municipal revenues from the ICI tax in 2007, 2008 and 2009 from the Ministry of the Interior, Department of Internal and Territorial Affairs (Local Government Databases - Local Finance) and use these as instrumental variables[15].

In order to merge the municipal level- with the firm-level variables, we use the six-digit Istat code that uniquely identifies Italian municipalities. As for sample selection, we excluded firms without employees, because it is unlikely, they participate to PP tenders and, moreover, they are not affected by governance issues.

We merge balance sheet information from ORBIS in the years 2018, 2014 and 2010 (using a 4-year interval between cross sections) with firm-level characteristics from the last three waves of RIL and with data on PP contracts and municipal controls in 2018, 2014 and 2010. In total, after excluding

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[11] PP variables in monetary units have been deflated using national price indices with base year 2010. For balance sheet data at the firm level, we have used sectoral deflators at the 2-digit level of NACE Rev. 2, based on industrial production prices with base year 2010, and provided by Istat.

[12] See <https://bitly.ws/VraH>.

[13] We have retrieved data from <https://bitly.ws/VxC7> on civil cases of the first instance in courts. The data, which cover the period 2010-2020, provide information on the cases that were filed, settled, settled with judgment and still pending each year. Since the Italian territory is divided, for the administration of justice, into *circondari* (for first instance cases) that do not follow the borders of the municipality (or the province), it was necessary to create an allocation matrix in order to link each municipality to the *circondario* to which it belongs. The annual workload disposal rate is a proxy for the efficiency of civil courts. The variable is equal to the ratio of annual decisions to annual workload. The workload includes not only the cases filed in year *t*, but also the cases pending at the end of year *t-1*. The Italian courts are characterized by a considerable workload, which increases the average time needed to reach a decision. In principle, the workload disposal rate can exceed 100% if a court has been productive enough to reduce its *t-1* backlog.

[14] As explained by Nifo and Vecchione (2014), the corruption index with range [0,1] synthesizes provincial (NUTS 3) data on: (1) crimes committed against the public administration, (2) the number of local administrators overruled by national authorities, and (3) the Golden-Picci index, which measures the level of corruption based on the difference between the stock of public infrastructure and the monetary value allocated by the government to build this infrastructure (Golden and Picci 2005).

[15] Local government financial, accounting, and master data can be accessed at <https://bitly.ws/WmEI>.

firms with missing information on key variables, our pooled cross-sectional sample consists of about 43000 firm-year observations in 2010, 2014 and 2018. The main characteristics of the resulting ORBIS -RIL-ANAC merge are shown in tables 1 and 2.

3.2   Descriptive statistics

Table 1 presents descriptive statistics for both the PP variables and the municipal and local characteristics. The average per capita monetary value of PP contracts tendered by Italian municipalities in 2010, 2014 and 2018 is € 144.36. However, the ratio of the standard deviation to the mean is about 1.64, indicating a relevant heterogeneity in the value of PP contracts tendered by Italian municipalities. The per capita monetary value of PP contracts put out to tender by non-municipal entities, regardless of their purpose (museums, hospitals, schools etc.) or territorial scope (national, regional or provincial), is higher (173.86 € per inhabitant). As with the other local variables, a first relevant characteristic of the process by which PP contracts were awarded by a municipality is the average number of firms that bid on the tender. A higher value indicates fiercer competition for the PP contract. On average for the years considered, and for all Italian municipalities, slightly less than seven bidders participated in the auction. The efficiency of civil courts and corruption are two relevant local characteristics that may well correlate with the value of PP contracts tendered by municipalities.

Table 1.   Descriptive statistics on PP and local variables

	Mean	SD	Min	Max
	Public procurement variables (source: open data ANAC)			
Total value of municipal PP contracts, per inhabitant (€ per capita)	144.36	237.17	0	1409.865
Total value of PP contracts put out to tender by other contracting bodies, per inhabitant (€ per capita)	173.86	512.92	0	3570.586
	Other local characteristics (sources: Istat; Ministry of Justice; Nifo and Vecchione 2014)			
Average number of bidders per PP contract in a given municipality	6.95	14.01	0	87.5
Index of civil courts efficiency	50.70	8.92	26.57	69.53
Index of corruption (NUTS 3 level; range [0,1])	0.83	0.19	0	1
Share manufacturing firms in the municipality (%)	12.50	6.03	0	32.91
Population density (number of inhabitants per square Km)	447.97	603.31	5.37	2952.76
	Number of municipalities per year			
	Municipalities		Year	
	3274		2010	
	3730		2014	
	3798		2018	

Source: Authors' calculations based on ORBIS-RIL-ANAC data in 2010, 2014, and 2018. The per capita value of PP variables have been winsorized at 1% and 99% levels

The average value of the civil courts efficiency variable, equal to 50.7, indicates that, on average, Italian courts have difficulties in reducing their backlog of cases. As for corruption, a higher value indicates less corruption and the variable shows a certain heterogeneity among Italian municipalities.

Finally, we consider two structural characteristics of the municipality, i.e. population density and a proxy for industrial structure, the share of manufacturing firms in total active firms. The average number of inhabitants per square kilometer in the sample of considered municipalities is about 448; however, in our sample there are municipalities with high population density (the maximum value is about 2950) and municipalities with very low population density (the minimum value is slightly more than five inhabitants per square kilometer). The share of manufacturing firms in the 'typical' Italian municipality is about 12.5% of all firms active in the municipality.

To go more in deep in understanding the differentiated incidence of local procurement, in figure 1 we show the geographical distribution of the average values (euro per inhabitant) of the municipal PP contracts over the period under study. As expected we observe strong territorial unbalances across the country, that is the higher density of the local PP contracts is localized in the North-eastern and central regions with respect to those financed in Southern regions (with some exception like municipalities in Puglia).

Figure 1.   Geographical distribution of the municipal PP contracts per inhabitants (average values in euro)
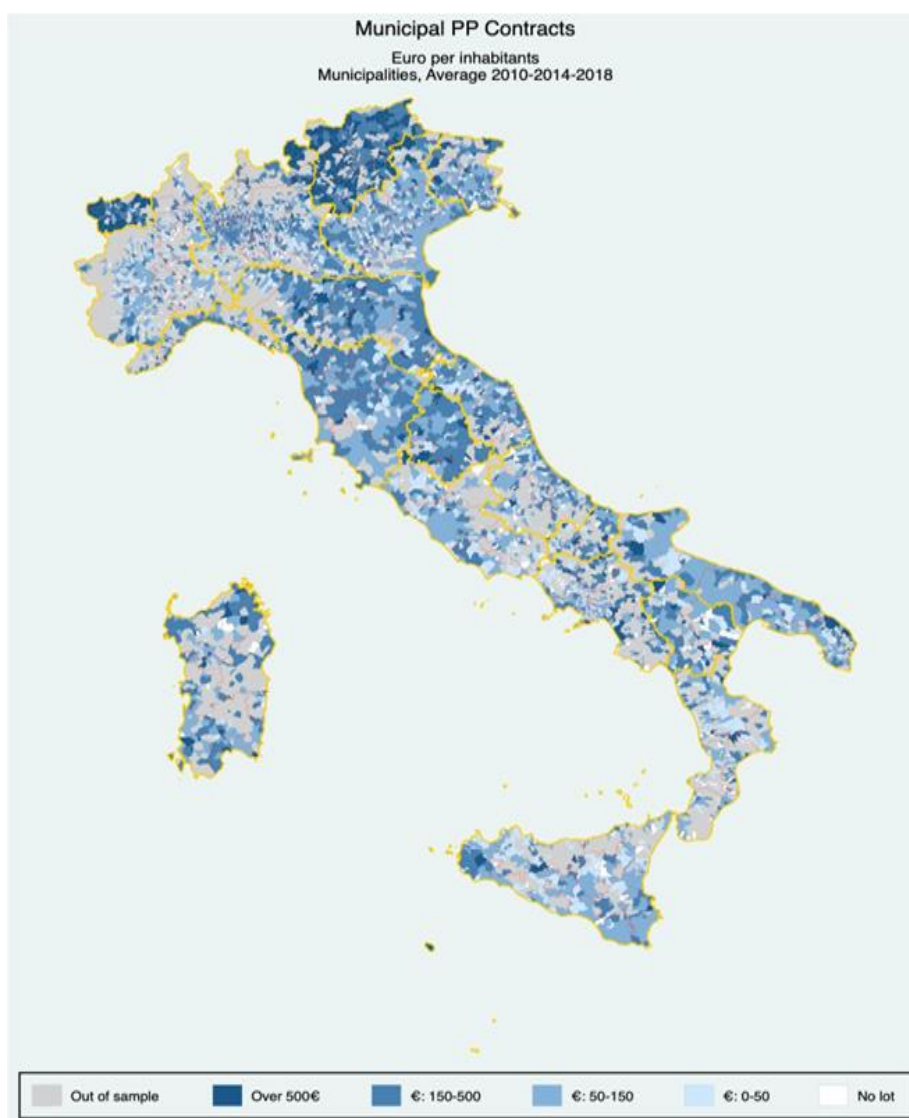
Turning to firm-level characteristics, table 2 shows the well-known heterogeneity in productivity (see Syverson 2011, among others) and capital intensity across firms. This heterogeneity is related to known firm characteristics, which we can control for thanks to the multi-scope nature of the RIL survey. Specifically, with regard to top management (or the person who runs the company), about 28% of firms are managed by a person with a tertiary education and less than 18% are managed by a woman. The demographic characteristics of Italian entrepreneurs reflect the predominance of small, family-owned firms and, consequently, of managers selected through dynastic ties (almost 90%). Focusing on the composition of the workforce, the share of workers with tertiary education is 12.7%, while by occupation, the share of executives is slightly higher than 4%, and the share of white collars (49%) is relatively higher than that of blue collars (47%). Table 2 also reports descriptive statistics on some strategic firms' characteristics. Just over 55% of the companies in our sample are mono-plant firms, and about 10% have signed an international agreement with foreign partners. About 41% of the firms have hired at least one worker in the previous year, and about 38% have invested in on-the-job training activities for employees. Finally, 22.7% have introduced at least one process innovation, and about 30% have introduced at least one new product or service in the last three years.

Table 2.   Descriptive statistics on firm-level variables

Variables	Definition	Mean	SD	Min	Max
		Balance sheet variables (source: Bureau Van Dijk's ORBIS)			
Labor productivity	Ratio of value added to total number of employees (euro per employee; log)	10.587	0.722	8.615	12.778
Capital-labor ratio	Ratio of value of total tangible assets to total number of employees (euro per employees; log)	9.546	2.052	4.427	14.150
		Top management characteristics (source: RIL)			
Dynastic management	The top manager of the company is the owner, or a member of the owner's family (dummy)	0.898	0.303	0	1
Tertiary education	The top manager of the company has a tertiary education degree (dummy)	0.277	0.447	0	1
Secondary education	The top manager of the company has a secondary education degree (dummy)	0.547	0.498	0	1
Female	The top manager of the company is female (dummy)	0.178	0.383	0	1
		Workforce characteristics (source: RIL)			
% of employees with tertiary education	Share of employees with a tertiary education degree (%)	0.127	0.249	0	1
% of employees with secondary education	Share of employees with a secondary education degree (%)	0.556	0.361	0	1
% of employees with primary or lower-secondary education	Share of employees with an elementary or junior high school degree (%)	0.316	0.353	0	1
% of executives	Share of executives in the firm's total employment (%)	0.041	0.131	0	1
% of white collars	Share of white collars in the firm's total employment (%)	0.492	0.390	0	1
% of blue collars	Share of blue collars in the firm's total employment (%)	0.467	0.394	0	1
Hiring	The company hired employees during the year (dummy)	0.408	0.492	0	1
Training activities	The firm has organized training activities for its employees (dummy)	0.384	0.486	0	1
		Other firm characteristics (source: RIL)			
Mono plant firm	The firm has a single plant (dummy)	0.555	0.497	0	1
Foreign agreements	The company has concluded trade agreements with foreign companies in the last two years (dummy)	0.100	0.301	0	1
Product innovation	The firm has introduced at least one product innovation in the current year and/or in the past two years(dummy)	0.303	0.459	0	1
Process innovation	The firm has introduced at least one process innovation in the current year and/or in the past two years (dummy)	0.227	0.419	0	1
Firm age	Years since firm establishment (log)	2.719	0.816	0	6.916
Firm size	Total number of employees (log)	1.627	1.208	0	9.828
Observations		43254			

Source: Authors' calculations based on ORBIS-RIL-ANAC data in 2010, 2014, and 2018. Labor productivity, capital-labor ratio have been winsorized at 1% and 99% levels

4.   Econometric analysis

4.1   Empirical model

We specify the following linear regression model to analyze the impact of municipal PP on firm productivity:

$$y_{it} = \beta_0 + \beta_1 MP_{mt} + \beta_2 MP_{mt} \cdot DYN_{it} + \beta_3 \cdot DYN_{it} + \gamma' X_{mt} + \rho' W_{it} + \delta_{jt} + \theta_n + u_{it}. \quad (1)$$

The dependent variable y_{it} is the (logarithm of) labor productivity of firm i in year t, located in municipality m. Our main explanatory variable, MP_{mt}, is the (logarithm of) total value of PP contracts per inhabitant tendered by municipality m in year t. Among the explanatory variables at the municipal level, X_{mt} includes the (logarithm of) municipal population per square kilometer, as a proxy for agglomeration economies (Ciccone and Hall 1996); the share of manufacturing firms, to control for the industrial structure of the municipality (Paci and Pigliaru 1999); the average number of bidders per tender, which controls for the intensity of competition to win the 'typical' PP contract tendered by municipality m in year t (Bajari and Hortaçsu 2003; Amaral et al. 2013); the annual workload disposal rate of municipal civil courts for first instance judgments, as a proxy for court efficiency (Lorenzani and Lucidi 2014; Giacomelli et al. 2017; Coviello et al. 2018); an index of corruption in the province (NUTS 3) to which municipality m belongs (Nifo and Vecchione 2014; Hessami 2014). W_{it} is a vector of firm-level controls that are known determinants of firm productivity (Jovanovic 1982; Bloom and Van Reenen 2007, 2011; Bernard et al. 2012; Garicano and Hubbard 2016; Barba Navaretti et al. 2022) and whose inclusion increases the precision of the estimates (Angrist and Pischke 2009)[16]: managerial (education and gender) and workforce characteristics (education, type of occupation, participation in training programs financed by the firm); firm capital-labor ratio; firm size and age; the number of plants; international trade agreements; innovation (if the firm has introduced a product or process innovation in the last three years) and hiring strategies (if the firm has hired new employees in the last year).

In Eq. (1), we include an indicator variable for dynastic management (DYN_{it}), which equals one if the top manager is also the owner (or a member of the owner's family) of firm i in year t and zero otherwise, and an interaction term between the total value of municipal PP contracts per inhabitant, MP_{mt}, and the DYN_{it} indicator. A first specification of the Eq. (1) is obtained by imposing $\beta_2 = 0$ and focusing on the estimate of the coefficient β_1, which captures the relationship between the per capita value of municipal procurement and the productivity of firms located in that municipality, ceteris paribus. In a second specification, we investigate whether dynastic management affects the link between procurement and productivity by allowing $\beta_2 \neq 0$, as suggested in section 2[17]. In this second

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[16] The inclusion of firm fixed effects is not feasible because the panel is highly unbalanced (about 1.38 observations per firm). Nevertheless, the large vector of firm characteristics (W_{it}) that we include in the analysis should improve the precision of the estimates.

[17] The base category in this second specification (DYN_{it}=0) includes all firms whose top management is not related to the ownership of the firm, either because (i) it is contracted on the market for managers, or (ii) it is contracted within the firm among its employees who are not members of the owner family, or finally (iii) because the majority owner of the firm is not a person or a family.

specification, the estimated marginal effect of MP_{mt} on y_{it} is equal to $\widehat{\beta_1} + \widehat{\beta_2} \cdot (DYN_{it} = 0) = \widehat{\beta_1}$ for firms with non-dynastic top management, while it is equal to $\widehat{\beta_1} + \widehat{\beta_2} \cdot (DYN_{it} = 1)$ for firms with dynastic top management. Thus, $\widehat{\beta_2}$ – if different from zero –, captures the differential effect that MP_{mt} has on firm productivity, when the top management in firm *i* is dynastic relative to its non-dynastic counterpart (baseline).

The vector of dummies, δ_{jt}, controls for shocks that affect all firms in the same 2-digit industry in a similar way in a given year, while ϑ_n controls for any time-invariant unobserved heterogeneity at the level of Italian labor market areas (LMAs), defined according to the Istat classification[18]. All estimations include cluster-robust standard errors at the municipality-year level to account for within-cluster correlation.

4.2   *Identification challenges*

The empirical analysis faces several identification challenges. First, we have to deal with omitted variable bias. The vector X_{mt} includes several time-varying controls at the municipal level, which should lessen the risk of endogeneity due to omitted variable. As we argued in the previous section, the existing literature has shown that these municipal characteristics are well correlated with both y_{it} and MP_{mt}. It may be desirable to include municipality fixed effects as a finer geographic level at which to control for time-invariant unobserved heterogeneity. Unfortunately, the short time dimension (three yearly observations, i.e. 2010, 2014, and 2018) does not make this option feasible, and we must also exploit the between-municipality variability in both productivity and municipal procurement within each LMA and each industry-year pair to estimate the coefficients of interest, β_1 and β_2. On a positive side, LMAs already take some relevant unobserved features that may be both correlated with municipal procurement and productivity into account, such as labor supply and knowledge spillover through workers' mobility.

Second, reverse causality and measurement error in the key explanatory variables, MP_{mt} and DYN_{it}, may introduce endogeneity and bias the estimates. Therefore, we take the following approach. Regarding DYN_{it}, we assume that the type of governance is exogenous to firm productivity over a relatively short period of time (2010-2018), and we treat it accordingly in the empirical models. Indeed, in the existing literature, the higher or lower relevance of dynastic management in a geographic area is associated with the long-term preferences of individuals and families (Bertrand and Schoar 2006). Productivity shocks should therefore not have a direct effect on the type of governance adopted by the firm in the short run.

For a possible residual correlation between MP_{mt}, and unobserved shocks to productivity, we use an instrumental variables (IV) approach. This is necessary because productivity shocks to firms can change the level of competitiveness in a given geographical area. In the case of a positive productivity shock, and thus an increase in competitiveness, the opportunity cost of participating in municipal public procurement tenders may increase, as firms may prefer to compete in the (national or international) markets or look for opportunities at higher (regional or national) levels of government to obtain tenders with higher values. Conversely, in the event of repeated negative productivity

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[18] See 15th Population and housing census 2011 <https://bitly.ws/VPdc>.

shocks, local governments may use public procurement to maintain the demand faced by firms and to guarantee them a certain level of customer base when they have become, on average, less competitive relative to their counterparts. Based on these considerations, we may expect a downward bias in the OLS estimates of β_1 and β_2.

These mechanisms make MP_{mt} as well as the interaction $MP_{mt} \cdot DYN_{it}$ endogenous in Eq (1). The IV approach adds to Eq. (1) the reduced form of MP_{mt} (Eq. 2), as it follows:

$$MP_{mt} = \alpha_0 + \alpha_1 Z_{1mt-x} + \boldsymbol{\gamma}' X_{mt} + \boldsymbol{\rho}' W_{it} + \delta_{jt} + \theta_n + \omega_{it}. \tag{2}$$
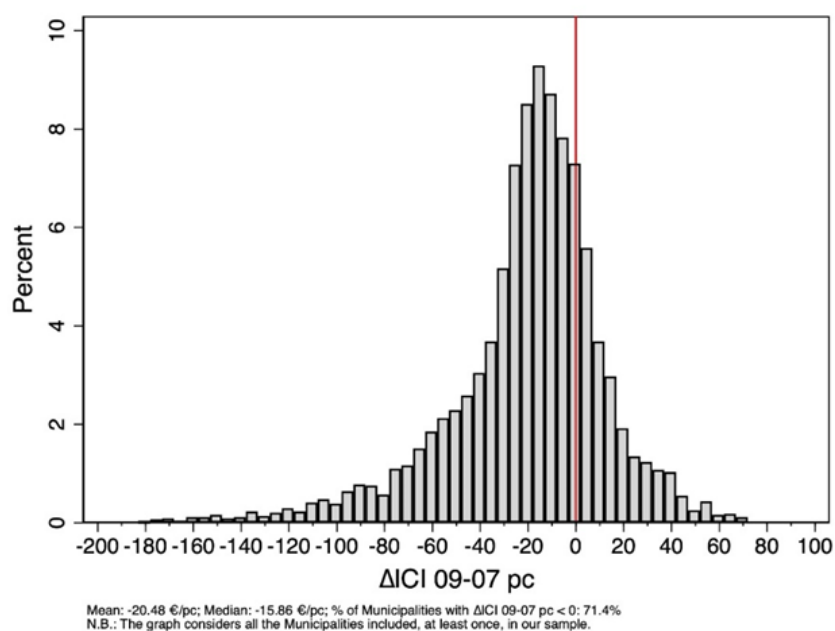
In the model where both the level of municipal public procurement and its interaction with the indicator of dynastic management are endogenous, two reduced form equations (Eqs. 3 and 4) are estimated:

$$MP_{mt} = \alpha_0 + \alpha_1 Z_{1mt-x} + \alpha_2 Z_{1mt-x} \cdot DYN_{it} + \boldsymbol{\gamma}' X_{mt} + \boldsymbol{\rho}' W_{it} + \delta_{jt} + \theta_n + \omega_{it} \tag{3}$$

$$MP_{mt} \cdot DYN_{it} = \alpha_0 + \alpha_1 Z_{1mt-x} + \alpha_2 Z_{1mt-x} \cdot DYN_{it} + \boldsymbol{\gamma}' X_{mt} + \boldsymbol{\rho}' W_{it} + \delta_{jt} + \theta_n + \omega_{it} \tag{4}$$

A valid instrument (Z_{1mt-x}) must correlate well with MP_{mt} (relevance), be uncorrelated with disturbances in both Eq. 1 and Eq. 2 (orthogonality), and correlate with y_{it} only through MP_{mt} (exclusion restriction). We take advantage of a legislative change in the public finance of municipal governments, due to the entry into force in 2008 of the exemption from the municipal property tax (*Imposta Comunale sugli Immobili* - ICI) on the first home of Italian households (Legislative Decree no. 93/2008). This change was largely unexpected (the reform took place in the middle of the year) and had a retroactive effect for 2008. Moreover, there were concerns about the compensation of the exemption by the central government, which may have forced municipalities to seriously revise their public budget balance, with a 'cascading' negative effect on the budget of subsequent years. We can consider the reduction to be randomly assigned across municipalities, since pre-reform revenues from ICI did not depend on the exemption. Figure 2 graphically shows the distribution of the reduction in per capita revenues from the ICI tax for the Italian municipalities in our sample. The difference is calculated as the value of per capita revenues in 2009 minus the value of per capita revenues in 2007. Clearly, the average difference is negative (i.e., it is 'cut') and it is about -20.48 € per inhabitant, because the vast majority of Italian municipalities (more than 70%) experienced a reduction in revenues from the ICI tax[19]. However, the heterogeneity is relevant – given the wide support of the distribution – and a minority of municipalities even increased the revenues from the ICI tax, thanks to the compensatory transfers implemented by the national government. We exploit this heterogeneity as an exogenous shock that hit the Italian municipalities in different ways in 2008 and the years immediately after.

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[19] To give an economic sense of the change in ICI tax revenues, in 2009 about half of the municipalities in our sample suffered a 'cut' in the range of 0-20% of ICI revenues received in 2007 (the last year before the exemption came into force), and just over 19% of the municipalities suffered a cut more than 20%. The reader is referred to figure A.1 in appendix.

Figure 2.   Distribution of the change (2007-2009) in per capita ICI tax revenue among Italian municipalities

Mean: -20.48 €/pc; Median: -15.86 €/pc; % of Municipalities with ΔICI 09-07 pc < 0: 71.4%
N.B.: The graph considers all the Municipalities included, at least once, in our sample.

Source: Authors' calculations based on data on municipal revenues from the ICI tax in 2007, 2008 and 2009 from the Ministry of the Interior, Department of Internal and Territorial Affairs (Local Government Databases - Local Finance)

This change came at a time when Italian municipal accounts were already 'under pressure'. Since 1999, municipalities have been operating under a tightening internal fiscal rule (Balduzzi and Grembi 2011), the Internal Stability Pact (*Patto di stabilità interno* - ISP), which has affected the ability of local governments to invest. In most cases, municipal governments cut capital spending to comply with the budgetary obligations imposed by the ISP, as current expenditures could not be easily compressed[20]. In this context, it is reasonable to assume that the ICI tax exemption for first homes of Italian households had a significant impact on the accounting policies of municipalities, further limiting the scope for investment: in fact, since 1993, revenues from the ICI tax have been an important source of financing for municipal investment (Bordignon *et al*. 2003; Santolini 2008; Bimonte and Stabile 2013; Ferri and Bruzzo 2017). It is reasonable to expect that the decline in revenues from the local property tax may have had a significant negative impact on the PP activity of Italian municipalities. Figure 3 provides some evidence for this hypothesis by showing the downward trend in per capita ICI tax revenues (gross of compensatory transfers from national governments) since 2008 and the trend in the per capita value of PP contracts tendered by Italian municipalities. Admittedly, the negative trend in the value of tendered contracts is pronounced in the first years after the reform (especially in the period 2011-2014), while it gains momentum in the last years of the series. Taking into account a time lag between the 'cut' in ICI tax revenues and municipal investments, it is reasonable to assume that the reform had a particular negative impact on municipal PP decisions in the very first years after the ICI exemption.

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[20] Municipal investments are financed from the current surplus (according to art. 199 of the *Testo Unico Enti Locali*). As a result, by reducing investments, local governments have used the current surplus to meet the new budgetary commitment.

Figure 3.   ICI tax revenues; Municipal PP; average per capita values over the period 2006-2018
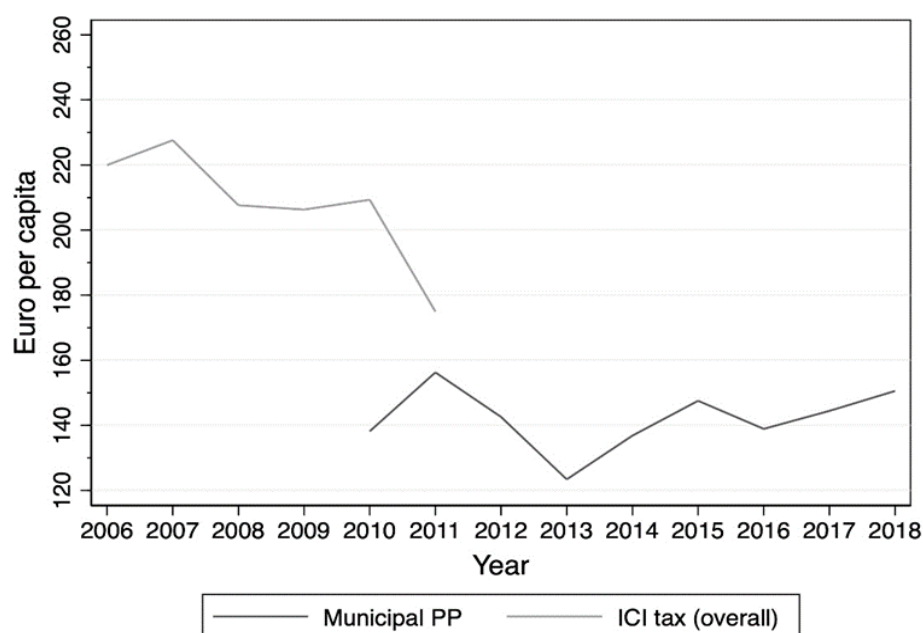
N.B.: The graph considers all the Municipalities included, at least once, in our sample.

Source: Authors' calculations based on: data on municipal revenues from the ICI tax in 2007, 2008 and 2009 from the Ministry of the Interior, Department of Internal and Territorial Affairs (Local Government Databases - Local Finance); data on public contracts awarded by Italian municipalities in 2010-2018 from ANAC

To account for a lag between the reduction in ICI revenues and the PP contracts put out to tender, we use the following time structure for the IV. The value of (per capita) ICI revenues in 2007, 2008, and 2009 is used as an instrument for the (per capita) value of PP contracts tendered in 2010, 2014, and 2018. This instrument should do a good job of satisfying the exclusion restriction condition. Indeed, even if we can imagine that households would have more financial resources after the tax cut, these can only be channeled into productive investment by firms if efficient financial markets are functioning and households are willing to do so (instead of increasing savings), and this is hard to believe in the period 2007-2009, when a most severe financial crisis took place.

4.3   OLS estimates

We start from estimating variants of Eq. (1) by OLS. Table 3 shows the results.
In this case, we use a wide range of controls at the municipal and firm levels, and the identification is based on selection on observables. Moving from col. (1) to col. (3), we include controls in a hierarchical manner. Col. (1) shows that the level of labor productivity of firm i located in municipality m in year t is positively associated with the per capita value of PP contracts tendered by the same municipality in that year, conditional on the capital-labor ratio, firm size, industry-year and LMA fixed effects. When we include the vector of municipal- and local-level controls, X_{mt}, in col. (2), the coefficient associated with the public procurement variable remains positive and significant, although smaller in magnitude. In col. (3), we include the full vector of firm-level controls, W_{it}, including the indicator variable that identifies firms with a dynastic management. The main coefficient of interest remains positive, although its magnitude is even smaller. As expected, firms whose top management either overlaps

with the owner or belongs to the owner's family have a lower level of productivity compared to their counterparts with non-dynastic management.

Table 3.   OLS estimates; Dependent variable: labor productivity

	[1]	[2]	[3]	[4]
MP	0.006***	0.004**	0.003**	0.010***
	[0.002]	[0.002]	[0.002]	[0.004]
DYN			-0.079***	-0.041**
			[0.008]	[0.019]
MP • DYN				-0.008**
				[0.004]
K/L	0.112***	0.119***	0.107***	0.107***
	[0.002]	[0.002]	[0.002]	[0.002]
SIZE	0.116***	0.117***	0.092***	0.092***
	[0.002]	[0.003]	[0.003]	[0.003]
Municipal and local controls	No	Yes	Yes	Yes
Management controls	No	No	Yes	Yes
Workforce controls	No	No	Yes	Yes
Other firm controls	No	No	Yes	Yes
LMAs fixed effects	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes
Constant	9.302***	9.212***	9.232***	9.201***
	[0.021]	[0.070]	[0.064]	[0.064]
Observations	43254	43254	43254	43254
Adjusted-R2	0.401	0.379	0.436	0.436

Note: management controls include education and gender of the top manager running the firm; workforce controls include employment composition by education, occupation (executives, white-collar, blue-collar), and participation in training programs; firm controls include measures of firm size and age; the number of plants; indicators for product and process innovation, trade agreements, hiring policies. Coefficients of the control variables are not reported to save space, and complete tables are available from the authors upon request. All regressions include fixed effects at the industry-year level and at the LMA level. Labor productivity, capital-labor ratio and the per capita value of municipal PP contracts have all been winsorized at 1% and 99% levels. Cluster-robust standard errors (at the municipality-year level) are reported in parentheses. Asterisks denote significance levels: *** 1%, ** 5%, * 10%.
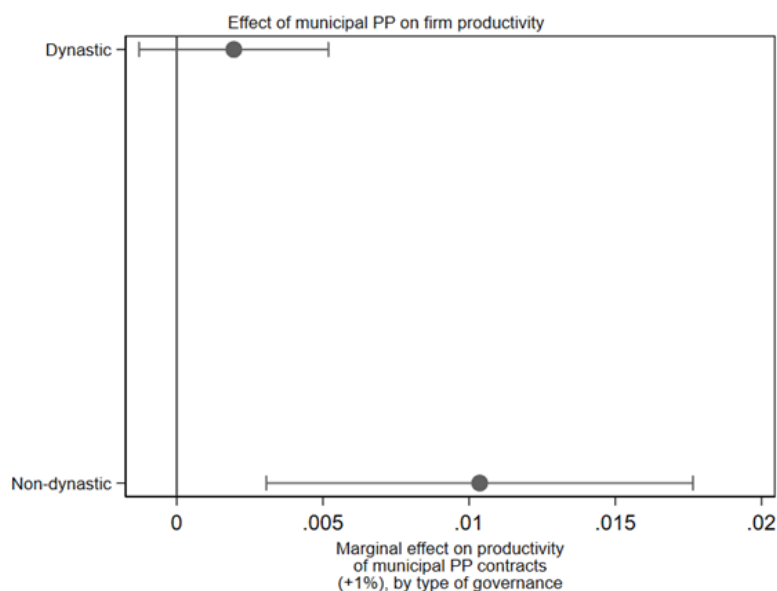Source: Authors' calculations based on ORBIS-RIL-ANAC data in 2010, 2014, and 2018

Given that $\widehat{\beta_1} > 0$, the estimates in col. (3) of Eq. (1) suggest that, after controlling for a wide range of local and firm characteristics, the per capita value of PP contracts tendered by municipality m in year t is positively associated with the productivity of the average firm located in m. This is the first result of this paper.

In col. (4), we introduce the interaction term $MP_{mt} \cdot DYN_{it}$. While the lower level of productivity of firms with dynastic management compared to their counterparts is confirmed, dynastic management negatively moderates the positive relationship between procurement and productivity. For ease of interpretation and based on col. (4), we can estimate the marginal effect of MP_{mt} on y_{it} for firms with non-dynastic management and for firms with dynastic management, as shown in figure 4. Given that the dependent and main independent variables of are in logarithmic form, *ceteris paribus*, a 1% increase in the per capita value of the municipal public procurement is associated with about 0.010% increase in productivity for firms with non-dynastic management.

However, the same percentage change in the municipal procurement spending is associated with only a 0.002% increase in productivity for firms with dynastic management and the effect is not statistically different from zero[21].

Figure 4.   Marginal effects of 1% increase in the per capita value of municipal PP contracts on productivity of firms with different types of governance

Source: Authors' calculations based on ORBIS-RIL-ANAC data in 2010, 2014 and 2018

The results in col. (4) of table 3 support the hypothesis that family firms with dynastic top management may invest resources in building networks that span politics and business in order to gain preferential access to public resources, including PP contracts (Bertrand and Schoar 2006). The decision to ensure firm survival at all costs may increase incentives for family firms to invest in political connections and access to procurement contracts in order to escape market competition. This diversion of resources may lead family firms to use PP contracts simply as a buffer against market exit, rather than as an opportunity to increase productivity (Chang 2017; Cappelletti and Giuffrida 2021). Less productive but 'connected' firms may have preferential access to relevant and stable demand from the public sector, with a lower impact on productivity. This is the second result of this paper.

4.4   IV estimates

To test whether the two main results presented in the previous section are robust to measurement errors in the explanatory variables and to reverse causality, we have adopted an IV approach using a two-stage least squares (2SLS) estimator. The IV strategy is based on the legislative change that, in

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[21] Given that the average Italian municipality spent about 144.36 € per inhabitant in the years considered, an increase of about 1.44 € per inhabitant would lead to an increase in the average labor productivity of the firm (60142 € per employee, in our sample) of 6.01 € per employee for firms with non-dynastic top management and of 1.20 € per employee for firms with dynastic management.

2008, has exempted Italian households from paying the local property tax, ICI, on their first home. As we have explained (see section 4.2), this change was largely unexpected and retroactive (for the year 2008) and had a heterogeneous effect across municipalities (see figure 2 and figure A.1 in appendix). The results are presented in table 4.

Table 4.   IV-2SLS estimates: Dependent variable: labor productivity

	[1]	[2]
MP	0.069***	0.127***
	[0.017]	[0.026]
DYN	-0.077***	0.210**
	[0.009]	[0.090]
MP • DYN		-0.064***
		[0.020]
K/L	0.107***	0.107***
	[0.002]	[0.002]
SIZE	0.092***	0.091***
	[0.003]	[0.003]
Municipal and local controls	Yes	Yes
Management controls	Yes	Yes
Workforce controls	Yes	Yes
Other firm controls	Yes	Yes
LMAs fixed effects	Yes	Yes
Industry-year fixed effects	Yes	Yes
Observations	42961	42961
Adjusted-R2	0.212	0.206
	First stage statistics	
Weak identification test: Kleibergen-Paap rk Wald F stat.	59.862	29.375
Underidentification test: Kleibergen-Paap rk LM stat. (p-value)	[0.000]	[0.000]

Note: management controls include education and gender of the top manager running the firm; workforce controls include employment composition by education, occupation (executives, white-collar, blue-collar), and participation in training programs; firm controls include measures of firm size and age; the number of plants; indicators for product and process innovation, trade agreements, hiring policies. Coefficients of the control variables are not reported to save space, and complete tables are available from the authors upon request. All regressions include fixed effects at the industry-year level and at the LMA level. Labor productivity, capital-labor ratio and the per capita value of municipal PP contracts have all been winsorized at 1% and 99% levels. Cluster-robust standard errors (at the municipality-year level) are reported in parentheses. Asterisks denote significance levels: *** 1%, ** 5%, * 10%.
Source: Authors' calculations based on ORBIS-RIL-ANAC data in 2010, 2014, and 2018

In col. (1), the value of (per capita) ICI revenues in 2007, 2008, and 2009 is used as an instrument for the (per capita) value of PP contracts put out to tender in 2010, 2014, and 2018. The underidentification (P value) and weak-identification (Kleibergen-Paap rk Wald) tests show that the equation is identified and that the instruments are well correlated with the total value of PP contracts (F statistic = 58.86; first-stage results are shown in table A.1 the appendix)[22]. The coefficient of MP_{mt} is positive, significant and larger in magnitude than OLS estimates, once the endogeneity is taken into

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[22] Critical values tabulated by Stock and Yogo (2005) are well below the reported value.

account. This result may be explained by the fact that where productivity is high, the opportunity cost of participating in municipal government tenders may increase, as firms may prefer to compete in (national or international) markets or look for opportunities at higher (regional or national) levels of government to obtain tenders of higher amounts. At the same time, municipalities where firms are less productive on average may use public procurement more intensively as a policy to support the lower competitiveness of firms located in their territories. Additionally, if the exclusion restriction condition is satisfied, the IV estimates should produce the treatment effect for compliers (LATE), that is higher than the overall average treatment effect (ATE).

In col. (2), we show the IV estimates when the interaction term between the per capita value of PP contracts and dynastic management is treated as an additional endogenous regressor in Eq. (1). Thus, we include the interaction between dynastic management and the instrument and estimate Eqs. (1), (3) and (4) using 2SLS. We confirm the sign of the OLS estimates shown in table 3: dynastic top management negatively moderates the positive relationship between procurement and productivity. Interestingly enough, *ceteris paribus*, for those municipalities with low total PP amounts, firms with dynastic management have a higher level of productivity compared to their counterparts.

In sum, the IV estimates confirm that, after controlling for a large vector of firm characteristics, unobserved heterogeneity, and the endogeneity of public procurement, a higher (per capita) value of PP contracts tendered by municipalities has a positive effect on the productivity of firms located there, especially those with non-dynastic management.

4.5   Robustness checks

In this section we run several robustness checks and present the results. First, since we are interested in the *total* (*direct* plus *indirect*) effect of local procurement on all firms located in the municipality that tendered the PP contracts, we have constructed our main explanatory variable as the total value of all PP contracts tendered by a given municipality. However, our estimates may be subject to measurement error. Indeed, firms may win PP contracts tendered by municipalities other than the one in which they are headquartered. We address this issue in two ways. We construct an indicator variable for whether a firm has one or multiple plants. Firms with one plant should be more dependent on the PP tendered by the municipality where their single plant is located. The results are shown in cols. (1) and (2) of table 5. Although the number of observations is significantly reduced, the main results are confirmed. The average effect of PP on firm productivity (col. 1) is positive, although less precisely estimated than in the full sample; nevertheless, the effect is positive and significant for firms with non-dynastic management (col. 2) and close to zero for firms with dynastic management. In addition, we re-estimate our main empirical model by excluding municipalities with less than 5,000 inhabitants. Indeed, we expect that small municipalities are more likely to put out to tender PP contracts that are awarded to firms located in other areas. The results reported in cols. (4) and (5) of table 5 are consistent with those in cols. (3) and (4) of table 3.

Second, the productivity of firms located in a particular municipality may be affected by PP tendered by other levels of government (national, regional or provincial). Typical examples are large physical infrastructures that may affect the productivity of firms located in different municipalities. To this end, we include in our main specification, as another control variable, the per capita value of

procurement contracts awarded by all other governments and bodies (national, regional or provincial) that affect the municipal territory, regardless of their purpose (i.e., museums, schools, hospitals etc.).

Table 5.   Robustness checks

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Mono-plant firms		Excluding small municipalities		Controlling for PP contracts tendered by other levels of government		Dependent variable: TFP	
MP	0.002 [0.002]	0.012** [0.005]	0.004** [0.002]	0.010** [0.005]	0.003* [0.002]	0.010** [0.004]	0.004** [0.002]	0.014*** [0.004]
DYN	-0.068*** [0.010]	-0.016 [0.024]	-0.079*** [0.009]	-0.050*** [0.025]	-0.079*** [0.008]	-0.042** [0.019]	-0.124*** [0.010]	-0.072*** [0.021]
MP • DYN		-0.011** [0.005]		-0.006 [0.005]		-0.008** [0.004]		-0.012*** [0.004]
K/L	0.111*** [0.002]	0.111*** [0.002]	0.106*** [0.002]	0.106*** [0.002]	0.107*** [0.002]	0.107*** [0.002]		
SIZE	0.074*** [0.004]	0.074*** [0.004]	0.092*** [0.003]	0.092*** [0.003]	0.092*** [0.003]	0.092*** [0.003]		
OP					0.001 [0.001]	0.001 [0.001]		
Municipal and local controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Management controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Workforce controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other firm controls	Yes†	Yes†	Yes	Yes	Yes	Yes	Yes	Yes
LMAs fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.259*** [0.088]	9.217*** [0.090]	9.188*** [0.072]	9.164*** [0.074]	9.233*** [0.063]	9.202*** [0.064]	9.480*** [0.068]	9.437*** [0.068]
Observations	23660	23660	37000	37000	43254	43254	43194	43194
Adjusted-R2	0.448	0.448	0.441	0.441	0.436	0.436	0.284	0.284

Note: management controls include education and gender of the top manager running the firm; workforce controls include employment composition by education, occupation (executives, white-collar, blue-collar), and participation in training programs; firm controls include measures of firm size and age; the number of plants; indicators for product and process innovation, trade agreements, hiring policies. Coefficients of the control variables are not reported to save space, and complete tables are available from the authors upon request. All regressions include fixed effects at the industry-year level and at the LMA level. Labor productivity, capital-labor ratio and the per capita value of municipal PP contracts have all been winsorized at 1% and 99% levels. Cluster-robust standard errors (at the municipality-year level) are reported in parentheses. Asterisks denote significance levels: *** 1%, ** 5%, * 10%. † in this specification, the variable measuring the number of establishments is excluded.
Source: Authors' calculations based on ORBIS-RIL-ANAC data in 2010, 2014, and 2018

The positive relationship between municipal PP and firm productivity is confirmed (col. 5), and its effect is stronger for firms with non-dynastic management (col. 6), even when controlling for procurement by other levels of government. Third, we re-estimate our main empirical model using an alternative proxy for productivity, total factor productivity (TFP), to check whether our results are robust to different proxies for firm efficiency. Specifically, we compute TFP through the IV-GMM

modified Levinshon-Petrin estimator developed in Wooldridge (2009)[23]. The estimates (cols. 7 and 8) are similar in magnitude to those in table 3, suggesting that the per capita value of municipal PP leads to an increase in the TFP of the average firm i located in municipality m in year t.

5.   Conclusions

This paper analyzes the impact of PP contracts tendered by municipalities on firm productivity. To this end, we combine firm-level information on a sample of Italian limited liability companies with the administrative records of the universe of public procurement contracts put out to tender in the period 2010-2018. To strengthen our results, we use an instrumental variable approach that exploits the unexpected exemption of households from paying the municipal property tax on their first home, which occurred in Italy in 2008 and strongly affected the ability of municipalities to use procurement in the following years.

Our main results can be summarized as follows. First, we find that a higher (per capita) value of PP contracts tendered at the municipal level leads to higher productivity of the 'average' firm located there. Second, the positive impact of procurement on productivity is attenuated by the presence of dynastic top management. The results are robust to the inclusion of a wide range of firm and local characteristics in the empirical model, and to several robustness checks.

The results have important implications for scholars. Indeed, after the last decades in which economies fell off the cliff several times due to the Great Recession and the recent Covid-19 pandemic, there has been a renewed interest in studying the effect of demand-side policies to sustain firms and prevent general crises. To date, however, the literature on the impact of PP on economic outcomes has mostly taken either a macroeconomic perspective on the countercyclical effects of PP or a microeconomic perspective on the individual firm that wins a PP contract. In an attempt to fill a gap in this literature, in this paper we examine the effect that municipal PP may have on the productivity of all firms located in the area that the local government wants to sustain, and not just on the winners of the tenders. In fact, positive effects may spill over to (non-winners) firms located in the same area. Moreover, the empirical literature on the effect of PP contracts on firm productivity is sparse and has produced mixed results. Indeed, the differential returns to PP may be due to some relevant dimension of firm heterogeneity. We propose and test that dynastic managers may want to pursue firm survival at all costs. This may increase incentives to invest resources in building long-lasting kinship networks that extend across politics and business to gain preferential access to public resources, including PP contracts (Bertrand and Schoar 2006). This diversion of resources may lead family firms with dynastic top management to use PP contracts not as an opportunity to increase productivity, but simply as a buffer against market exit.

The findings of this paper also have implications for policy makers. Indeed, governments use PP to address grand challenges, to deliver public services that affect the quality of life and well-being of

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[23] The estimates are performed pooling all firms, taking number of employees and fixed tangible assets as measures of labor and capital inputs, respectively, and value added as the proxy for output, while we use the cost of material inputs as the instrument to control for endogeneity of labor inputs.
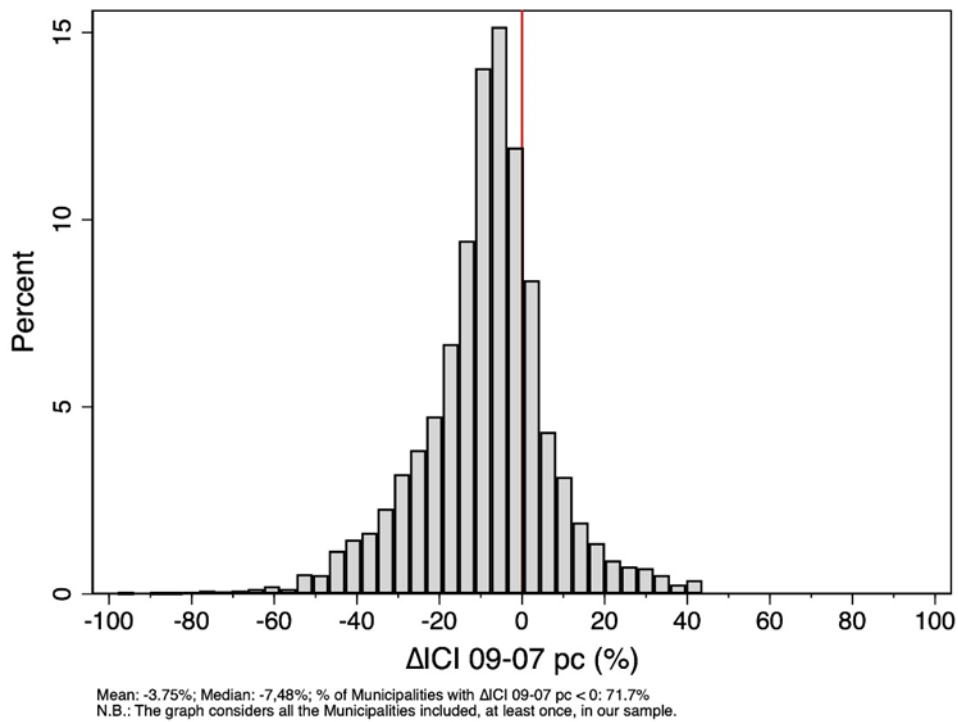
citizens, and to support businesses. Our results show that PP may be an effective tool to promote productivity, but the effects seem to be mostly concentrated in firms with non-dynastic management. This may reduce the *total* (*direct* plus *indirect*) positive effect of local procurement, as firms with dynastic management are ubiquitous in most advanced economies.

It is worth making a few caveats about our analysis. First, while we have done our best to minimize a possible omitted variable bias problem, the relatively short dimension of the unbalanced panel has prevented us from using a vector of fixed effects at a finer level. In addition, and for the same reasons, we hypothesize an almost contemporaneous effect of municipal procurement on firm productivity, while part of the effect may manifest itself with some lag. This suggests caution in interpreting our results as the causal effect of municipal procurement on firm productivity. Second, like many papers that use a measure of productivity deflated by an industry-level index, our measures of productivity are prone to omitted price bias. This fact may limit the reliability of the estimated efficiency scores, and a note of caution is warranted. Third, in the current framework, we assess the *total* effect of local procurement on productivity, but we are not able to separately assess the *direct* effect (on the winners of a PP contract) and the *indirect* effect (on firms located close to the winners). Thus, future research could assess the *direct* and *indirect* effects of procurement on firm productivity to complement the findings of this paper.

Appendix

Figure A.1 shows the distribution of the change in ICI tax revenues over the 2007-2009 period as a percentage of ICI tax revenues received in 2007 (the last year before the exemption came into force).

Figure A.1   Percentage change in the ICI tax revenues in the period 2007-2009. Distribution among Italian municipalities in our sample

Mean: -3.75%; Median: -7,48%; % of Municipalities with ΔICI 09-07 pc < 0: 71.7%
N.B.: The graph considers all the Municipalities included, at least once, in our sample.

Source: Authors' calculations based on data on municipal revenues from the ICI tax in 2007, 2008 and 2009 from the Ministry of the Interior, Department of Internal and Territorial Affairs (Local Government Databases - Local Finance)

Table A.1 shows the first-stage results of IV estimates in shown in table 4.

Table A.1   First-stage results of IV 2SLS estimates in shown in table 4

	Second-stage results are in:		
	col. [1], table 4	col. [2], table 4	
	Endogenous regressor(s)		
	MP	MP	MP* DYN
	[1]	[2]	[2]
ICI revenues	0.489***	0.413***	-0.383***
	[0.063]	[0.076]	[0.078]
ICI revenues *DYN		0.089*	0.970***
		[0.047]	[0.092]
Municipal and local controls	Yes	Yes	Yes
Management controls	Yes	Yes	Yes
Workforce controls	Yes	Yes	Yes
Other firm controls	Yes	Yes	Yes
LMAs fixed effects	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes
Observations	42961	42961	42961

Note: management controls include education and gender of the top manager running the firm; workforce controls include employment composition by education, occupation (executives, white-collar, blue-collar), and participation in training programs; firm controls include measures of firm size and age; the number of plants; indicators for product and process innovation, trade agreements, hiring policies. Coefficients of the control variables are not reported to save space, and complete tables are available from the authors upon request. All regressions include fixed effects at the industry-year level and at the LMA level. Labor productivity, capital-labor ratio and the per capita value of municipal PP contracts have all been winsorized at 1% and 99% levels. Cluster-robust standard errors (at the municipality-year level) are reported in parentheses. Asterisks denote significance levels: *** 1%, ** 5%, * 10%.
Source: Authors' calculations based on ORBIS-RIL-ANAC data in 2010, 2014, and 2018

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