

**Charles University**

Faculty of Social Sciences  
Institute of Economic Studies



MASTER'S THESIS

**Political Connections and Distortions on  
Public Procurement Markets: Evidence  
from the Czech Republic**

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Study program: **Economics and Finance**

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## Declaration of Authorship

The author hereby declares that he compiled this thesis independently; using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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Prague, 26.7. 2021

Alice Navrátilová

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## Bibliographic note

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## Abstract

Corporate political connections have been shown to induce preferential treatment towards connected firms. This thesis evaluates whether the effect of connections is reflected in the composition of public procurement suppliers in Czechia, using municipal procurement awarded between 2006 and 2020. In particular, we hypothesise that changes in municipal mayors affected the rate of new procurement suppliers following the elections in 2014 and 2018. The findings show that the rate of new suppliers increased significantly in municipalities that elected a new mayor in the 2014 elections; however, the effects appeared to be negative in 2018. We further hypothesise that these results can be driven by the major success of new political parties in 2014, with a large share of new politicians being elected to office. We specifically examine the case of ANO, the political movement that dominated both elections. We do not find robust evidence of a surge in new suppliers in municipalities where ANO was notably successful, suggesting that the effect was not driven only by this party and pointing to alternative explanations.

**JEL Classification**

*D72, H57, H72*

**Keywords**

political connections, public procurement, municipality, mayor, elections, politics

## Abstrakt

Výzkum ukazuje, že politické konexe mohou vyvolat zvýhodňování napojených firem. Tato práce hodnotí, zda se vliv vazeb odráží ve složení dodavatelů veřejných zakázek v Česku, k čemuž využívá zakázky obcí zadaných v letech 2006 až 2020. Předpokládáme, že změny starostů ovlivnily míru nových dodavatelů veřejných zakázek po volbách v letech 2014 a 2018. Výsledky ukazují, že míra nových dodavatelů se významně zvýšila v obcích, které si ve volbách v roce 2014 zvolily nového starostu; v roce 2018 se naopak výrazně snížila. Dále předpokládáme, že tyto protichůdné efekty by mohly být způsobeny úspěchem nových stran v roce 2014, který byl doprovázen zvolením mnoha nových politiků. Konkrétně zkoumáme hnutí ANO, které vyhrálo volby v obou letech. Nenacházíme ale dostatek důkazů o nárůstu dodavatelů v obcích, kde bylo zejména ANO úspěšné, což naznačuje, že efekt nebyl vyvolán pouze touto stranou a poukazuje tak na alternativní vysvětlení.

**Klasifikace**

D72, H57, H72

**Klíčová slova**

politické konexe, veřejné zakázky, obec, starosta, volby, politika

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# Acronyms

<b>ANO</b>	ANO 2011
<b>CPI</b>	Corruption Perception Index
<b>ČSSD</b>	Czech Social Democratic Party
<b>FN</b>	False negative
<b>FP</b>	False positive
<b>GDP</b>	Gross Domestic Product
<b>IČO</b>	Company (Municipality) registration number
<b>ISPC</b>	Information System on Public Contracts
<b>KDU-ČSL</b>	Christian and Democratic Union – Czechoslovak People’s Party
<b>KSČM</b>	Communist Party of Bohemia and Moravia
<b>NGO</b>	Non-Governmental Organisation
<b>NR</b>	New rate
<b>ODS</b>	Civic Democratic Party
<b>OLS</b>	Ordinary Least Squares
<b>ROA</b>	Return on assets
<b>STAN</b>	Mayors and Independents
<b>TARP</b>	Troubled Asset Relief Programme
<b>TN</b>	True negative
<b>TP</b>	True positive
<b>VAT</b>	Value Added Tax
<b>VR</b>	Value rate

# Master's Thesis Proposal

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<b>Defense Planned:</b>	February 2021

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## **Proposed Topic:**

Political Connections and Distortions on Public Procurement Markets: Evidence from the Czech Republic.

## **Motivation:**

The issue of possible linkages between political entities and firms has been widely discussed in both the media and academic environment. These connections can be abused and lead to political favours and advantages benefitting connected agents, which may give rise to unfair competition. Additionally, this can also question the independence of politicians and political institutions and consequently decrease overall political trust.

In order to quantify potential rent extraction, it is inherent to determine what can be considered as political connections and how they can be measured. Among the commonly used indirect measures are donations to politicians and political parties as data on donations are relatively accessible and allow to determine the real value of connections compared to binary indicators of connections. On the other hand, the use of such methodology may lead to the self-selection bias caused by the fact that better performing companies are simply more likely to donate money than worse performing ones. Studies incorporating donations as a proxy for political connectedness include, for instance, Akey (2015) in the USA, Baltrunaite (2017) in Lithuania or Palanský (2014), Navrátilová (2018) and Titl and Geys (2019) in the Czech Republic.

Despite the drawbacks of binary measures, many researchers have specified political connections through political persons themselves since it allows to capture connections in a rather direct manner. These include Faccio (2006), Goldman et al. (2013) and Baranek and Titl (2018) who have considered companies as being politically connected if their officials (board members, CEOs and others) were members of some political party and occupied a political position at the same time. Several studies, for example Amore and Bennedsen (2013) or Acemoglu et al. (2016), have dug even deeper by employing personal ties of individual politicians such as friendship or family relations. However, the collection of such data might be very time-consuming and even impossible given current personal data protection laws.

Previous research has demonstrated that connected agents may benefit from political connections in various ways. These involve indirect effects such as increased market capitalisation (Faccio, 2006), but also more direct channels such as easier access to government funding (Duchin and Sosyura, 2012) or lower effective tax rates (Wu et al., 2012). As municipal contracts are used, this study mostly contributes to the

string of literature focusing on the impact of political connections on public procurement spending.

Following that, Baltrunaite (2017) estimated that the probability of winning a public tender by firms who contributed to some political party decreased by 5 % after the ban on corporate donations was introduced in Lithuania. Goldman et al. (2013) found that the value of procurement supplied by firms connected to the Republican party increased significantly after the Republicans took over control of House and Senate in 1994. In the Czech Republic, Palanský (2014) and Navrátilová (2018) already showed that companies contributing to political entities received public procurement of higher value than their non-contributing rivals, though they focused on tenders at the regional and governmental level, respectively. Using public procurement awarded by local authorities, Palguta (2016) further revealed that chances of donating firms to gain contract decreases with the increasing number of parties controlling the municipality. Palanský (2018) also showed that politically connected firms significantly outperformed their non-connected rivals and he further estimated this effect to be stronger for companies operating in procurement-intensive industries, pointing to the fact that procurement contracts are likely to serve as a source through which corporate entities make use of their connections.

In this thesis, we thus attempt to extend existing literature by focusing on political connections, which are defined in several ways, and their impact on Czech public procurement administered at the municipal level. Primarily, we focus on the indirect specification of connections (as explained in the Methodology section of this proposal). Additionally, we aim to extend the analysis using other proxy variables such as political donations or direct connections with elected politicians.

#### **Hypotheses:**

Hypothesis #1: Politically connected companies supply, on average, public procurement of higher value.

Hypothesis #2: Companies connected to politicians holding the mandate in local governments receive, on average, public procurement of higher value during the period when they are connected.

Hypothesis #3: Companies which donate more to political parties obtain, on average, public procurement of higher value.

Hypothesis #4: The presence of politically connected companies reduces competition in procurement tenders.

#### **Methodology:**

We develop several empirical hypotheses to test the impact of political connections on the allocation of municipal procurement. From the side of political linkages, we mainly focus on indirect connections by dividing data on public procurement into two or three terms between respective municipal elections and then defining entity as being politically connected if it supplied procurement contract in the respective political term. Using artificially created panels, we can thus track overall changes between these periods.

To do so, we firstly need to determine which political parties were elected to respective municipalities during these terms. If possible, we attempt to narrow this definition by considering only political parties which were in power, i.e. we focus on parties whose members occupied major positions in local governments such as the mandate of mayor or mandates in city councils. We will then compare the extent

to which connected firms supply public procurement before in municipalities in which the mayor changed in elections and those in which the mayor stayed the same. The basic information about results of municipal elections and political composition at respective municipalities will be obtained from the Czech Statistical Office (Volby.cz) using a Python-based scraper, and from open data of the Czech Ministry of the Interior. Details about occupied positions in local governments will be further extracted from individual websites of municipalities.

In the second part of this study, we would like to focus on other sources of political connections either by incorporating indirect connections through donations to elected political parties or direct connections through elected politicians. In the latter case, this would be accomplished by matching elected politicians with companies' officials, since we plan not only to collect information on political parties, but also on respective politicians.

Data on public procurement, other data such as firm characteristics, and, if employed, data on political donations will be obtained from the civic organisation EconLab, z.s. This entity collects data from the Commercial Register, the site [vestnikverejnychzakazek.cz](http://vestnikverejnychzakazek.cz), and the database [PolitickeFinance.cz](http://PolitickeFinance.cz), which retrieves information from the annual reports of political parties. Regarding the methodology from the statistical point of view, basic methods such as comparative statistics, OLS and pooled OLS are going to be used.

#### **Expected Contribution:**

First important contribution of this study can be perceived in the data collection. The Ministry of the Interior provide information only about the current mayor in individual municipalities. Our objective is to collect information on the political structures of past municipal representation and merge these into one comprehensive dataset. Consequently, we believe that such data can be then useful for further research related not only to political connections.

The next contribution is the analysis of the effects of political connections itself. Considering the case of the Czech Republic, similar research has been already conducted using both public procurement as a channel of rent extraction, though administered mostly at regional or governmental level, and various proxies of political connections. However, to the best of my knowledge, there is no empirical research studying the effect of political connections according to our main indirect definition as well as the overall impact on public tenders allocated at the municipal level.

Finally, there are several reasons why the Czech Republic represents a suitable candidate to test these effects. Firstly, previous studies already demonstrated that political connections are more likely to be observed in countries suffering from corruption and weaker institutional framework. According to the periodical study of Transparency International (2019), the Czech Republic took 44<sup>th</sup> place in the Corruption Perceptions Index, obtaining only 56 from 100 points. Together with findings of previous studies and individual instances presented by media, it is likely that political connections are present and perhaps even exploited in the Czech Republic more than in other countries. Secondly, the Czech procurement market represents a significant share of GDP (around 11.76% in 2018; Ministry of Regional Development, 2019). Considering its long-standing non-transparency, it seems that it constitutes a channel through which entities may extract benefits from political connections. Thirdly, we perceive this type of analysis as being of high importance

and that it should be conducted regularly by economists or political scientists as it represents the way how the general public can oversee politicians.

**Outline:**

1. Introduction
2. Literature review (Foreign literature: Defining political connections, Benefits from political connections; Political connections and public procurement in the Czech Republic)
3. Czech political background (Public procurement, Political environment – functioning of municipal institutions and municipal elections)
4. Data description (Data collection process – municipal elections, local councils and majors, and individual candidates; Data description – public procurement, political donations – if employed; Other data sources)
5. Methodology (as in the Methodology section of this proposal)
6. Results and Discussion (Comparison to the previous Czech and Foreign studies, ideas for future research)
7. Conclusion

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# 1 Introduction

In recent years, a growing literature has examined political connections and their impact on partaking entities. On the one hand, politicians can abuse their power to favour affiliated agents. For such prerogatives, they may demand a certain pay-out in return which closely borders on corruption. On the other hand, firms can enjoy preferential treatment of different forms, which may stimulate unfair competition and induce inefficiency, leading to a loss of public welfare.

Different approaches have been adopted, resulting mainly from various ideas of what can constitute political connections and diverse institutional frameworks across countries, shaping the data availability considerably. Previous Czech studies have primarily defined connections through donations to political parties and formal linkages with politicians, particularly at the regional and governmental levels. Both specifications have their limitations which may cause an underestimation, for instance, an impossibility to capture contributions from firms hiding behind natural persons in the former case and an impossibility to identify all relationships, especially informal ones, politicians maintain over time in the latter case.

To avoid these difficulties, we approach the problem the other way around. We focus on the last two changes in the posts of mayors induced by municipal elections, which took place in 2010, 2014, and 2018. Contrarily to preceding studies, we inspect the effect of the elections instead of specifying direct connections established between mayors and companies. For this purpose, we create a new database gathering information about elected mayors. Following the example of previous research, we investigate the response using public procurement awarded by municipalities between 2006 and 2020. Public tenders comprise a substantial part of GDP (almost 13% in 2020; Ministry of Regional Development, 2021) and thus play a vital role in the Czech Republic. Considering their criticised non-transparency, they are likely to constitute a source through which politically connected companies may acquire benefits. We then compare the impact on the structure of suppliers between municipalities in which the mayor stayed the same and those in which the mayor changed as we endeavour to answer the following policy questions: Does a change of mayor caused by the elections increase the number of new suppliers in a municipality? Do newly entering companies receive procurement of higher value in municipalities where mayors changed than in

those where they stayed unchanged? Hence resulting in the most crucial question: Are political connections associated with the elections of new mayors reflected in the changes in the structure of suppliers?

We develop a set of distinct models to test these questions empirically. In all cases, we hypothesise that the change of a mayor in a municipality is related to an increase in the relative count of new suppliers and the value of procurement awarded to those. Firstly, we build pooled specifications to examine the consequences following the mayoral changes for both election periods together. The results surprisingly indicate that changes in municipal governance do not have any significant impact on suppliers' composition. Consequently, we construct separate equations for each election period in the second empirical part to analyse these terms individually. We find a positive response after the 2014 elections; conversely, we uncover a negative effect following the 2018 elections, although not being robust in an absolute way.

We assess that these conflicting effects could be caused by the emergence and subsequent entry of new parties into politics, which might also be related to the change of vast mayors after the 2014 elections. These mayors, more precisely the municipal government they represent, might have awarded procurement to selected companies and, after other elections, if they retained their positions, they could have allocated contracts to the same already proved and connected suppliers. However, the municipal political spectrum is overly fragmented to capture all the coalitions formed before and after the elections. To evaluate this additional surmise empirically, we narrow the transformation in political composition by focusing on a single political movement, ANO 2011, which dominated in both elections. In the next section, we re-estimate the same equations, except that we include an indicator capturing ANO representation. We do not find enough evidence favouring the auxiliary hypothesis, which opens a space for alternative explanations but keeps our findings partly inconclusive. Overall, our results confirm previous studies that certain connections exist between local governments and procurement contractors, though only in some periods. Nonetheless, unveiling concrete linkages in individual years is beyond the scope of this thesis.

The rest of this thesis is structured as follows. Chapter 2 summarises foreign and Czech literature based on measures used for political connections and possible channels of rent extraction. Chapter 3 is dedicated to municipal governance. Chapter 4 presents the final datasets and explains the methodology used in the core empirical part. Chapter 5 provides and interprets the results reached in the analysis. The final Chapter 6 declares the main conclusions and suggests ideas for further research.

## 2 Literature review

The issue of possible linkages between private and public entities has been broadly reviewed in both the media and academic fields. Earlier studies have been more theoretically oriented towards the rent-seeking motives and corruption (for instance, Krueger, 1974; Shleifer & Vishny, 1994). On the other hand, recent papers have empirically attempted to define political connections and discovered privileges arising from these. Accordingly, the purpose of this chapter is to summarise the recent literature associated with both these angles to situate this thesis into the context of previous studies. Chapter 2.1. commences with a summary of the foreign literature based on measures used for political connectedness while Chapter 2.2. describes these studies from the side of variables which might be affected as such. Chapter 2.3. concludes with an overview of the Czech literature associated with connections and its effects on the allocation of public resources and a discussion of a potential contribution of this thesis.

### 2.1 Specifying political connections

In order to quantify potential rent extraction, it is firstly inherent to determine what can be considered as political connections and how they can be proxied. The previous research looking at the benefits of political linkages has defined these in various ways, each having its certain advantages that balance its disadvantages. The use of different measurements results from diverse ideas about what can constitute political connections and different institutional frameworks across countries, which shape the data availability for such purposes considerably. Especially in emerging countries, the incompleteness and non-existence of the data create a serious mismatch as these economies usually suffer from a weaker institutional framework and may be more predisposed to rent-seeking problems (Špolc, 2017).

Among the commonly used indirect measures of political connections are contributions to politicians, political parties, and campaigns. From the econometrics point of view, the data on donations are relatively accessible and enable determining the actual value of connections compared to the binary indicators of connections. Nonetheless, as better-performing firms might be more likely to donate money than worse-performing ones, the use of this proxy may lead to the self-selection problem

and consequently to the biased estimation. Furthermore, anecdotal evidence has pointed out that companies might not officially report all the contributions they received, or they might attempt to hide the actual corporate donors behind contributions from natural persons (Vymětal, 2017). Many critics thus believe that giving money serves as an investment in political favours. On the contrary, supporters of donations claim that the private financing of politicians is more desirable than the public one.

Moreover, being usually made by individuals in small amounts, these contributions are often viewed as a pure form of political participation (Ansolabehere et al., 2003), increasing political information and fostering civic involvement (Baltrunaite, 2020). However, rather than investment in political capital, Aggarwal et al. (2012) argued that donations represent agency problems within companies, reflecting managers' political preferences; and according to Fulmer and Knill (2012), it is, therefore, executives who collect all the benefits arising from these contributions. Specifically, they found that contributing managers engaging in fraudulent activities enjoy lenient sanctions and transfer part of imposed penalties to shareholders, which is, in consequence, detrimental to firms' value.

On the other hand, plenty of existing research has indicated that political donations can serve as a political investment, especially for large corporations. For instance, in Brazil, Boas et al. (2014) showed that money donated to winning candidates boost the value of government contracts acquired by contributing firms. Other primary studies using political donations as a proxy for connectedness include Cooper et al. (2010), Ettore et al. (2017), Huber and Kirchler (2013) and Jayachandran (2006) in the United States; Baltrunaite (2020) in Lithuania or Claessens et al. (2008) in Brazil. These studies have mostly confirmed that by making contributions, companies secure preferential treatment in various ways. In other words, political donations can buy political influence and distort public interest. In fact, that might be the reason why are corporate donations officially banned in 45 countries around the world (International IDEA, 2020). Furthermore, according to Akey (2015), political contributions represent only a part of firms' political strategy as he found these to be correlated with engagements such as hiring former government employees or lobbying expenditures. Lobbying expenditures together with other proxies; for instance, campaign contributions, personal relations of companies' top officials, and others; have also been employed by Blau et al. (2013), Duchin and Sosyura (2012) or Kim and Zhang (2016). In contrast to Akey (2015), Duchin and Sosyura (2012) showed that these variables represent distinct measures of political activities as they evince low correlation.

Despite the drawbacks of binary measures, many researchers have specified political connections through either political persons or top officers of companies themselves since it enables to capture connections in a rather direct manner. This specification is also closely related to the issue of so-called revolving doors, specifically, the movement of high-level employees from the public to private sector employment and vice versa (Albaladejo et al., 2017). On the one hand, companies may utilise the regulatory expertise of former or even present public sector employees, which may help them save costs. On the other hand, using their political relations may lead to various outside legislative benefits in terms of skewed legislation, inside information or preferential treatment in procurement tenders. Furthermore, compared to the financial support provided to politicians, which can be perceived as a short-term transaction (Aggarwal et al., 2012; Faccio, 2006), personal relations tend to be more durable and from this aspect might be therefore more suitable as a measure of political connectedness.

The pioneering work in formulating connections through politicians themselves is the cross-country research conducted by Faccio (2006). She classified a firm as being politically affiliated if at least one of the company's large shareholders (controlling at least 10 per cent of voting shares) or top officer (e.g., CEO, vice-president) is a member of parliament, a minister, or the head of state. Using data for 47 countries, she showed that firms' stock prices rose significantly after a businessperson related to that firm entered politics. Many researchers have attempted to support her results, focusing on connections through private or public sector officials themselves. Relying on her database, mapping connections across the whole world, Boubakri et al. (2012) found that firms can gain easier access to long-term debt after establishing political connections, enjoy benefits in terms of increased performance and that the effect is even more significant for stronger ties. Focusing on the shift in political control, Goldman et al. (2013) determined connections by the political background of directors with the Republican (Democratic) Party solely. Other researchers who have also incorporated connections through top officials of companies include, for example, Bertrand et al. (2018), Cingano and Pinotti (2013), Fan et al. (2007), Ferris et al. (2016) or Wu et al. (2012).

Several studies have dug deeper by employing unofficial relations of politicians such as friendship or family ties. However, collecting such data might be very time-consuming and even impossible, given the country-specific personal data protection laws. Furthermore, it is hardly achievable to identify all relationships political officials maintain over time, and the actual extent of connections can be therefore

underestimated (Navrátilová, 2018; Palanský, 2020). Amore and Bennedsen (2013) explored the value of family connections as they had access to official Denmark databases containing information on board members, their families, and local candidates. Using their identification numbers, they specified connections between politicians and firms through their family members. Similarly to our study, Lévêque (2020) also focused on the connections at the municipal level by examining individuals providing support to candidates running for mayor's office. Using ordinary least squares (OLS) regression, he showed that families related to supporters of mayors receive 35% more building permits than those connected to opponents. Schoenherr (2019) further defined connections through the social networks of the Korean president consisting of his former fellows and colleagues. Several other economists have also incorporated indirect connections through unofficial relations of government officials; among them, for instance, Adhikari et al. (2006), Faccio et al. (2006), or Johnson and Mitton (2003).

Other proxies for political connections may be perceived as less challenging to construct. Besides other measures, Adhikari et al. (2006) or Song et al. (2017) used the state equity ownership of firms which was viewed as a reasonable proxy for the government support; Faccio and Parsley (2009) considered a company as politically affiliated if being headquartered in the same city where a particular politician was born or used to live for some time; Li et al. (2008) focused on the membership of executives in the Chinese Communist Party.

## 2.2 Benefits of political connections

Considering the results of previous literature, political connections appear to be valuable worldwide; however, the means through which the rent can be extracted vary from one country to another. Many research findings have indicated that connected firms outperform their non-connected peers in different ways. Li et al. (2008) or Wu et al. (2012) provided evidence that connections have a positive effect on the performance of Chinese private firms as measured by return on assets (ROA) and Tobin's Q; Cingano and Pinotti (2013) identified an increase in revenues of locally connected companies, which might have been induced by greater market power resulting from higher sales to the public administration; Amore and Bennedsen (2013), using exogenous shifts in local Danish municipalities, showed that political linkages boost firms' operating profitability as quantified by operating returns on assets.

There has also been a growing consensus in the empirical literature that political connections increase the market value of publicly traded companies, representing an investment in political capital. For instance, Akey (2015) identified a wedge of 1.7% to 6.8% in equity value between companies connected to the US congressional winning and losing candidates; Claessens et al. (2008) demonstrated that firms contributing to elected Brazilian deputy candidates evince higher stock returns after announcing the election results. Many authors have explicitly focused on affiliations with the US presidential candidates; for example, Goldman et al. (2009), Huber and Kirchler (2013), Knight (2006), or Shon (2009); and found abnormal post-election returns of companies classified as connected to the eventual winner. Conversely, researchers such as Aggarwal et al. (2012) or Coates (2012), employing different empirical strategies, observed a negative relationship between political activity and stock prices. Aggarwal et al. (2012) then also argued that the results of previous studies finding a positive association could have been driven by the focus on small samples, short time horizons, and isolated events. On the other hand, Acemoglu et al. (2016) explained increases in equity prices associated with political linkages by the so-called crisis hypothesis. Specifically, they claimed that the value of political connections matters more during periods of financial distress and political discretion, demonstrating this idea on the example of increased powers of certain political positions during such times. Focusing on unofficial ties of financial institutions with Timothy Geithner, they showed that market prices of political companies accelerated significantly after he had been nominated for the position of Treasury Secretary.

The fact that investors presumably value political linkages can also be observed from the adverse effects upon terminating connections. For instance, Faccio and Parsley (2009) identified a 1.7% decline in the equity value of companies geographically affiliated with politicians who unexpectedly die; Fisman (2001) observed declining prices in response to the worsening health of Indonesian president Suharto at the end of the 1990s; Jayachandran (2006) also estimated negative response to the market capitalisation of firms which donated to the Republican Party after Senator Jeffords left this political party while tipping the control to the Democrats.

As pointed by Shleifer and Vishny (1994), politicians may also extract part of the rent generated by connections and companies are enhanced only if the benefits outweigh their costs. Consequently, political engagement could be detrimental to affiliated agents, which could explain the contracting evidence on accounting performance raised by several studies. Namely, after establishing connections, political

firms evinced poorer performance relative to their non-connected peers in terms of sales (Fan et al., 2007) and ROA (Bertrand et al., 2018).

Previous studies have mostly demonstrated that politically connected firms perform better than non-connected ones, although the channels through which such agents acquire the benefits have not been explored. Moreover, considering the findings of the studies mentioned above, it cannot be explicitly claimed that political connections cause harm to politically non-linked or other economic agents. In this vein, one string of literature has suggested that easier access to funding might represent such a source, confirming that political engagement can serve as a specific form of insurance for periods of financial distress. For instance, Claessens et al. (2008) observed significantly increased financial leverage of politically connected firms. In Pakistan, Khwaja and Mian (2005) showed that such beneficial loans were usually provided by government banks and suffered from higher default rates, causing substantial economic harm. These results are also consistent with the cross-country research of Faccio et al. (2006). Moreover, they also pointed to the more unsatisfactory performance compared to politically inactive companies. They further explained that lenders do rely on home governments, in this case, as such firms were more likely to be bailed out. This may also explain the lower market price of credit risk as measured by credit default swap spreads (Fang et al., 2017) and interest rates (Faccio et al., 2006). Similarly, Blau et al. (2013) found that connected banks were not only more likely to receive funds from the Troubled Asset Relief Programme (TARP)<sup>1</sup> but that they were also granted a greater amount in an earlier time; yet, they used the capital less efficiently compared to the non-connected banks (Duchin & Sosyura, 2012).

Plenty of studies have provided evidence on other different government-related benefits granted to politically active firms. Adhikari et al. (2006) and Wu et al. (2012) ascertained that political companies in Malaysia and China, respectively, enjoy paying taxes at lower effective rates; Kim and Zhang (2016) confirmed that US companies are more tax aggressive due to better information concerning tax regulations and enforcement, again induced by connections. Considering potential influence over the US regulatory outcomes, Correia (2014) unveiled that contributing firms incur lower enforcement costs in terms of lower penalties if being prosecuted; De Figueiredo and Edwards (2007) showed that donating firms were able to skew regulatory outcomes of the US telecommunications industry; Ferris et al. (2016) found that bidders are more

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<sup>1</sup> TARP was a funding programme operated by the U.S. Treasury to stabilise the financial system and restore economic growth after the 2008 mortgage crisis.

likely to acquire targets during M&A processes and avoid regulatory actions by employing former politicians to their management teams, thus making use of their legislative knowledge and their political networks.

As the impact of political connections on the allocation of Czech local procurement is investigated, the primary stream of contributions can be perceived in connection to studies orientated towards public procurement, representing a possible source of favouritism. On the one hand, considering the allocation of public resources, political connections, in terms of political networks, may help to reduce information asymmetries, enabling thus public officers to achieve possibly more efficient distribution. Although Witko (2011) showed that political contributions represent a significant determinant of the quantity of supplied contracts, he also found that a company reputation and past contracting experience constitute essential factors. His results thus suggested that politicians might balance between political and technical aspects when awarding procurement. On the other hand, a growing literature has documented that political affiliations might induce the reallocation of spending favouring affiliated agents. Using the difference-in-difference regression design, Baltrunaite (2020) examined the impact of the ban on corporate donations over the allocation of procurement tenders in Lithuania and found that the chance of winning a contract by donors decreased by 5% compared to non-donors. Moreover, her results indicated that contributing firms received insider information about bids of their non-contributing competitors, which helped them to secure more contracts. Similar findings were provided by Albalade et al. (2017), who showed the weakening impact of connections after tightening laws regulating public procurement and financing of political parties in Spain, suggesting again that political connections have a certain role in allocating public funds spending. Goldman et al. (2013) demonstrated that companies connected by officials to the winning (losing) Republican (Democratic) party in the 1994 elections benefited from an increase (decrease) in the value of received contracts afterwards. Nevertheless, approximating connections by contributions to these political parties, they found no effect on the value of supplied contracts. Another evidence has also shown that connections can boost the value of procurement awarded to related companies; for instance, Boas et al. (2014) in Brazil, using a regression discontinuity framework on close elections or Schoenherr (2019) in Korea, using a firm-time fixed effects design.

The conclusions of the above-mentioned research have indicated that political connections could induce unfair competition; nonetheless, this does not reveal any corruption cases. On the other hand, procurement contracts can be, in such a case,

awarded to companies that are incapable of executing them efficiently, as have been stipulated by several papers. In India, Lehne et al. (2018) found that preferential firms supplied road contracts for higher prices and that these were more likely to be never constructed; Mironov and Zhuravskaya (2016) confirmed that companies providing cash to politicians in exchange for procurement emerged to be less productive; Schoenherr (2019) showed that contracts executed by affiliated companies exhibited more adverse outcomes such as delays, construction mistakes, and cost increases in ex-post negotiations. Such misallocation has been estimated to be costly for all economic agents in terms of lost GDP: between 0.2% to 0.41 % (Claessens et al., 2008; Khwaja & Mian, 2005; Schoenherr, 2019).

Finally, as demonstrated in several studies, the value of the rent transferred to companies increases with the strength of established ties. For example, if connected to politicians in power (Khwaja & Mian, 2005) or provided more donations to political parties (Baltrunaite, 2020).

## 2.3 Political connections in the Czech Republic

Previous research has demonstrated that political connections are more common in countries that suffer from a weaker institutional framework and higher levels of corruption (Claessens et al., 2008; Faccio, 2006; Fisman, 2001; Wu et al., 2012). On the other hand, the reciprocity of connections has also been detected in regions with solid political institutions (Amore & Bennedsen, 2013); when linked to influential politicians (Goldman et al., 2013), or during times of financial crisis (Acemoglu et al., 2016). According to the well-respected Corruption Perception Index (CPI) prepared by Transparency International (2021), the Czech Republic ranked 49 with 54 obtained points out of 100 in 2020. The obtained score is still far below the European average of 66 and decreased compared to previous years. This decline is mainly attributable to the recent scandals of Czech prime minister Andrej Babiš and his efforts to obtain EU subsidies for his company. Considering the findings of previous studies and individual instances presented by media, it is likely that political connections are present and perhaps even exploited in the Czech Republic.

The oversight of politicians from the public and academic field is essential and should be conducted regularly. Concerning civic activities, several Czech NGOs focus on conflict of interest and corruption issues, of which activities are closely related to the topic of this thesis. These covers, for instance, Transparency International – Czech

Republic<sup>2</sup> and Hlídač státu<sup>3</sup>, which monitor the transparency of public procurement, besides other activities; or economic think tank Datlab Institut<sup>4</sup>, which conducts economic research connected to public policies. Datlab Institut currently cooperates with the NGO coalition Reconstruction of the State<sup>5</sup>, which promotes transparent selection in procurement procedures, besides other things; manages the project zIndex<sup>6</sup>, which benchmarks public contracting authorities; and operates the project PolitickeFinance.cz, which assesses the transparency of political parties funding.

Considering the empirical environment, this thesis further contributes to the literature analysing the effect of political connections and the distribution of public resources in the Czech Republic. Kopeček (2019) and Špolc (2017) showed that political companies are more likely to receive subsidies, using political donations and Ministers engaged in the management body of companies as a measure of connectedness, respectively. Additionally, Špolc (2017) found that firms connected with Ministers significantly underperform their non-connected rivals; however, he observed a gradually improving performance over time. This observation indicates that firms may seek connections as a last resort to improve their poor results; nonetheless, this can be made at the expense of consumers, as he demonstrated in the example of the Czech agriculture sector. On the contrary, Palanský (2020) estimated a positive impact of connections, as proxied by contributions to political parties, over a firm performance with an even more substantial effect for companies operating in procurement intensive industries. This observation again points to public procurement as the mean through which the added value can be extracted.

The interconnection between political links and procurement contracts awarded at different administration levels has been already inspected prior to this study. Palanský (2014) found that companies donating to the party in power witness an increase in the value of obtained contracts administered at the regional level. It was also unveiled that political firms are more successful in gaining smaller contracts, which are processed under more flexible rules, face less competition (Titl & Geys, 2019) and that such allocation leads to lower efficiency of regional public good provision (Titl et al., 2019). Focusing on public procurement administered at the

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<sup>2</sup> [www.transparency.cz](http://www.transparency.cz)

<sup>3</sup> [www.hlidacestatu.cz](http://www.hlidacestatu.cz)

<sup>4</sup> [www.datlabinstitut.cz](http://www.datlabinstitut.cz)

<sup>5</sup> [www.rekonstrukcestatu.cz](http://www.rekonstrukcestatu.cz)

<sup>6</sup> [www.zindex.cz/](http://www.zindex.cz/)

governmental level, Navrátilová (2018) also concluded that donations are associated with the higher value of supplied contracts; nonetheless, she did not manage to unveil causal relation. Similarly, Baranek and Titl (2018), employing two measures of connections through politicians holding a function in the board of companies and based on a frequency of business between procurer and supplier, showed that procurement awarded to connected firms tend to be overpriced. By contrast, Vitvar (2020) did not observe any suspicious behaviour at the municipal procurement market, examining the impact of changes in governance, which he proxied by the change in the prevailing party, on the structure of suppliers. In our empirical part, we partially extend his work. His findings are closely related to Palguta (2016) conclusions, demonstrating that municipalities with broader political representation open the procurement tenders to a wider range of suppliers. He further confirmed that municipalities award less often contracts to companies donating to political parties in past, i.e., to firms that could potentially seek a rent.

Finally, as described above, plenty of Czech studies have already discussed the association between political connections and the allocation of public procurement prior to this study. Considering that, we perceive the contribution of this thesis as being fourfold. The first significant contribution can be viewed in the data collection related to the past municipal representation as we believe that such data can be useful for future research. The second contribution can be recognised in the analysis itself. As opposed to the previous research, directly examining the impact of political connections, we attempt to answer the question of whether connections are reflected in the allocation of public procurement after new mayors are elected. Therefore, using a relatively novel approach, we estimate whether the outcomes of elections significantly alter suppliers' structure in terms of new companies. Thirdly, we deal with changes of mayors and public procurement administered at the municipal level, which has not been conducted before, to the best of our knowledge. Fourthly, we consider this type of political analysis fundamental, which economists should regularly conduct as it comprises how the public can oversee politicians.

## 3 Municipal governance

This chapter describes data on local governance in detail as it constitutes an essential input to the core empirical part. Section 3.1 explains our approach to political connections together with its pros and cons. Section 3.2 delineates the collection process of data on mayors elected in 2014 and issues connected with these. Section 3.3 describes the methodology related to the determination of mayors elected in 2010 and provides associated findings. Section 3.4 depicts the demographic statistics of mayors, representatives, and non-elected candidates.

### 3.1 Existence of political connections

In the previous research, especially in the Czech Republic, political connections have been defined in a rather direct manner. That is proxies through donations to political parties, direct linkages of governing officials to firms, for instance, politicians who sit in firms' boards simultaneously. Nonetheless, variables constructed in this way may not capture all the facts on which connections can be based (e.g., misreported donations, informal relations with politicians), and the real extent of connections can be thus underestimated. Therefore, in this thesis, we approach the problem the other way around as we attempt to evaluate whether changes in local governance alter public procurement outcomes using the data for municipal contracts.

As discussed in the literature review, political connections usually pay off the most when politicians or political parties hold power. Therefore, we narrow the scope by examining only individuals holding the mandate of the mayor to satisfy this criterion. To avoid potential problems with underestimating, we focus on the change of mayors between two election periods, i.e., between 2010 and 2014 and between 2014 and 2018. Thus, we examine the elections' effect instead of specifying connections through direct linkages between companies and mayors. We then compare the impact on the structure of firms supplying procurement in municipalities in which the mayor stayed the same and those in which the mayor changed (see Chapter 4). On the one hand, we indirectly examine all the relationships that mayors, or more precisely

all the governing councils/political parties<sup>7</sup> whose representative is the mayor, can potentially have with companies operating at the municipal procurement market. Should there exist any relation between mayors and firms that could be exploited, the structure of the municipality's suppliers (the flows towards the municipality's contractors) would change as soon as the mayor changed. On the other hand, we implicitly assume that mayors hold the mandate throughout the four-year election term, which may not always be true. For example, the mayor can resign, the mayor can be removed or changed due to the announcement of new elections, e.g., the number of council members falls below the statutory minimum. Tracking the changes of mayors within individual municipalities is impossible given the available data and is thus beyond the scope of this study.

## 3.2 Data collection process

For the purpose of our analysis, we needed to gather information about elected mayors in all municipalities during the period between 2010 and 2020. Throughout this study, the term municipality should be understood as the local authority, which implies that we consider the body of representatives at the level of municipalities, cities, statutory cities, including their city districts separately. Data on current mayors in the office, i.e., those elected in 2018, was obtained from the official directory of contacts of municipalities, which is available at the website of the Ministry of the Interior.<sup>8</sup> The document contained names and surnames of mayors, information about the corresponding municipality and region.

Nonetheless, many hand-made adjustments had to be made not only to allow the data to be processed further but also to ensure their reasonable quality. Firstly, the data completely lacked a unique identifier, such as a municipality registration number (referred to as IČO) or a municipality code (used by the Czech Statistical Office for reporting purposes), which was subsequently assigned. The presence of identifiers is important mainly due to the fact that in the Czech Republic, there exist municipalities

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<sup>7</sup> We do not distinguish between the terms political party and coalition of parties. The term political party thus includes both unless explicitly stated.

<sup>8</sup> Adresář kontaktů obcí pro interní potřebu Ministerstva vnitra; available at: <https://www.mvcr.cz/odk2/clanek/ostatni-prehledy-zmen-v-uzemni-organizaci-v-nazvech-obci-a-jejich-casti.aspx> (Accessed: 19 January 2021).

of the same name that are located in the same region.<sup>9</sup> We refer to these municipalities as “duplications” hereinafter. It would be possible to omit these observations from the analysis; however, that would lead to a considerable loss of observations, specifically 1 512 out of a total of 6 394 municipalities as of 2018.

In order to match duplications correctly, we made use of the address contained in the database to find the corresponding district. Secondly, by doing so, we found that information about current mayors had been fulfilled wrongly in case of several duplications. The overall data quality, e.g., spaces behind the full name, suggested that the database of current mayors had been generated by hand and the author made such mistakes as probably not possessing information about duplications. With the increasing use of data in research, we would like to emphasise the need for a better-managed database, which would also contain information about officials elected in the past.

The information about mayors holding the mandate since 2014 was obtained from the Central Notification Register<sup>10</sup> using a python-based scraper, which the Ministry of Justice operates. The programme was designed to request the information using the municipality’s name together with the keyword “mayor”. Using this method, we collected the following records: name, surname, the type of position in a municipality, and the period during which the official held the mandate. Surprisingly, we managed to get the name of several mayors who were elected to office during the 2010 elections. Unintentionally, we also gathered information about deputy mayors and other officials, who are unfortunately not needed for the research and who again complicate the matching concerning the aforementioned issues. An example of the output from the scraper can be found in Table A.1 in Appendix A. Unluckily, we did not manage to obtain records of all mayors who were elected in 2014. Therefore, we attempted to acquire some of the information on the websites of individual municipalities (for instance, from the archive of the official notice board).

Consequently, based on the approaches described above, we collected observations about all 6 394 mayors elected in 2018, 6 352 mayors out of 6 388 elected in 2014, and 1 032 mayors out of a total of 6 388 elected in 2010. Creating a new

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<sup>9</sup> For example, there are 15 municipalities called Nová Ves, three of which are in the South Bohemian Region.

<sup>10</sup> Centrální registr oznámení; available at: [cro.justice.cz](http://cro.justice.cz)

dataset containing information about past mayors can be viewed as one of the primary tasks of this study, as this data may be helpful in future political research.

### 3.3 Who could be elected as a mayor in 2010

In this study, we focus indirectly on political connections by examining the impact of the change of mayors on the structure of suppliers in individual municipalities. The information about mayors acquired by scraping would allow us only to investigate the change between the 2014 and 2018 elections. As we mostly use the data on public procurement awarded since 2011, we need to include the data on mayors who were elected in 2010. However, the information about these mayors is not publicly available to the best of our knowledge. It would be possible to extract the information by visiting individual websites of all municipalities; nevertheless, this process would be very time consuming and probably unsuccessful as not all municipalities publish this information. We, therefore, decide to estimate who could be elected as a mayor in 2010. For this purpose, we utilise the open data of the Czech Statistical Office on municipal elections<sup>11</sup>, which contains all the necessary information about municipal candidates, political parties, and municipalities, along with the election results themselves. Matching the collected data on mayors with the data on all municipal council members, we obtain additional characteristics such as sex, age, education, previous occupation, number of votes received, political affiliation, number of seats received by corresponding political party, and others. Nevertheless, several municipalities had to be dropped from the final analysis due to the following technicalities preventing the matching: candidates that share both the full name and the place of candidacy and where the information provided on individual municipal websites did not help to assign the candidate; candidates who were not originally elected to the council and were registered as alternates but with some representatives resigning acquired the mandates and had been elected as mayors at the same time; municipalities where a supplementary or new election had been announced. In the latter case, we drop the observations as these are in direct conflict with the assumption that the mayor held the office throughout the whole election term. To omit these municipalities, we use a list provided by the Czech Statistical Office<sup>12</sup> containing references to laws listing new and supplementary elections. Eventually, the sample of mayors is reduced from the

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<sup>11</sup> <https://volby.cz/.opendata/opendata.htm>

<sup>12</sup> For the 2018 elections, we use the state as at September 19, 2020; available at: <https://volby.cz/pls/kv2018/kvs?xjazyk=CZ>, <https://volby.cz/pls/kv2014/kvs?xjazyk=CZ>, <https://volby.cz/pls/kv2010/kvs?xjazyk=CZ> (Accessed: 30 November 2020).

preceding 6 394, 6 352, and 1 032 in 2018, 2014, and 2010 to 6 273, 6 179, and 987, respectively.

Having additional controls, the initial idea was to train logistic regression using observations from 2014 and 2018 to predict mayors elected in 2010 (similarly as in Kushner et al., 2001). After econometric consultation, we depart from this method since it would not be possible to capture changes in the political composition between 2010 and 2018, and the resulting estimates might be, therefore, far from true. Instead, following the example of previous research, we decide to determine mayors based on two simple classifiers: the candidate of the winning political party according to the number of mandates acquired (likewise, Baranek & Titl, 2018; Vitvar, 2020) and the candidate receiving the most votes. Unlike in previous studies, we need to determine mayors in 2010 unequivocally, meaning one mayor per municipality. Therefore, we narrow our specifications as well as the sample of observations as follows. In the case of the mandate's classifier, we limit our samples to municipalities where the elections resulted in a strict victory of exactly one political party based on the number of seats received. From the representatives of this party, we then select the candidate with the best-ranked position on the electoral ballot. In the case of the vote's classifier, we restrict our samples to municipalities where the elections resulted in a strict victory of one candidate based on the number of votes obtained. Additionally, we cannot determine the monitored classifiers for municipalities divided into multiple wards, which are also not included in this analysis.<sup>13</sup> All these adjustments lead to further reductions of examined municipalities, which differ across the classifier and year used. The number of resulting municipalities used is thus attached to individual results.

We evaluate the accuracy of these classifiers using data on mayors collected for the years 2018, 2014, and part for the year 2010, i.e., on those of whose election we are sure about. The accuracy of the mandate's classifier for 2018 and 2014 can be found in Table 3.1 and Table 3.2, respectively.

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<sup>13</sup> These cover, for example, Prague, Lišov, Prague 9. We possess information about all mayors elected in these municipalities and we are thus able to include them in the main empirical part.

**Table 3.1: Accuracy of the mandate’s classifier for 2018**

Year	2018 - Mandates						
	Sample	All	75%	25%	P < 1 000	P >= 1 000	P >= 10 000
<b>Sensitivity</b>		82.64%	82.84%	82.04%	81.87%	84.68%	73.59%
<b>TP</b>		4 237	3 200	1 037	3 043	1 194	117
<b>FP = FN</b>		890	663	227	674	216	42
<b>No. Observ.</b>		51 150	38 444	12 706	29 443	21 707	4 391
<b>No. Mayors</b>		5 127	3 863	1 264	3 717	1 410	159

Source: Author’s calculation based on data from Czech Statistical Office and Ministry of the Interior

Note: The first column summarises the findings for the whole sample. The second and third columns depict the accuracy for the random splits constituting 75% and 25% of the whole sample. Last three columns show the results for subsamples divided according to the size of the population.

The number of mayors is also equal to the number of municipalities examined in the analysis; the number of observations consists of all representatives, including mayors, and is presented solely for informative purposes. True positive (TP) denotes the number of mayors predicted correctly by the classifier; false positive (FP) summarises the number of representatives who are incorrectly classified as mayors; vice versa, false negative (FN) summarises the number of mayors who are incorrectly classified as representatives. Given that we need to determine mayors unequivocally, the number of tested municipalities/mayors is exactly equal to the number of established classifiers. Therefore, the number of FN is identical to the number of FP. That is also why we do not report true negative (TN), i.e., the number of representatives correctly categorised to the representative class, as we do not need to employ these observations. Moreover, if these entries were considered, the results would be biased due to many more representatives than the mayors. Sensitivity, a.k.a. true positive rate a.k.a. recall, depicts the fraction of mayors that are detected by the classifier and equals to precision in our case:

$$Sensitivity = \frac{TP}{TP + FN} = \frac{TP}{TP + FP} = Precision, as FP = FN \quad (3.1)$$

Consequently, sensitivity can be perceived as an indicator of accuracy that evaluates our classifiers.

**Table 3.2: Accuracy of the mandate’s classifier for 2014**

Year	2014 - Mandates					
	All	75%	25%	P < 1 000	P >= 1 000	P >= 10 000
<b>Sensitivity</b>	77.65%	77.68%	77.53%	76.86%	79.77%	72.37%
<b>TP</b>	3 838	2 903	935	2 777	1 061	110
<b>FP = FN</b>	1 105	834	271	836	269	42
<b>No. Observ.</b>	49 648	37 542	12 106	28 965	20 683	4 180
<b>No. Mayors</b>	4 943	3 737	1 206	3 613	1 330	152

Source: Author’s calculation based on data from Czech Statistical Office and Central Notification Register

Note: The first column summarises the findings for the whole sample. The second and third columns depict the accuracy for the random splits constituting 75% and 25% of the whole sample. Last three columns show the results for subsamples divided according to the size of the population.

The results in Table 3.1, summarising the outcome for 2018, shows that the mandate’s classifier estimates correct mayor in 82.64% of cases when using the whole sample. The result remains stable when splitting randomly into sets with the size of 75% and 25%. The accuracy decreases slightly to 81.87% when examining only municipalities with up to 1 000 people. It improves a little to 84.68% when restricting to municipalities with a population of 1 000 inhabitants and more. The latter finding is favourable, as we analyse only contracts of this group in the main part of the research. However, when considering only municipalities with 10 000 inhabitants and more, the accuracy decreases substantially to 73.59%. This finding can be attributable to the political fragmentation that logically grows along with the size of the municipality, with which the number of seats occupied increases. However, the chance of identifying the elected candidate under the increased competition diminishes. Specifically, the average number of elected parties in the smallest municipalities (with fewer than 1 000 people) equals 2.88. In comparison, in larger municipalities (with more than 10 000 inhabitants), it reaches 7.02.

As depicted in Table 3.2, the per cent of correctly predicted mayors further declines to 77.65% for the 2014 elections. Nonetheless, the trend in accuracy across different samples persists. That is, the accuracy stays almost unchanged when dividing the whole sample randomly into two sets, slightly reduces for municipalities with a maximum of 999 inhabitants (76.86%), increases again for municipalities having 1 000 inhabitants or more (79.77%), and declines sharply for the last group (72.37%).

The vote’s classifier results for the 2018 and 2014 elections are presented in Table 3.3 and Table 3.4, respectively.

**Table 3.3: Accuracy of the vote's classifier for 2018**

Year	2018 - Votes						
	Sample	All	75%	25%	P < 1 000	P >= 1 000	P >= 10 000
<b>Sensitivity</b>		61.80%	61.39%	63.06%	59.94%	67.33%	62.78%
<b>TP</b>		3 843	2 870	973	2 788	1 055	113
<b>FP = FN</b>		2 375	1 805	570	1 863	512	67
<b>No. Observ.</b>		60 682	45 428	15 254	36 488	24 194	4 950
<b>No. Mayors</b>		6 218	4 675	1 543	4 651	1 567	180

Source: Author's calculation based on data from Czech Statistical Office and Ministry of the Interior

Note: The first column summarises the findings for the whole sample. The second and third columns depict the accuracy for the random splits constituting 75% and 25% of the whole sample. Last three columns show the results for subsamples divided according to the size of the population.

As can be observed, the accuracy of the classifier declines considerably compared to the mandate's method. Namely, the classifier correctly predicts only 61.80% and 58.70% of mayors elected in 2018 and 2014, in this order. The trend in accuracy across examined subsamples remains similar to the mandate's method in both years. Despite its lower ability to predict, the advantage of this classifier is that it includes even the smallest municipalities, where only independent candidates, i.e., those without political affiliation, stand as candidates for the mayor. These records are primarily excluded from the mandate's classifier as it is not possible to determine the winning one unambiguously. Secondly, it also covers cases where elections end in a draw with the victory of two or more political parties. As a result, the vote's classifier inspects more municipalities than the mandate's one.

**Table 3.4: Accuracy of the vote's classifier for 2014**

Year	2014 - Votes						
	Sample	All	75%	25%	P < 1 000	P >= 1 000	P >= 10 000
<b>Sensitivity</b>		58.70%	58.34%	59.80%	56.81%	64.36%	57.06%
<b>TP</b>		3 593	2 690	903	2 607	986	101
<b>FP = FN</b>		2 528	1 921	607	1 982	546	76
<b>No. Observ.</b>		60 189	45 225	14 964	36 357	23 832	4 838
<b>No. Mayors</b>		6 121	4 611	1 510	4 589	1 532	177

Source: Author's calculation based on data from Czech Statistical Office and Central Notification Register

Note: The first column summarises the findings for the whole sample. The second and third columns depict the accuracy for the random splits constituting 75% and 25% of the whole sample. Last three columns show the results for subsamples divided according to the size of the population.

Finally, we evaluate both classifiers using collected mayors for 2010, of which the findings are presented in Table 3.5 and Table 3.6. The overall accuracy decreases compared to 2018 and 2014: 69.92% and 54.49% for the mandate's and vote's classifiers, in this order, when using the primary samples. Nevertheless, we should not

forget that we analyse a much smaller sample of data than in previous years. Improvements and deteriorations in accuracy remain unchanged across different subsamples. Regarding the data used in the empirical part, the key remains the accuracy for the sample, including municipalities with more than 999 inhabitants where a slight increase can be observed: 72.03% (mandate's) and 58.97% (vote's).

Considering the pros and cons mentioned above, we decide to use both classifiers to determine mayors who could be elected in 2010. Therefore, we obtain 4 154 (mandate's) and 4 937 (vote's) of potential candidates to the already scrapped data on 987 mayors, who are further examined in the next part of this thesis.

**Table 3.5: Accuracy of the mandate's classifier for 2010**

<b>Year</b>	<b>2010 - Mandates</b>					
<b>Sample</b>	<b>All</b>	<b>75%</b>	<b>25%</b>	<b>P &lt; 1 000</b>	<b>P &gt;= 1 000</b>	<b>P &gt;= 10 000</b>
<b>Sensitivity</b>	69.92%	69.61%	70.85%	69.02%	72.03%	64.29%
<b>TP</b>	551	410	141	381	170	18
<b>FP = FN</b>	237	179	58	171	66	10
<b>No. Observ.</b>	8 321	6 230	2 091	4 579	3 742	771
<b>No. Mayors</b>	788	589	199	552	236	28

Source: Author's calculation based on data from Czech Statistical Office and Central Notification Register

Note: The first column summarises the findings for the whole sample. The second and third columns depict the accuracy for the random splits constituting 75% and 25% of the whole sample. Last three columns show the results for subsamples divided according to the size of the population.

**Table 3.6: Accuracy of the vote's classifier for 2010**

<b>Year</b>	<b>2010 - Votes</b>					
<b>Sample</b>	<b>All</b>	<b>75%</b>	<b>25%</b>	<b>P &lt; 1 000</b>	<b>P &gt;= 1 000</b>	<b>P &gt;= 10 000</b>
<b>Sensitivity</b>	54.49%	53.96%	56.09%	52.61%	58.97%	48.49%
<b>TP</b>	504	375	129	343	161	16
<b>FP = FN</b>	421	320	101	309	112	17
<b>No. Observ.</b>	9 669	7 167	2 502	5 352	4 317	892
<b>No. Mayors</b>	925	695	230	652	273	33

Source: Author's calculation based on data from Czech Statistical Office and Central Notification Register

Note: The first column summarises the findings for the whole sample. The second and third columns depict the accuracy for the random splits constituting 75% and 25% of the whole sample. Last three columns show the results for subsamples divided according to the size of the population.

### 3.4 Characteristics of political representatives

In the previous subsections, we documented the process of collecting data for mayors. In this part, we explore the gathered data for the 2018 elections and describe demographic differences between mayors, representatives, and candidates. We partly extend Palguta (2017) study, in which he focused on the description of the election outcomes in 2014, as we provide additional evidence to support his results. Tables 3.7, 3.8, and 3.9 summarise the findings for electoral candidates, representatives, and elected mayors, in this order.

Firstly, the proportion of candidates who acquired an academic degree or equivalent in the past equals 29.24% regardless of the size of the municipality. The elections lead to a further positive selection in higher education, both at the level of representatives (36.57%) and at the level of elected mayors (38.02%). Secondly, mayors are, on average, less than three years older than all representatives and non-elected candidates. Thirdly, women are generally less successful in elections: only 33.22% of all candidates are women and their representation further declines both in the council (27.97%) and in the mayor's position (25.54%).

Considering the size of the municipality, we can observe that the number of university-educated individuals increases with the population at all three levels studied. As demonstrated in Table 3.9, the largest ratio can be seen in the case of mayors, i.e., between 81% and 100% for municipalities with more than 10 000 inhabitants. On the contrary, there are merely 29.94% educated mayors in the smallest municipalities (less than 1 000 people). As already mentioned by Palguta (2017), the insufficient number of educated candidates in smaller municipalities can be caused by distinct courses of the elections. Specifically, the competition is more anonymous in larger cities, and voters are often forced to decide based on education, occupation, age, or previous experience. At the same time, in smaller villages, it can be possible for voters to elect based on the personal knowledge of the candidate. Finally, all the above conclusions are in accordance with the findings of Palguta (2017), who conducted a similar analysis using the data for the 2014 elections. We can thus conclude that the characteristics of candidates, representatives, and mayors remain, more or less, unchanged over time.

**Table 3.7: Candidates' characteristics according to the size of the municipality, the 2018 elections**

Year	All candidates in 2018						
Sample	All	P < 1 000	1 000-3 000	3 000-10 000	10 000-50 000	50 000-150 000	P > 150 000
Degree	29.94%	20.17%	29.41%	34.29%	40.37%	42.71%	46.73%
Age	46.98	45.51	46.82	48.47	48.49	47.47	47.10
Female	33.22%	31.76%	33.28%	34.34%	34.18%	35.80%	32.59%
No. Observ.	213 962	74 894	48 901	39 145	34 409	12 603	4 010

Source: Author's calculation based on data from Czech Statistical Office and Ministry of the Interior

**Table 3.8: Representatives' characteristics according to the size of the municipality, the 2018 elections**

Year	Elected candidates in 2018						
Sample	All	P < 1 000	1 000-3 000	3 000-10 000	10 000-50 000	50 000-150 000	P > 150 000
Degree	36.57%	24.74%	45.02%	60.58%	70.71%	74.75%	79.28%
Age	47.06	46.33	47.60	49.05	49.30	46.93	45.13
Female	27.97%	29%	27.39%	26.48%	23.25%	25.25%	24.32%
No. Observ.	61 122	36 859	13 080	6 200	3 656	1 105	222

Source: Author's calculation based on data from Czech Statistical Office and Ministry of the Interior

**Table 3.9: Mayors' characteristics according to the size of the municipality, the 2018 elections**

Year	Elected mayors in 2018						
Sample	All	P < 1 000	1 000-3 000	3 000-10 000	10 000-50 000	50 000-150 000	P > 150 000
Degree	38.02%	29.94%	54.71%	72.78%	84%	81.48%	100%
Age	49.82	49.68%	50.38	50.44	50	45.33	43.75
Female	25.54%	26.86%	24.10%	17.22%	16%	14.81%	25%
No. Observ.	6 273	4 703	1 029	360	150	27	4

Source: Author's calculation based on data from Czech Statistical Office and Ministry of the Interior

# 4 Data and Methodology

This chapter provides the overview of the data sources together with corresponding descriptive figures, describes the methodological approaches and their limitations, and presents the final merged dataset, which is created for the main empirical part.

## 4.1 Data

Primary data for this analysis consists of municipal procurement contracts and information about elected mayors, which was extracted from several different sources. The process of collecting data on mayors is described in detail in Chapter 3. This section focuses more on public procurement data and the legislative basis regulating the awarding process. This data is then converted to metrics that constitute the explained variables in the final models used to estimate the effects of elections. Additionally, we shortly delineate the final data on mayors together with their exchanges between individual elections. Final data sets of public procurement and mayoral changes are merged and accompanied by the population and regional affiliation. We are grateful to Datlab for providing part of the data on public procurement.

### 4.1.1 Public procurement

The allocation of public procurement in the Czech Republic is currently regulated by Act No. 134/2016 Coll. on Public Procurement (134/2016 Sb. Zákon o zadávání veřejných zakázek), which implemented three European Directives approved in 2014.<sup>14</sup> This Act specifies three procurement regimes that are determined based on their estimated value excluding VAT: above-threshold, below-threshold, and small-scale public contracts. The financial limit for the first two categories varies depending on the contracting authority and the contract itself. In contrast, the financial limit for small-scale contracts is set uniformly, i.e., contracts whose estimated value is equal to

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<sup>14</sup> Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement; Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport, and postal services sectors; Directive 2014/23/EU of the European Parliament and of the Council of 26 February 2014 on the award of concession contracts Text with EEA relevance.

or lower than CZK 2 000 000 for a public supply contract or a public service contract, or CZK 6 000 000 for a public works contract. These categories further differ in the types of procurement procedures which can be used in the awarding process. Currently, there are nine procurement procedures, each having distinct conditions concerning the announcement, the number of allowed tenderers, and the overall development.<sup>15</sup>

Information about public procurement is accessible to the public in the Information System on Public Contracts (ISPC).<sup>16</sup> The contracting authority is obliged to use procurement procedures and thus publish information in the ISPC to award above and below-threshold contracts, with some exceptions. Nonetheless, this obligation does not apply to small-scale contracts, which are published in the ISPC only voluntarily. Consequently, the number of procurement contracts officially monitored by both the Ministry and the public decreases, which should be considered when conducting empirical research.

Data about municipal public procurement awarded between 2006 and 2019 was provided by Datlab, which regularly collects and cleans data from the ISPC. Despite their high quality, technical steps and hand adjustments must be performed. The cleaned database contained initially 313 609 observations of public procurement administered by all Czech contracting authorities. In this list, a contractor is identified by a name and an identification number (IČO). We select municipal contracts based on the name of the contracting authority to which we subsequently assign their municipality code, which is further used for the matching purposes in this study (see Chapter 3.2). Assigning the corresponding municipality code is more difficult because of the above-mentioned duplications, i.e., municipalities that share the same name and a location in the same region. To identify these municipalities, we first find the address of a municipality based on the IČO; second, we assign the appropriate district to match the relevant municipality code using Google Maps. By retaining only tenders administered at the municipal level, the number of records decreases substantially to 54 225. As we examine the structure of suppliers and its changes over time in consequence of the elections, we initially decided to focus only on municipalities with

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<sup>15</sup> The Act No. 134/2016 Coll. defines 9 procurement procedures, namely, below-threshold procedure, open procedure, restricted procedure, negotiated procedure with prior publication, negotiated procedure without prior publication, competitive dialogue, innovation partnership, concession procedure, or procedure to award a public contract in the simplified regime.

<sup>16</sup> Informační systém o veřejných zakázkách; available at: [http://www.isvz.cz/ISVZ/Podpora/ISVZ\\_open\\_data\\_vz.aspx](http://www.isvz.cz/ISVZ/Podpora/ISVZ_open_data_vz.aspx)

at least 1 000 inhabitants. Exceptions are municipalities having the state of a city that are retained regardless of population size.<sup>17</sup> The reason for this omitting is that smaller municipalities rarely participate in the public procurement tenders during the observed period (less than five contracts). Moreover, we are forced to drop observations that do not contain a contract price, bidder identification number (IČO), and award date of a contract, as these entries are needed in the final analysis. Where possible, we substitute the missing final price with the estimated price of a contract. Consequently, the original dataset shrinks to 39 614 observations, which carry all the necessary information about municipal procurement contracts. Additionally, we decide to extend the study by including public procurement awarded in 2020, which is obtained directly from the open data of ISPC. The initial number 46 453 of uncleaned records is processed following the cleaning procedures described above to yield the final 2 692 entries.

The pre-final dataset contains 42 306 municipal contracts awarded by 1 508 different municipalities between July 7, 2006, and December 31, 2020. These were supplied by 6 772 different companies, and their total value amounts to CZK 602.78 billion. Figure 4.1 compares the number of contracts against the average value of procurement supplied between 2011 and 2020, which are primarily utilised years in the final part of the research.

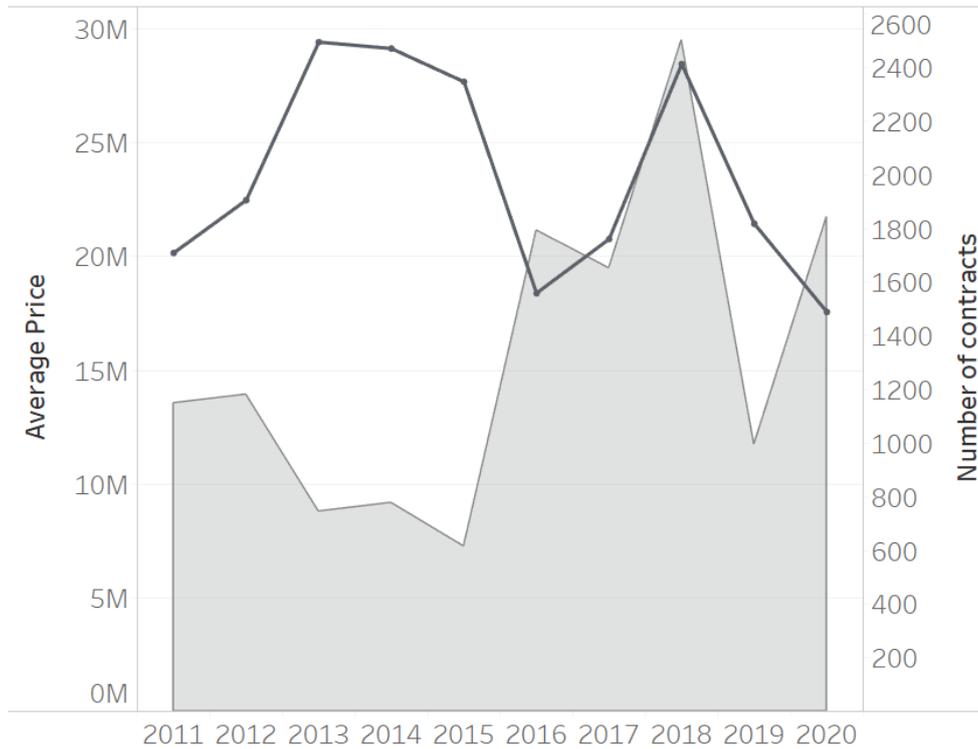
We can observe a gradual decrease in the average value of procurement in the first years, reaching its average minimum of CZK 7 million in 2015, probably due to austerity measures imposed in response to the European debt crisis. Contrarily, the number of awarded contracts grew during this period, indicating that the municipalities placed mostly low-value procurement. Both variables had been increasing from 2016 until 2018, where the average value of procurement reaches its maximum of almost CZK 30 million. After 2018, both indicators began to decline, following the slowdown in industrial production and the effects of the COVID-19 pandemic.

Further descriptive statistics summarising the dataset according to corresponding regions can be found in Table A.2 in Appendix A. The largest contractors based on the number of tenders are municipalities pertaining to Moravian-Silesian Region (6 235 contracts), Central Bohemian Region (4 826 contracts), and Prague (4 618 contracts). Their value together reaches almost half of the total value of the inspected municipal procurement (approximately CZK 300 billion).

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<sup>17</sup> The list of Czech cities is extracted from Wikipedia; available at: [https://cs.wikipedia.org/wiki/Seznam\\_m%C4%9Bst\\_v\\_%C4%8Cesku](https://cs.wikipedia.org/wiki/Seznam_m%C4%9Bst_v_%C4%8Cesku) (Accessed: 31 March 2021).

**Figure 4.1: Comparison of the number of contracts and their average price**



Source: Author based on data from ISPC

Note: Average Price area (on the left) is reported in CZK million. The line constitutes the number of supplied contracts (on the right).

### 4.1.2 Election data

As mentioned before, in this study, we explore the existence of political connections using municipal elections and the associated changes in political governance. Specifically, we focus on changes in the office of mayors between 2010 and 2020. Data about mayors serving in the office since 2018 was obtained from the open data of the Czech Ministry of the Interior; information about mayors elected in 2014 and part of mayors elected in 2010 was gathered from the Central Notification Register using a python-based scraper; the rest of representatives elected as mayors in 2010 was determined using two classifiers: the elected candidate with the highest rank on the ballot of the winning party in the municipality (mandate’s classifier) and the candidate with the largest number of votes acquired in the municipality (vote’s classifier). See Chapter 3.2 and Chapter 3.3 for more details on the data collection process and determination of mayors elected in 2010.

We manage to collect information about 6 273, 6 179, and 5 141 (mandate’s classifier)/5 924 (vote’s classifier) mayors elected in 2018, 2014, and 2010, respectively. Table 4.1 presents the number of municipalities, divided according to

population size, where the mayor changed or remained the same between the elections held in 2010, 2014, and 2018. These two groups represent the treatment and control groups in the final specifications. As can be seen, the number of observed municipalities declines due to the reduced intersection of observations between individual elections.

**Table 4.1: Changes in the office of mayor between 2010 and 2018**

Period / Sample	All	up to 1 000	1 000- 3 000	3 000- 10 000	10 000- 50 000	50 000- 150 000	more than 150 000	more than 1 000
<b>2018 elections</b>								
Changed	1 638	1 181	259	105	72	19	2	457
Same	4 381	3 284	758	253	76	8	2	1 097
Total	6 019	4 465	1 017	358	148	27	4	1 554
<b>2014 elections (M)</b>								
Changed	2 050	1 514	324	126	65	18	3	536
Same	2 901	2 099	564	174	54	10	0	802
Total	4 951	3 613	888	300	119	28	3	1 338
<b>2014 elections (V)</b>								
Changed	2 806	2 072	447	178	85	20	4	734
Same	2 887	2 110	536	176	56	9	0	777
Total	5 693	4 182	983	354	141	29	4	1 511

Source: Author's calculation based on data from Czech Statistical Office, Ministry of the Interior, and Central Notification Register

Note: The label M (V) denotes the mandate's (vote's) classifier.

It can be observed that practically half of the mayors changed after the 2014 elections, which corresponds to the changes in political composition. Specifically, the strengthening of minor parties and establishing and subsequent entry of new political parties into politics (e.g., ANO, Pirates, STAN, TOP 09), which competed with more traditional parties (such as ČSSD, KDU-ČSL, KSČM, ODS). Based on the mandate's classifier, a new mayor was elected in 2 050 municipalities, while in 2 091 municipalities, the same mayor was re-elected. Counts are relatively balanced in the vote's classifier, i.e., 2 806 new mayors, 2 887 old mayors; however, it should not be left out that the vote's classifier can estimate more mayors and thus evaluates a different sample. As explained before, the data on mayors elected in 2010 were mostly estimated, and their reliability thus largely depends on the accuracy of the used classifier. The findings further indicate that the political composition remained relatively unchanged after the 2018 elections, namely, 4 381 re-elected mayors to 1 638 replaced mayors. Additionally, the proportion of newly elected mayors to the re-elected ones is generally higher in municipalities with a larger population.

As explained before, we are only interested in municipalities with 1 000 or more inhabitants, which reduces the number of examined municipalities to 1 554 in 2018; 1 338 and 1 511 in 2014, the latter for the mandate's and vote's classifier, respectively. Finally, we collect other characteristics of municipalities from the open data of the Czech Statistical Office. These include the municipality's size and regional affiliation as these variables further enter the final analysis.

### 4.1.3 Measures of the structure of suppliers

To ascertain the impact of mayoral exchanges on the distribution of public procurement, we need to set reliable variables capturing the structure of suppliers. We collected data for public procurement awarded between 2006 and 2020; nonetheless, we exploit primarily contracts that have been concluded since 2011. Similarly to Vitvar (2020), we investigate whether the change in municipal governance is associated with the entry of new firms into the procurement market. Accordingly, we define the ratios of new firms as follows:

$$NR_T = \frac{\sum_{it} \text{new suppliers}_{it}}{\sum_{it} \text{all suppliers}_{it}} \quad (4.1)$$

$$VR_T = \frac{\sum_{it} \text{value of } PP_{it} \text{ (new suppliers)}}{\sum_{it} \text{value of } PP_{it} \text{ (all suppliers)}} \quad (4.2)$$

where  $T$  stands for the year or period after the elections, depending on the specification used. These periods, however, begin in the years following the elections, namely in 2015 and 2019, respectively, as we decide not to specify the period following the elections with an accuracy of months. There are two main reasons for this simplification. First, it takes some time to award a procurement contract; we calculate 4.96 months, on average, from the available data. Second, the regular municipal elections are held at the end of the year, usually in October, and an additional time span arises until the appointment of a new mayor.

Supplier in the  $i^{th}$  municipality is classified as *new* if and only if it did not sign any contract in the same municipality during the previous election period, i.e., four years before the examined period. Thus, for example, for the period after the 2018 elections ( $T = 2018$ ), in the  $i^{th}$  municipality, a contractor is considered as *new* for the years 2019 and 2020 (available data) if and only if it did not supply any procurement between 2015 and 2018 in this same municipality; likewise for the election period after 2014 and 2010. The first ratio,  $NR_T$  (new rate), counts the number of all new relative to all suppliers in the  $i^{th}$  municipality in a year or period  $t$ , depending on the model

selection (see Chapter 4.2). The other measure,  $VR_T$  (value rate), then summarises the total value of obtained procurement associated with those *suppliers*.

Another way to define the proportion would be to include the count of all suppliers in all municipalities (or the value of corresponding contracts) at time  $t$  in the denominator. Using these ratios, it would be possible to capture the situation at the municipal market throughout time. Nevertheless, we depart from these specifications since we predominantly aggregate data over time, and denominators would be equal to the same number in all cases, having no additional value. On the other hand, these measures would be more suitable for the cases where the number of new firms equals the number of all firms in the municipality. Both  $NR_T$  and  $VR_T$  are then equal to one, which is typical for smaller municipalities awarding fewer contracts than the biggest ones.

## 4.2 Methodology

Previous research has already indicated the existence of political connections in the Czech Republic. This evidence has also pointed to public procurement as a possible channel where the rent-extraction can be made. Palanský (2014) and Navrátilová (2018) already demonstrated that donating firms supplied procurement of higher value compared to their non-donating peers, examining the contracts signed at the regional and governmental levels, respectively. In this study, however, we explore public procurement administered at the municipal level with the aim to focus on less monitored administration units. Instead of directly analysing the effect of political connections, following the example of these studies, we focus on the impact of changes in municipal governance. Therefore, in this Chapter, we describe the methods which are designed to achieve this goal.

Existing literature has further suggested that political connections are most beneficial when established with entities being in power (Faccio, 2006; Goldman et al., 2013; Khwaja & Mian, 2005). For this reason, we direct our study at the changes in the office of mayors, as constituting the highest representative of the municipal administration. Changes in mayors thus serve as a proxy variable for the changes in governance. If any relations are established between the companies and mayors or other representatives of the governing entity represented by the mayor, the structure of suppliers would change together with the change in municipal leadership. On the contrary, if there do not exist any political relations in the procurement market, the

structure of suppliers should not be altered by the election outcomes. Accordingly, we formulate and evaluate the following hypothesis:

*Hypothesis: A change in municipal governance, on average, leads to a change in the municipal structure of suppliers.*

Testing for this hypothesis, we pursue to answer the following questions: Does a change of mayor increase the number of new suppliers in a municipality? Do newly entering companies supply contracts of higher value in municipalities where mayors changed than in those where they stayed unchanged? In other words, we hypothesise that the election of a new mayor caused more new companies to enter municipal tenders.

We assess the hypothesis using the data for two periods following the 2014 and 2018 elections, and we specify two methodological approaches, both defined at the municipal level. In the first section, we employ a method similar to the event study specification. This approach enables us to analyse both periods together irrespective of the elections' timing. We then focus on the potential impact of changes in mayors on municipal suppliers one year after the elections. Conversely, in the second section, we examine each election term separately, taking into account different political spectra after 2014 and 2018. We apply the cross-sectional analysis as we summarise the data on procurement for each municipality over time. The empirical models used partially proceeds from the study of Vitvar (2020)

#### 4.2.1 Event study and Pooled models

In this section, we assess the general effect of elections for both terms together, regardless of the year in which they took place. Specifically, we explore the whole period between 2011 and 2020. As described before, we transform the procurement data into ratios measuring the number of new suppliers entering the market after the 2014 (2018) elections. Before doing so, we reduce our sample to the municipalities which contracted at least one procurement in each of the years between 2011 and 2020. The main reason for this restriction is that we focus on the development of suppliers over time in this part, and there is no point to include municipalities that awarded procurement only a few times per period (usually smaller municipalities with less than 10 000 inhabitants). In such a case, we are more likely to misidentify new suppliers; for example, in a municipality that awarded contracts in 2012, 2013 and 2016 to distinct entities, a supplier from 2016 is automatically considered new, i.e., potentially connected to the mayor. However, from an economic point of view, it may be an

independent firm, as the contract could concern an item that any of the previous companies could not supply. We delineate more the process of merging and final adjusting of the merged data in Chapter 4.3.

Secondly, we identify new and old suppliers over these periods based on the definitions described before. We then separate the period into two terms between 2011 and 2017 and between 2015 and 2020. By doing so, we obtain observations for three years before and three or two years after the elections, for the 2014 and 2018 elections, in this order. As in the event study design, we combine these periods into one axis by assigning unified labels to individual years. That is the range starting in year -3, through the year 0 constituting the elections in 2014 and 2018, and ending in years 3 and 2, depending on the elections. Next, we join these samples with the data on mayors, dividing municipalities into two groups based on whether the mayor changed (treatment) or stayed the same (control). As in the event study, we plot rates for treatment vs control groups in the years before and after the elections.

Finally, we merge these periods to create artificial panels, hence having two observations per municipality. To estimate the impact of mayoral change, we concentrate on year one after the elections. More precisely, the equations are specified as below:

$$NR\_1 = \beta_0 + \beta_1 Mayor\_P + \beta_2 Pop\_P + \sum_{j \in \{3, \dots, 15\}} \beta_j Region + \mu \quad (4.3)$$

$$VR\_1 = \beta_0 + \beta_1 Mayor\_P + \beta_2 Pop\_P + \sum_{j \in \{3, \dots, 15\}} \beta_j Region + \mu \quad (4.4)$$

where  $NR\_1$  and  $VR\_1$  comprise the new and value rates one year after the elections, i.e., in 2015 or 2019. Specifically,  $NR\_1$  is the ratio of new to all suppliers, while  $VR\_1$  constitutes the corresponding value of supplied procurement. Unlike in the subsequent models, suppliers can be considered new irrespective of when they received the first contract since we examine only the first year. Furthermore, the main variable of interest,  $Mayor\_P$ , constitutes a dummy variable that equals 1 if a mayor was exchanged in a municipality due to the elections, and 0 otherwise. The elections and personal characteristics of mayors are assumed to be exogenous and thus should not be correlated with the error term. For all the equations, we perform the estimation twice based on the method used to identify mayors elected in 2010 (the mandate's and vote's classifiers). Additionally, a municipality fixed effect is controlled by the continuous variable  $Pop\_P$ , which includes the number of inhabitants in 2014 or 2018, depending

on the elections. It thus serves as a proxy variable for the municipality's size. Finally, we include information about the region in which the municipality is located. This is added to the model as 14 binary variables sorting municipalities to their corresponding region, except for the Central Bohemian Region, which is excluded to avoid the dummy variable trap.

We use the ordinary least squares method (OLS) to estimate these specifications. Where needed, the heteroskedasticity-robust standard errors are employed when either the White test or Breusch-Pagan test suggests the presence of heteroskedasticity. We abandon the fixed effects method for the following reasons. First, we control the fixed effects partially by including the controls of size and region. Second, this method is not suitable for the cases where the primary explanatory variable is binary, taking only values 0 and 1. Third, we do not have any time-changing variables at our disposal.

#### 4.2.2 Cross-section models

In the basic cross-section models, we explore the periods following the 2014 and 2018 elections separately. That is the period between 2015 and 2018 and the period between 2019 and 2020. Nonetheless, this time we aggregate the data on procurement over these periods, obtaining a single observation per municipality. As before, we further convert the data to ratios designed to measure the count of new suppliers and the value of procurement granted to these companies. There are several reasons for this aggregation. Firstly, regarding the time series angle, it would be more complicated to define when the supplier should be considered new; for instance, a new contractor supplied procurement in both 2019 and 2020. Secondly, we do not manage to collect other time-changing variables except for the population. Thirdly, we initially thought this would allow us to include smaller municipalities in the analysis this time. However, when forming the final data set for the models, we find that for smaller municipalities, there is a large proportion of cases where the count of new suppliers equals the count of all suppliers in the municipality. For instance, for the period after the 2018 elections, this is the case of 582 municipalities out of 805 small municipalities (less than 10 000 inhabitants). That means that the ratios  $NR$  and  $VR$  are equal to 1, which reduces the overall variability of the sample and thus prevents the use of these observations. Considered together with the difficulties described above, we are again forced to use only municipalities which contracted at least one procurement in each of these years. We then construct the following specifications to estimate the effect of the 2018 elections:

$$NR_8 = \beta_0 + \beta_1 Mayor_8 + \beta_2 Pop_8 + \sum_{j \in \{3, \dots, 15\}} \beta_j Region + \mu \quad (4.5)$$

$$VR_8 = \beta_0 + \beta_1 Mayor_8 + \beta_2 Pop_8 + \sum_{j \in \{3, \dots, 15\}} \beta_j Region + \mu \quad (4.6)$$

where  $NR_8$  and  $VR_8$  are the explained variables representing measures of new suppliers. Observations for these ratios are aggregated over 2019 and 2020. The main observed explanatory variable  $Mayor_8$  is a dummy variable, taking a value of 1 if a new mayor was elected in the 2018 elections compared to the state after the 2014 elections, and 0 otherwise. Furthermore, a municipality fixed effect is controlled by the continuous variable  $Pop_8$ , representing the population in 2018. The rest of the controls are unchanged. Similarly to the previous models, we use the OLS estimation with heteroskedasticity robust errors, if needed, to estimate the effect of elections. The aggregation of observations as well as the consequent usage of the OLS is a common approach employed in Czech studies, given the nature of available data (Navrátilová, 2018; Palanský, 2020; Špolc, 2017).

We proceed similarly to the previous case to estimate the effect of the 2014 elections. Specifically, we summarise the data on procurement following the elections between 2015 and 2018; we convert these to the ratios measuring the count of new suppliers; we reduce our sample to municipalities distributing at least one procurement each year between 2011 and 2020. The main difference is that we estimate the models twice due to the twofold determination of mayors elected in 2010 based on the mandate's and vote's classifiers. Therefore, we have two samples determining the change of mayor between 2010 and 2014. We define the exact model specifications as in equations 4.5 and 4.6 to evaluate the effect of the 2014 elections:

$$NR_4 = \beta_0 + \beta_1 Mayor_4 + \beta_2 Pop_4 + \sum_{j \in \{3, \dots, 15\}} \beta_j Region + \mu \quad (4.7)$$

$$VR_4 = \beta_0 + \beta_1 Mayor_4 + \beta_2 Pop_4 + \sum_{j \in \{3, \dots, 15\}} \beta_j Region + \mu \quad (4.8)$$

where  $NR_4$  and  $VR_4$  represent the dependent variables comprising the ratios of new firms, which are established based on data for procurement between 2011 and 2014. We are mainly interested in the coefficient on  $Mayor_4$ , whose sign confirms or rejects our hypothesis. As before,  $Mayor_4$  is a binary indicator that equals 1 if there was a change in the mayor's office compared to the state in 2010, and 0 otherwise. We further

include the size of the population, *Pop\_4*, a municipality had in 2014. The rest of the independent variables remain the same. Finally, the OLS accompanied by robust-standard errors, where the heteroskedasticity is confirmed, is utilised to estimate models 4.7 and 4.8.

### 4.2.3 Methodology limitations

Considering the subsequent results, we should consider possible drawbacks of our methodological approaches. First, regarding the changes in municipal governance, we would like to point to the assumption that mayors hold their mandate throughout the whole term of office. This assumption is critical in cross-section models, where we summarise the data for the whole period. In the real world, however, this presumption may not always be met. We attempt to approach this assumption by omitting the municipalities where a new election was announced. Secondly, we should remind that mayors elected in 2010 are estimated based on mandate's and vote's classifiers. Therefore, the quality of this data highly depends on classifiers' accuracy, which is, unfortunately, declining retrospectively over time. In the final analysis, we are forced to examine only the municipalities awarding procurement each year between 2011 and 2020. Theoretically, we could have attempted to find mayors for this small sample using the data on municipalities' websites; regrettably, this information is unavailable for all municipalities.

Regarding the data on public procurement, we should note that we do not possess all the data related to municipal contracts. Namely, there is no obligation to publish information related to small-scale contracts, and most of this data is thus inaccessible to the public. Moreover, we were forced to drop procurement lacking the information about suppliers (IČO), price and award date of the contract. Unfortunately, we do not know whether this data is missing by chance or unfulfilled intentionally to hide crucial information, which could bias our results.

Concerning the empirical approaches, we acknowledge that the analysis is conducted using a smaller number of observations, i.e., the basic sample of 196 municipalities, which is further reduced in individual models due to missing information about elected mayors. Unluckily, we are unable to extend the sample as we already use the population data. On the other hand, we explore only the largest municipalities, predominantly cities with more than 10 000 inhabitants, which is more reasonable from an economic point of view. Finally, we again recall the main advantage of our method. By examining the existence of connections instead of

specifying them directly, we avoid potential problems with biased estimates resulting from the impossibility of capturing all the connections mayors can maintain over time.

### 4.3 Final data set

After specifying empirical equations, we can prepare the data for the final analysis. Namely, each model requires a distinct set of data points. As emphasised before, our models are specified at the municipal level, i.e., each cross-sectional observation represents an individual municipality. We inspect the situation after the 2014 and 2018 elections, for which we need to utilise the data summarising two changes in the mayor's office. We use predominantly the data on public procurement awarded between 2011 and 2020, except for the event study figures where we employ information about procurement since 2007 to distinguish new from old companies (those that received procurement in the previous period) concluding contracts between 2011 and 2014.

We further drop municipalities to retain only those which administered at least one procurement each year between 2011 and 2020 to focus on the most prominent units granting procurement frequently. This reduces our sample dramatically from 1 507 (having more than 1 000 inhabitants) to 196 municipalities. On the other hand, these entities announced more than half of the inspected procurement – the number of awarded contracts since 2007 is lowered from 40 944 to 25 929. Consequently, only cities, statutory cities and their districts enter the final analysis (mostly having more than 10 000 inhabitants). After constructing corresponding measures of the structure of suppliers per each model and merging these with the data on municipal governance, we have final data sets prepared for the empirical part. We present basic descriptive statistics in Table 4.2 and Table 4.3 for the mandate's and vote's classifier, respectively.

**Table 4.2: Summary table of a municipality data set, mandate’s classifier**

Statistic	N	Mean	St. Dev.	Min	Max	Mncp.	Mayor changed	Mayor same
NR	2 132	0.724	0.255	0	1	164 x 13	165	163
VR	2 132	0.685	0.316	0	1	164 x 13	165	163
NR_1	328	0.655	0.266	0	1	164 x 2	165	163
VR_1	328	0.616	0.326	0	1	164 x 2	165	163
Pop_P	328	30 457	43 584	1 666	379 527	164 x 2	165	163
NR_4	165	0.762	0.117	0.375	1	165	87	78
VR_4	165	0.673	0.216	0.125	1	165	87	78
Pop_4	165	30 467	43 529	1 666	377 508	165	87	78
NR_8	192	0.716	0.174	0	1	192	91	101
VR_8	192	0.635	0.276	0	1	192	91	101
Pop_8	192	28 764	42 120	1 685	379 527	192	91	101

Note: Column “Mncp.” represents the number of municipalities used in the analysis. Columns “Mayor changed” and “Mayor same” stands for the number of municipalities in which the mayor changed/stayed the same. Mandate’s classifier is used to determine mayors elected in 2010.

As can be seen, the number of observed municipalities decreases in all models from the original 196 after merging the ratios with the information on mayoral changes. The first two lines comprise a sample used in the event study figures, i.e., 164 municipalities recorded in two periods: between 2011 and 2017 and between 2015 and 2020 (164 municipalities throughout 13 years). Variables *NR\_1*, *VR\_1*, and *Pop\_P* correspond to the pooled models (each municipality is recorded twice); the rest of the variables is created for the cross-section models. Variables constructed for the cross-section model after the 2018 elections are not again listed in Table 4.3 as we use neither mandates nor votes to identify mayoral change between 2014 and 2018.

**Table 4.3: Summary table of a municipality data set, vote’s classifier**

Statistic	N	Mean	St. Dev.	Min	Max	Mncp.	Mayor changed	Mayor same
NR	2 444	0.724	0.255	0	1	188 x 13	180	196
VR	2 444	0.685	0.316	0	1	188 x 13	180	196
NR_1	376	0.648	0.274	0	1	188 x 2	180	196
VR_1	376	0.612	0.329	0	1	188 x 2	180	196
Pop_P	376	29 061	42 449	1 666	379 527	188 x 2	180	196
NR_4	189	0.759	0.122	0.375	1	189	87	102
VR_4	189	0.668	0.223	0.125	1	189	87	102
Pop_4	189	29 074	42 377	1 666	377 508	189	87	102

Note: Column “Mncp.” represents the number of municipalities used in the analysis. Columns “Mayor changed” and “Mayor same” stands for the number of municipalities in which the mayor changed/stayed the same. Vote’s classifier is used to determine mayors elected in 2010.

We are also forced to drop the capital Prague from all models due to its extreme population, which has more than one million inhabitants. The city mayor of Prague changed four times between 2010 and 2018. Firstly, Bohuslav Svoboda (ODS) held the post from 2010 to 2013, first in the coalition of ODS with ČSSD, later with TOP 09. After his dismissal in 2013, he was replaced by his First Deputy from TOP 09, Tomáš Hudeček. In 2014, Andrea Krnáčová was elected (ANO 2011), becoming thus the first woman in this position. Finally, in 2018, Zdeněk Hřib was elected as a city mayor (Piráti) and still holds office. Prague can be considered as an outlying observation also from the side of public procurement. Its number of suppliers classified as new ranges from 28 to 80 companies between 2011 and 2020, while for the rest of cities, this number falls within the interval between 0 and 40. On the other hand, the average new and value rates are equal to 0.564 and 0.272, respectively, which is below the total average. In other words, Prague entered contracts with many new suppliers, especially after the 2014 elections; however, the count of new companies seems to be balanced by the count of old firms. Furthermore, it appears that the value of procurement supplied by new firms is, on average, lower than the value contracted by already proved companies. Unfortunately, we are unable to determine whether old firms supplied procurement in industries where the price is generally higher (e.g., construction).

It can be further observed that distributions of  $NR\_T$  and  $VR\_T$  ratios are both skewed to the left. This problem is partially solved by omitting extreme values in several robustness checks. We label outlying observations if they lie outside the interval of 3 standard deviations around the mean. Additionally, we identify high-leverage points based on the models' output. We also trim the 5<sup>th</sup> and 95<sup>th</sup> percentile values. The estimations emerging from the intersection of these three controls are attached as robustness checks to the results.

# 5 Results

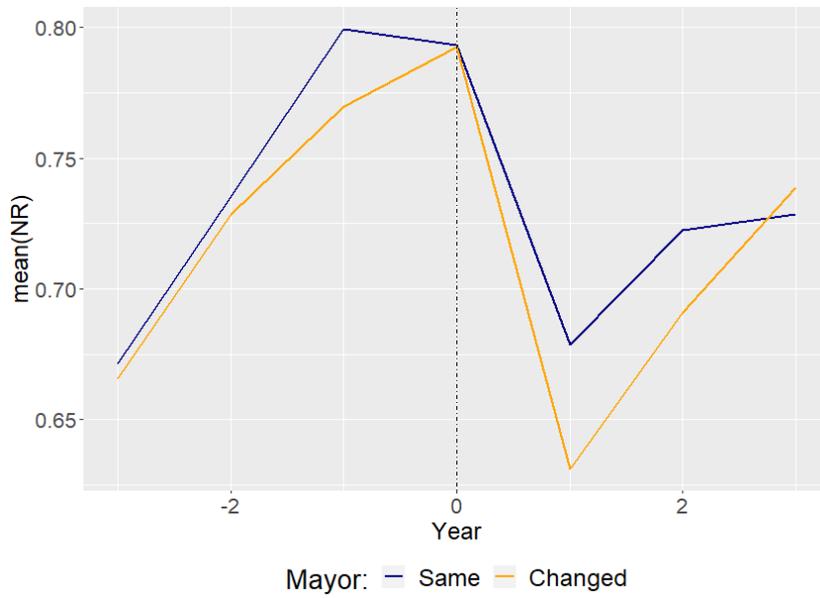
This chapter presents results about changes in municipal governance and their effects on the structure of companies supplying procurement. Section 5.1 summarises findings of event study and pooled models, where we analyse both election periods together. Section 5.2 follows with estimates of cross-section models, where we examine each term individually. Section 5.3 interprets these results from an economic point of view, provides a supplementary analysis emerging from the discussion and concludes with a final evaluation.

## 5.1 Event study and Pooled models

Figures 5.1 and 5.2 show the development of average new and value rates for the treatment (municipalities in which the mayors changed) and control (municipalities where the mayors stayed the same) groups separately, using the mandate's classifier to determine mayors elected in 2010. Average values are calculated using the data for both election terms, which are unified at one axis, and are further analysed in the pooled models. The sharp decline after the elections is attributable to the decrease in awarded contracts after 2014 and mainly after 2018 (see Figure 4.1 in Chapter 4.1.1). On the other hand, regarding the new rate, it seems that the economic boost starting in 2016 outweighs the contraction after 2018. Interestingly, the trend in the new rate is practically the same for both groups; nevertheless, municipalities where the mayor changed evince lower new rates almost all the time. The pattern remains almost the same for the value rate during the period before the elections; however, after the second year, the ratio begins to fall sharply for municipalities where the mayor stayed the same.

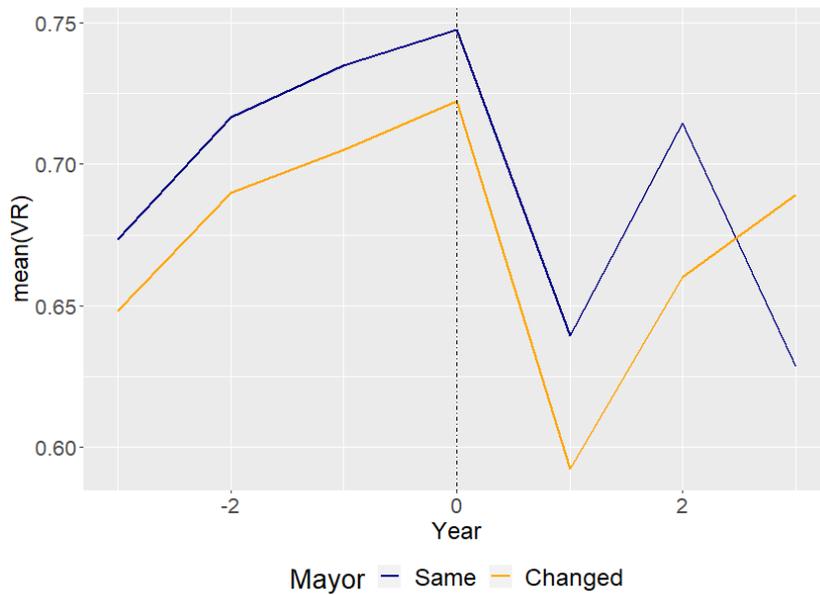
Trends are similar for the vote's classifier, as can be observed from Figures 5.3 and 5.4. Based on these initial observations, it seems that the effect is opposite to what is expected in our hypothesis and that the changes in the office of mayors did not significantly impact companies entering the municipal procurement market. Therefore, we anticipate the models, measuring the effect one year after the elections, to return negative or insignificant responses.

**Figure 5.1: Average new rate (NR) for municipalities between 2011 and 2020, mandate's classifier**



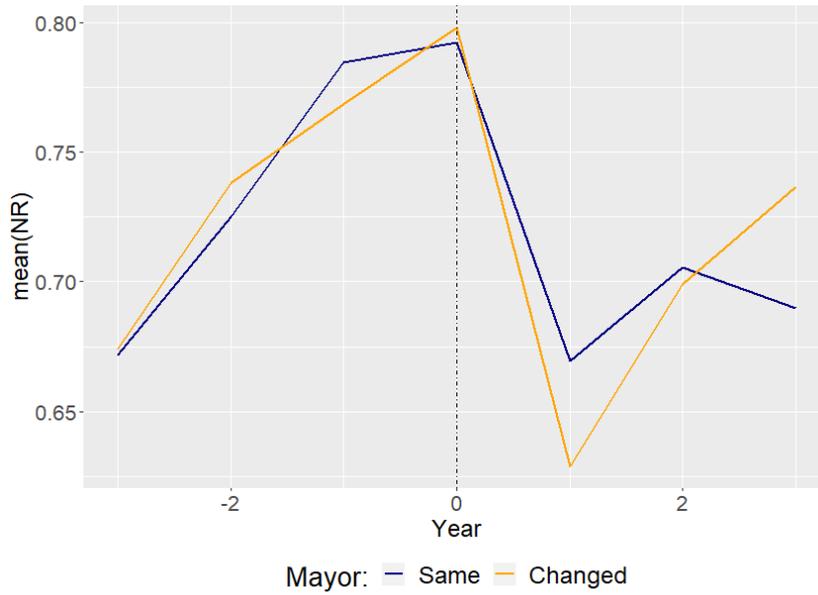
Source: Author based on data from Czech Statistical Office, Ministry of the Interior, Central Notification Register, and ISPC

**Figure 5.2: Average value rate (VR) for municipalities between 2011 and 2020, mandate's classifier**



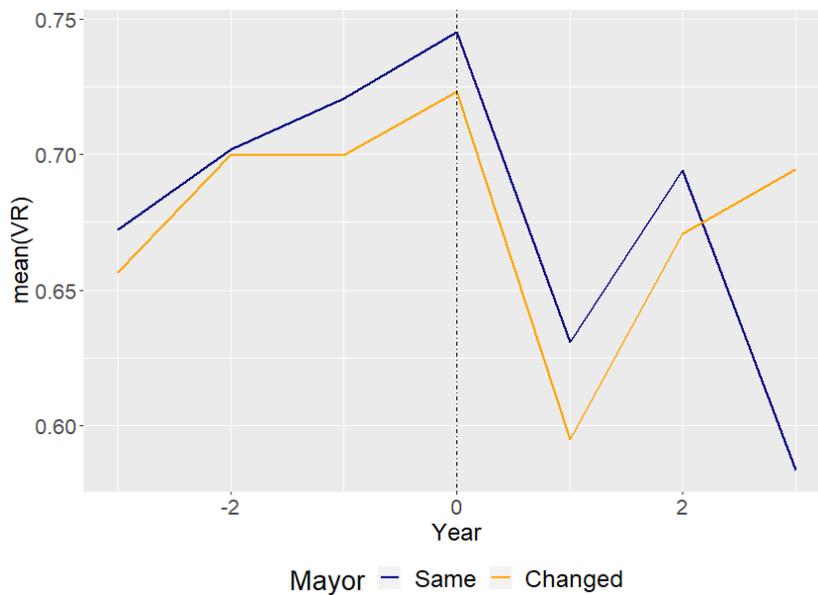
Source: Author based on data from Czech Statistical Office, Ministry of the Interior, Central Notification Register, and ISPC

**Figure 5.3: Average new rate (NR) for municipalities between 2011 and 2020, vote's classifier**



Source: Author based on data from Czech Statistical Office, Ministry of the Interior, Central Notification Register, and ISPC

**Figure 5.4: Average value rate (VR) for municipalities between 2011 and 2020, vote's classifier**



Source: Author based on data from Czech Statistical Office, Ministry of the Interior, Central Notification Register, and ISPC

Accordingly, the following tables depict pooled models' findings, estimating the effect of the 2014 and 2018 elections together. The results summarised in Table 5.1 are achieved using the mandate's classifier to determine the mayor in 2010. Conversely, the findings in Table 5.2 then show the outcomes using the vote's classifier, which partly serves as another robustness check made to verify our results. Next, panels (1) and (2) show the effect one year after the elections for the basic sample; Panels (3) and (4) then display the re-estimation of models excluding outlying and high-leverage observations. An insignificant coefficient on *Mayor\_P* means that the election of a new mayor does not affect the structure of suppliers on the municipal procurement market. The estimated coefficient is negative in all models, which is in the opposite direction than stated by our hypothesis. Surprisingly, all models estimate negative and significant coefficients of *Pop\_P* on both ratios, signalling that the number of new companies decreases with the increasing size of the municipality. Precisely, one year after the elections, new and value rates are estimated to be 0.85% and 1.63% lower for each 10 000 inhabitants. Regarding robustness checks, all coefficients remain the same in sign and slightly differ in magnitude; nevertheless, the goodness-of-fit measure improves for all models. Even so, the insignificance stays unchanged.

Coefficients on *Mayor\_P* are again estimated negative and insignificant when using the sample of mayors determined by the vote's classifier, as shown in Table 5.2. All coefficients are the same in sign and similar in size. We also find a significant and negative effect of population on new and value ratios, confirming our previous findings. Furthermore, results remain practically unchanged when eliminating extreme values. Consequently, based on these initial findings, it seems that local authorities behave responsibly and do not attract new and potentially allied companies, contrarily to our hypothesis.

**Table 5.1: Results of the pooled models, mandate's classifier**

	<i>Dependent variable:</i>			
	NR_1 (1)	VR_1 (2)	NR_1 (3)	VR_1 (4)
Constant	0.763 <sup>***</sup> (0.038)	0.694 <sup>***</sup> (0.051)	0.865 <sup>***</sup> (0.026)	0.792 <sup>***</sup> (0.047)
Mayor_P	-0.029 (0.029)	-0.026 (0.037)	-0.034 (0.024)	-0.026 (0.036)
Pop_P	-8.501e-07 <sup>***</sup> (2.309e-07)	-1.626e-06 <sup>***</sup> (2.798e-07)	-2.381e-06 <sup>***</sup> (4.370e-07)	-3.337e-06 <sup>***</sup> (6.611e-07)
Region	Yes	Yes	Yes	Yes
Robust errors	Yes	Yes	Yes	Yes
Observations	328	328	282	280
R <sup>2</sup>	0.066	0.085	0.195	0.145
Adjusted R <sup>2</sup>	0.021	0.041	0.150	0.096

*Significance:*

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

Notes: New rate, NR\_1, represents the count of new to all suppliers in a municipality one year after the elections; value rate, VR\_1, constitutes procurement values supplied by these firms. Mayor\_P is a dummy variable signalling whether the mayor changed after the elections; Pop\_P stands for the population in 2014 or 2018, depending on the elections. Estimates of binary variables sorting municipalities into their regions are not reported.

**Table 5.2: Results of the pooled models, vote's classifier**

	<i>Dependent variable:</i>			
	NR_1 (1)	VR_1 (2)	NR_1 (3)	VR_1 (4)
Constant	0.761 <sup>***</sup> (0.036)	0.691 <sup>***</sup> (0.048)	0.845 <sup>***</sup> (0.025)	0.773 <sup>***</sup> (0.045)
Mayor_P	-0.026 (0.028)	-0.017 (0.034)	-0.009 (0.028)	-0.010 (0.032)
Pop_P	-8.794e-07 <sup>***</sup> (2.345e-07)	-1.757e-06 <sup>***</sup> (2.991e-07)	-2.383e-06 <sup>***</sup> (3.547e-07)	-3.619e-06 <sup>***</sup> (5.094e-07)
Region	Yes	Yes	Yes	Yes
Robust errors	Yes	Yes	Yes	Yes
Observations	376	376	318	316
R <sup>2</sup>	0.065	0.075	0.183	0.145
Adjusted R <sup>2</sup>	0.026	0.036	0.143	0.102

*Significance:*

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

Notes: New rate, NR\_1, represents the count of new to all suppliers in a municipality one year after the elections; value rate, VR\_1, constitutes procurement values supplied by these firms. Mayor\_P is a dummy variable signalling whether the mayor changed after the elections; Pop\_P stands for the population in 2014 or 2018, depending on the elections. Estimates of binary variables sorting municipalities into their regions are not reported.

## 5.2 Cross-section models

In the previous models, we estimate the effect for both election periods together, and we find no significant response. In this section, we thus scrutinise these periods separately to examine whether the impacts differ across the individual elections. Accordingly, Table 5.3 presents the estimated effect of the 2018 elections on the new ( $NR\_8$ ) and value ( $VR\_8$ ) rates. Panels (1) and (2) summarise the coefficients for the basic models; panels (3) and (4) present the coefficients for robustness checks, i.e., excluding outliers and high-leverage points.

**Table 5.3: Results of the cross-section models, the 2018 elections**

	<i>Dependent variable:</i>			
	NR_8 (1)	VR_8 (2)	NR_8 (3)	VR_8 (4)
Constant	0.816*** (0.034)	0.740*** (0.056)	0.830*** (0.027)	0.733*** (0.052)
Mayor_8	-0.054** (0.025)	-0.089** (0.041)	-0.029 (0.019)	-0.090* (0.038)
Pop_8	-5.226e-07* (3.096e-07)	-9.254e-07* (5.081e-07)	-6.874e-07* (3.725e-07)	-8.609e-07* (4.360e-07)
Region	Yes	Yes	Yes	Yes
Robust errors	No	No	No	No
Observations	192	192	167	165
R <sup>2</sup>	0.138	0.082	0.207	0.106
Adjusted R <sup>2</sup>	0.065	0.003	0.129	0.016

*Significance:*

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

Notes: New rate,  $NR\_8$ , represents the count of new to all suppliers in a municipality; value rate,  $VR\_8$ , constitutes procurement values supplied by these firms.  $Mayor\_8$  is a dummy variable signalling whether the mayor changed after the 2018 elections;  $Pop\_8$  stands for the population in 2018. Estimates of binary variables sorting municipalities into their regions are not reported.

Considering the new rate, the estimated significant coefficient on  $Mayor\_8$  is negative, which is in the opposite direction than expected by our hypothesis, as in previous models. We estimate the new rate to be 5.4% lower for municipalities where new mayors were elected than for those where mayors stayed the same. The finding is not preserved when re-estimating the model without outliers, though it is very close to being significant at the 10% level. Similarly, the negative and significant effect on the value rate ( $VR\_8$ ) is estimated for  $Mayor\_8$ , i.e., the value rate appears to be 8.9% lower for municipalities in which the mayor changed than in municipalities in which the mayor stayed the same after the 2018 elections. In other words, suppliers classified

as new received procurement contracts of lower value in municipalities where the mayor was replaced than in those where the mayor stayed the same, all measured in relative numbers. The result remains robust when excluding outlying observations; nonetheless, its significance decreases to the 10% level. The excessive weight given to the eliminated observations can be observed in the subsequent increase in the R-squared and thus the overall explanatory power of the model. Moreover, the estimated effect of a population is negative, suggesting that the larger the municipality, the fewer new entrants to the procurement market. Nevertheless, for all models, the coefficients are significant only at the 10% level.

On the other hand, it seems that the changes in the office of mayor, induced by the elections held in 2014, significantly influenced the structure of suppliers entering the municipal procurement. Table 5.4 summarises the results using the mandate's classifier to determine the mayor in 2010; Table 5.5 presents the outcome using the vote's classifier. In both the tables, panels (1) and (2) depict the primary models evaluating the effect of the 2014 elections on the new (*NR\_4*) and value rate (*VR\_4*). Panels (3) and (4) complement these by excluding outlying observations.

**Table 5.4: Results of the cross-section models, the 2014 elections, mandate's classifier**

	<i>Dependent variable:</i>			
	NR_4 (1)	VR_4 (2)	NR_4 (2)	VR_4 (4)
Constant	0.770 <sup>***</sup> (0.025)	0.663 <sup>***</sup> (0.049)	0.796 <sup>***</sup> (0.020)	0.666 <sup>***</sup> (0.043)
Mayor_4	0.046 <sup>**</sup> (0.019)	0.096 <sup>***</sup> (0.033)	0.026 <sup>*</sup> (0.014)	0.097 <sup>***</sup> (0.033)
Pop_4	-5.710e-07 <sup>**</sup> (2.238e-07)	-1.668e-06 <sup>***</sup> (2.686e-07)	-7.758e-07 <sup>***</sup> (2.624e-07)	-2.141e-06 <sup>***</sup> (6.943e-07)
Region	Yes	Yes	Yes	Yes
Robust errors	No	Yes	Yes	No
Observations	165	165	145	149
R <sup>2</sup>	0.146	0.189	0.123	0.161
Adjusted R <sup>2</sup>	0.060	0.108	0.021	0.066

*Significance:*

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Notes: New rate, *NR\_4*, represents the count of new to all suppliers in a municipality; value rate, *VR\_4*, constitutes procurement values supplied by these firms. *Mayor\_4* is a dummy variable signalling whether the mayor changed after the 2014 elections; *Pop\_4* stands for the population in 2014. Estimates of binary variables sorting municipalities into their regions are not reported.

Considering the mandate's classifier, for both measures, we estimate the coefficient on *Mayor\_4* to be positive and significant, which is in line with our hypothesis. Namely, the new and value rates are estimated to be 4.6 % and 9.6% higher for the municipalities in which the new mayor was elected than in those where the same mayor was re-elected, respectively. Similarly, as in the previous models, we observe a negative but significant effect for the population, *Pop\_4*, since both the new and value rates are estimated to be 0.57% and 1.67% lower for each 10 000 inhabitants, respectively. Both models withstand the robustness checks, and the significance of the coefficients is preserved after re-estimating the models without outliers. Furthermore, the outcomes reached using the vote's classifier follow an almost identical pattern, enhancing the overall reliability of our results. Specifically, we observe a 5% higher ratio of new suppliers in municipalities where the mayor changed than in those where staying the same, and a 9.7% higher ratio corresponding to values of received procurement by these companies. Both ratios decrease with the growing population size since the coefficients on *Pop\_4* are estimated to be significant and negative.

**Table 5.5: Results of the cross-section models,  
the 2014 elections, vote's classifier**

	<i>Dependent variable:</i>			
	NR_4 (1)	VR_4 (2)	NR_4 (2)	VR_4 (4)
Constant	0.761*** (0.025)	0.663*** (0.045)	0.764*** (0.022)	0.672*** (0.041)
Mayor_4	0.050*** (0.018)	0.097*** (0.033)	0.034** (0.016)	0.071** (0.031)
Pop_4	-5.951e-07*** (2.202e-07)	-1.582e-06*** (3.995e-07)	-7.502e-07** (3.187e-07)	-1.629e-06*** (4.908e-07)
Region	Yes	Yes	Yes	Yes
Robust errors	No	No	No	Yes
Observations	189	189	172	168
R <sup>2</sup>	0.130	0.147	0.123	0.148
Adjusted R <sup>2</sup>	0.055	0.073	0.039	0.063

*Significance:*

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Notes: New rate, NR\_4, represents the count of new to all suppliers in a municipality; value rate, VR\_4, constitutes procurement values supplied by these firms. Mayor\_4 is a dummy variable signalling whether the mayor changed after the 2014 elections; Pop\_4 stands for the population in 2014. Estimates of binary variables sorting municipalities into their regions are not reported.

Although the findings appear to be propitious, we should not forget the small number of observations examined. Unfortunately, we do not have an opportunity to expand the sample as we already analyse the population data.

### 5.3 Discussion

In this section, we summarise and discuss the results in more detail and suggest a comprehensive interpretation. We employ various empirical strategies to estimate the impact of mayoral changes resulting from the elections held in 2014 and 2018 on the relative count of new suppliers. Firstly, we explore the general impact using both elections together, but we do not find any significant response, which corresponds to the findings of Vitvar (2020). As a result, in the second step, we focus on individual elections separately. We estimate a positive and significant effect after 2014, which is in accordance with our hypothesis and points to the potential existence of connections at the municipal level. Contrarily, we detect negative and significant impact following the 2018 elections. Therefore, these effects probably work against each other in the general model, leading to insignificant coefficients.

This raises the question of what can be behind the fact that after the first elections, the results are in line with our hypothesis, but not after the second. With regard to the elections' results, one possible cause represents the change in the political composition. That is the strengthening of smaller political parties and establishing new political entities (e.g., ANO, Pirates, STAN, TOP 09), which replaced more traditional parties (such as ČSSD, KDU-ČSL, KSČM, ODS). New political parties could attract new companies after the first elections, and they might have awarded contracts to already proved suppliers after the second ones, which would correspond to the increase (decrease) of new companies over time. Nonetheless, it is impossible to exactly quantify the exchange of political spectrum, given the number of independent candidates and coalitions formed before and after the elections. Additionally, the composition of coalitions usually varies across individual municipalities. We thus focus on the party with the largest number of received votes, not considering independent candidates and coalitions formed before the elections, which is the political movement ANO.<sup>18</sup> Irrespective of coalitions formed with other parties before the elections, it acquired 14.59% of total votes, and it even strengthened its dominant

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<sup>18</sup> The results of regular municipal elections held in 10 and 11 October 2014; available at: <https://volby.cz/pls/kv2014/kv1211?xjazyk=CZ&xid=1&xv=1&xdz=7&xnumnuts=0&xstat=0&xvyber=1>

position in the next elections held in 2018.<sup>19</sup> ANO had already succeeded in the parliamentary elections in 2013, after which they formed a government with dominant ČSSD and KDU-ČSL. The popularity of ANO continued to grow, which might have partially transferred to the municipal level.

To evaluate the hypothesis that through its representatives, ANO attracted new firms to the procurement market and eventually retained these, we utilise the equations 4.5 to 4.8. These cross-section models measure the impact of mayoral change separately for each of the elections. In addition, we add dummy indicators capturing the influence of ANO. The specification of the party ANO, in our case, includes members of the coalition formed before the elections, independent candidates running for ANO, and party members. In the first step, we focus on the representation itself through the proportion of seats obtained in the municipality. In this case, the binary variable is equal to 1 if ANO received at least 20% of all mandates in a particular municipality, and 0 otherwise. This threshold results from the average number of 6 elected parties in cities explored in the analysis. If ANO gained at least 20% representation in the city, it would have an opportunity to form a council and thus appoint a mayor from its members. In the second step, we narrow the specification of the variable to mayors themselves. The dummy takes the value of 1 if a mayor appointed in a city is related to ANO, and 0 otherwise. We use the OLS method with robust standard errors, if needed, to estimate additional regressions of which findings can be found in Tables A.3 (2018), A.4 (2014 – mandates), and A.5 (2014 – votes) of Appendix A. We only attach results that are adjusted for outlying observations.

We do not identify any significant coefficient of ANO controls for 2018, irrespective of whether we use new or value rates. Similarly for 2014 with mandates where the effect is at least close to being significant at the 10% level for the dummy specified using the 20% threshold. As for 2014 with votes, we estimate positive and significant coefficients for both ANO controls but only in the case of value rates. Precisely, the value rate is estimated to be 6.4% higher in municipalities where ANO obtained at least 20% of all seats and 6.9% higher in municipalities where the mayor from ANO succeeded, controlling for the mayoral change and other factors. Both indicators are significant only at the 10% level. Somewhat surprisingly, we do not detect a significant effect for any of the ANO controls in the case of new rates. Last

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<sup>19</sup> The results of regular municipal elections held in 5 and 6 October 2018; available at: <https://volby.cz/pls/kv2018/kv1211?xjazyk=CZ&xid=1&xv=1&xdz=7&xnumnuts=0&xstat=0&xvyber=1>

but not least, coefficients of other observed variables (mayoral change, population) remain similar in size and magnitude compared to the original models. However, the significance of the mayors' coefficients slightly lessens.

Even though we estimate the significant impact of the ANO dummies in one case, we still do not possess strong evidence to support our sub-hypothesis in general. Moreover, the effect is significant only when using votes for determining mayors. Concerning the accuracy of this method, we employ these models as additional robustness checks. In other words, the idea about the entrance of ANO into politics does not fully explain why the effect is significant after the 2014 elections but not after the elections in 2018 and thus leaves our findings inconclusive in part. However, in view of all the results, the variant of an entry of new parties and a subsequent establishment of relationships with new companies seems realistic, leaving room for further research. Future studies could collect data on mayors elected in 2010 and 2006, which would help confirm this idea and generally strengthen the informative value of the results. Another option is to attempt to find whether there exists any post-election coalition pattern in both years, similar to what is established at the governmental level. In this case, however, we think that the answer will be negative, i.e., coalitions tend to vary across cities.

An alternative interpretation of our results could be the positive effect of growing political fragmentation, as already indicated by Palguta (2016). Meaning, the wider the political representation, the fewer opportunities to alter the outcomes of procurement. Furthermore, we explore primarily cities having on average 25.64 representatives (as of 2018). The larger number of councils may further prevent interference in the procurement market. This is partly following our results on the size of the city, with which the number of representatives increases disproportionately. Namely, we estimate the negative and significant effect of the population in all cases. In smaller municipalities, there may exist larger room for exploiting connections due to their size and less augmented control. Nonetheless, we are unable to quantify the impact due to the insufficient number of awarded procurement.

Finally, another explanation of why we do not discover the effect of mayoral change can be the potential influence of procurement by representatives who are not partaking in the municipal government but constitute the opposition. Unfortunately, our models do not cover these cases. Another option might be seeking political connections at higher levels of public administration, where firms can obtain more voluminous procurement (government: Navrátilová, 2018; regions: Palanský, 2014;

Titl & Geys, 2019). Finally, firms may search for benefits through other channels such as subsidies (Kopeček, 2019; Špolc, 2017) or through small-scale contracts, which do not always have to be published.

## 6 Conclusion

This case study evaluates whether political connections are reflected between local governments and companies entering municipal tenders. We thus collect information about elected mayors, which serve as a proxy for municipal governance, and we focus on the effect of elections using mayoral changes between respective election terms. From public sources, we gather data on mayors elected in 2014 and 2018. This information is subsequently used to train two classifiers to determine mayors elected in 2010: the highest-ranking candidate of the winning political party according to the number of mandates acquired and the candidate receiving the most votes. In the core empirical part, we then compare the structure of suppliers between municipalities where mayors changed and where they were re-elected. For this purpose, we use the data on public procurement awarded between 2006 and 2020 in the largest municipalities, which we convert into ratios capturing the relative counts of new contractors and procurement values obtained by those. We hypothesise that the number of new suppliers is greater in the municipalities where new mayors were elected as they can attract new and potentially connected companies. The motivation stems from the previous empirical literature demonstrating that political linkages can be exploited through procurement contracts, which, in consequence, may stimulate unfair competition and lead to a loss of public welfare.

We assess the effect of the elections from two main perspectives. Firstly, we construct a general pooled specification, examining the impact for both election periods together one year after the elections. However, the findings suggest that municipal governance changes do not significantly impact the suppliers' composition for none of the ratios when controlling for the population and region of municipalities. Therefore, in the second step, we inspect each election term separately by employing separate cross-section models, where we aggregate data over time. We estimate the effect associated with the mayoral change after the 2014 elections between 4.6 % and 5% on new rate and between 9.6% and 9.7% on value rate, depending on the classifier used. By contrast, we unveil negative responses after the 2018 elections; precisely, new and value rates are estimated at 5.4% and 8.9% lower for municipalities in which new mayors were appointed than in those where not replaced. The results, however, do not remain robust in all cases. The significance of all estimates slightly decreases after

excluding outlying observations; unfortunately, it diminishes entirely for the new rate after 2018.

We assume that these contradictory effects could be caused by establishing new political entities, which would also explain the exchange of vast mayors after the 2014 elections. Newly elected mayors might have allocated contracts to selected and potentially linked companies. After the next elections, if they remained in the office, they could have awarded procurement to the same and already proved firms. Nevertheless, the political sphere at the municipal level is too fragmented as many coalitions are formed before and after the elections, which often vary across individual municipalities. To test for this auxiliary hypothesis, we restrict the political composition to a single political movement, ANO, which dominated both the elections. In the final part, we thus evaluate the same equations except that we add dummy controls capturing whether ANO had at least 20% representation in the local council or whether the mayors were related to ANO. Unfortunately, the results are not convincing enough to confirm our additional sub-hypothesis as we detect insignificant coefficients predominantly, leaving our findings partially ambiguous.

An alternative interpretation of our findings could be the plausible impact of broader political representation, preventing individual representatives from influencing public procurement. Similarly, the larger number of councils can further preclude the interference, which increases disproportionately with population. This is in accordance with our findings as we identify the negative effect of population ranging between 0.97% and 1.58% for each 10 000 inhabitants, which is estimated significant in all models. Considering our results, the option of an entry of new parties followed by forming relations with new firms seems realistic, leaving opportunities for further research. Future studies could extend the study by collecting data on mayors elected in 2010 and 2006, which would help confirm this notion and generally enhance the results. Other potential areas include, for instance, specifying political connections between companies and mayors directly and evaluate their impact on various indicators such as the value of public procurement, favouritism in granting subsidies, firms' performance, and others.

Overall, our results confirm previous findings that certain connections exist between local governments and procurement contractors, though only in some periods. However, we find only limited evidence, probably due to fewer observations and inaccurate measurements. Generally, we consider the contribution of this thesis as being fourfold. Firstly, we create a new database containing data on mayors elected

since 2010, and we believe that it may find its use in future research. Secondly, contrarily to previous studies, we develop a relatively novel approach in which we indirectly focus on political connections, enabling us to avoid underestimating problems. Thirdly, we examine the effect of mayoral changes on the allocation of municipal procurement contracts, which has not yet been conducted in Czechia. Fourthly, we perceive this type of political research important as it constitutes one of the ways how to shed more light on the role of political connections in the public procurement allocation, which could inform policy on the regulation of such linkages.

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# Appendix A:

**Table A.1: An example of the output of the scrapper**

Name	Surname	Municipality	Function	Period
Tomáš	Němec	Obec Archlebov	místostarosta / zástupce starosty	02. 11. 2018 -
Antonín	Hrbotický	Obec Archlebov	místostarosta / zástupce starosty	03. 07. 2017 - 02. 11. 2018
Jan	Buchlovský	Obec Archlebov	místostarosta / zástupce starosty	03. 07. 2017 - 02. 11. 2018
Miroslav	Jarolík	Obec Archlebov, Obec Archlebov	starosta, starosta	02. 11. 2018 - , 03. 07. 2017 - 02. 11. 2018
Marek	Starý	Obec Babice nad Svitavou	místostarosta / zástupce starosty	13. 11. 2018 -
Eduard	Levý	Obec Babice nad Svitavou	starosta	13. 11. 2018 -
Miroslav	Martykán	Obec Babice nad Svitavou	starosta	19. 11. 2014 -

Source: Author based on data from Central Notification Register

Note: The sample includes output data for municipalities from the South Moravian Region

**Table A.2: Descriptive statistics of municipal procurement administered between 2006 and 2020**

Region	Total value of PP	Number of PP	Mean	St. Deviation	Min	Max
South Bohemian Region	<i>28 246 779</i>	2 636	<i>10 716</i>	<i>26 563</i>	2 618	<i>883 228</i>
South Moravian Region	<i>60 426 921</i>	4 381	<i>13 793</i>	<i>44 770</i>	1 235	<i>1 692 746</i>
Karlovy Vary Region	<i>14 882 224</i>	1 348	<i>11 040</i>	<i>35 590</i>	2 783	<i>894 925</i>
Vysočina Region	<i>20 640 782</i>	2 092	<i>9 867</i>	<i>20 844</i>	9 370	<i>468 395</i>
Hradec Králové Region	<i>23 486 039</i>	2 142	<i>10 965</i>	<i>27 702</i>	3 856	<i>546 534</i>
Liberec Region	<i>19 772 038</i>	1 759	<i>11 240</i>	<i>48 985</i>	2 850	<i>1 440 780</i>
Moravian-Silesian Region	<i>63 697 126</i>	6 235	<i>10 216</i>	<i>25 912</i>	538	<i>1 025 071</i>
Olomouc Region	<i>29 493 959</i>	2 625	<i>11 236</i>	<i>23 858</i>	3 810	<i>525 747</i>
Pardubice Region	<i>21 113 819</i>	2 017	<i>10 468</i>	<i>23 668</i>	4 200	<i>558 393</i>
Plzeň Region	<i>31 848 588</i>	2 349	<i>13 558</i>	<i>52 332</i>	3 256	<i>1 264 422</i>
Prague	<i>169 770 239</i>	4 618	<i>36 763</i>	<i>473 244</i>	1 086	<i>21 205 274</i>
Central Bohemian Region	<i>66 126 851</i>	4 826	<i>13 702</i>	<i>32 252</i>	6 801	<i>690 269</i>
Ústecký Region	<i>30 761 016</i>	2 798	<i>10 994</i>	<i>27 254</i>	2 590	<i>520 619</i>
Zlín Region	<i>22 510 852</i>	2 480	<i>9 077</i>	<i>16 920</i>	3 280	<i>338 947</i>
<b>All Regions</b>	<b><i>602 777 231</i></b>	<b>42 306</b>	<b><i>14 248</i></b>	<b><i>159 548</i></b>	<b>538</b>	<b><i>21 205 274</i></b>

Source: Author based on data from ISPC

Note: Value in italics is presented in CZK thousands. Value in the sixth column (Min) is listed in CZK.

**Table A.3: Results of the cross-section models including controls  
for the political movement ANO, the 2018 elections**

	<i>Dependent variable:</i>			
	NR_8 (1)	NR_8 (2)	VR_8 (3)	VR_8 (4)
Constant	0.831 <sup>***</sup> (0.020)	0.831 <sup>***</sup> (0.020)	0.735 <sup>***</sup> (0.051)	0.736 <sup>***</sup> (0.051)
Mayor_8	-0.030 (0.018)	-0.031 <sup>*</sup> (0.018)	-0.090 <sup>**</sup> (0.038)	-0.092 <sup>**</sup> (0.038)
ANO_P	0.004 (0.023)		-0.014 (0.047)	
ANO_M		0.012 (0.024)		0.0004 (0.049)
Pop_8	-7.216e-07 <sup>*</sup> (4.020e-07)	-7.418e-07 <sup>**</sup> (3.617e-07)	-9.118e-07 <sup>*</sup> (4.696e-07)	-9.671e-07 <sup>**</sup> (4.422e-07)
Region	Yes	Yes	Yes	Yes
Robust errors	Yes	Yes	No	No
Observations	167	167	163	163
R <sup>2</sup>	0.208	0.209	0.117	0.116
Adjusted R <sup>2</sup>	0.123	0.124	0.020	0.019
<i>Significance:</i>			<sup>*</sup> $p < 0.1$ ; <sup>**</sup> $p < 0.05$ ; <sup>***</sup> $p < 0.01$	

Notes: New rate, NR\_8 represents the count of new to all suppliers in a municipality; value rate, VR\_8, constitutes procurement values supplied by these firms. Mayor\_8 is a dummy variable signalling whether the mayor changed after the 2018 elections. ANO\_P is a binary variable taking the value of 1 if ANO acquired at least 20% of mandates in a municipality; ANO\_M is a dummy variable that equals 1 if an elected mayor is related to ANO. Pop\_8 stands for the population in 2018. Estimates of binary variables sorting municipalities into their regions are not reported.

**Table A.4: Results of the cross-section models including controls for the political movement ANO, the 2014 elections, mandate's classifier**

	<i>Dependent variable:</i>			
	NR_4 (1)	NR_4 (2)	VR_4 (2)	VR_4 (4)
Constant	0.797*** (0.020)	0.797*** (0.020)	0.676*** (0.045)	0.669*** (0.045)
Mayor_4	0.024* (0.014)	0.024 (0.016)	0.081** (0.033)	0.090*** (0.035)
ANO_P	0.019 (0.017)		0.052 (0.037)	
ANO_M		0.008 (0.018)		0.026 (0.041)
Pop_4	-9.331e-07*** (2.938e-07)	-7.947e-07*** (2.627e-07)	-2.534e-06*** (6.687e-07)	-2.194e-06*** (6.440e-07)
Region	Yes	Yes	Yes	Yes
Robust errors	Yes	Yes	Yes	Yes
Observations	145	145	149	149
R <sup>2</sup>	0.130	0.124	0.174	0.163
Adjusted R <sup>2</sup>	0.021	0.014	0.074	0.061
<i>Significance:</i>			* $p < 0.1$ ; ** $p < 0.05$ ; *** $p < 0.01$	

Notes: New rate, NR\_4 represents the count of new to all suppliers in a municipality; value rate, VR\_4, constitutes procurement values supplied by these firms. Mayor\_4 is a dummy variable signalling whether the mayor changed after the 2014 elections. ANO\_P is a binary variable taking the value of 1 if ANO acquired at least 20% of mandates in a municipality; ANO\_M is a dummy variable that equals 1 if an elected mayor is related to ANO. Pop\_4 stands for the population in 2014. Estimates of binary variables sorting municipalities into their regions are not reported.

**Table A.5: Results of the cross-section models including controls for the political movement ANO, the 2014 elections, votes' classifier**

	<i>Dependent variable:</i>			
	NR_4 (1)	NR_4 (2)	VR_4 (2)	VR_4 (4)
Constant	0.766*** (0.022)	0.766*** (0.022)	0.679*** (0.043)	0.679*** (0.042)
Mayor_4	0.032* (0.017)	0.029 (0.017)	0.064** (0.031)	0.057* (0.033)
ANO_P	0.016 (0.021)		0.064* (0.038)	
ANO_M		0.024 (0.027)		0.069* (0.041)
Pop_4	-8.684e-07** (3.528e-07)	-3.231e-07** (2.627e-07)	-2.1014e-06*** (5.4002e-07)	-1.7533e-06*** (5.0129e-07)
Region	Yes	Yes	Yes	Yes
Robust errors	No	No	Yes	Yes
Observations	172	172	168	168
R <sup>2</sup>	0.127	0.128	0.162	0.158
Adjusted R <sup>2</sup>	0.037	0.038	0.073	0.069
<i>Significance:</i>			* $p < 0.1$ ; ** $p < 0.05$ ; *** $p < 0.01$	

Notes: New rate, NR\_4 represents the count of new to all suppliers in a municipality; value rate, VR\_4, constitutes procurement values supplied by these firms. Mayor\_4 is a dummy variable signalling whether the mayor changed after the 2014 elections. ANO\_P is a binary variable taking the value of 1 if ANO acquired at least 20% of mandates in a municipality; ANO\_M is a dummy variable that equals 1 if an elected mayor is related to ANO. Pop\_4 stands for the population in 2014. Estimates of binary variables sorting municipalities into their regions are not reported.