Charles University
Faculty of Social Sciences
Institute of Economic Studies

MASTER'S THESIS

EU and State Grants Distribution in the Czech Republic: The Effect of Political Connections

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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, May 1st, 2019

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Abstract

This thesis is divided into two parts. The first part analyses recently published data from the Central Grant Registry (CEDR) on state grant distribution in Czechia between 1999 and the present year. In the second part, I link this data to information on political connections established through donations to parties and examine whether politically connected firms are more successful in competing for state grants. I match the donating firms to non-donating but otherwise similar firms using propensity scores based on a number of observable characteristics. The results indicate that donating companies have a 40% higher success rate in receiving state grants compared to non-donating firms. I find that the effect is higher for grants from the state budget than for grants from EU funds, which is consistent with EU-funded grants being subject to stricter regulations.

JEL Classification	D72, D73, H2, H71, H81
Keywords	grants, subsidies, donations, political connections
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Abstrakt

Tato práce je rozdělena do dvou částí. První část zkoumá data z Centrálního dotačního registru (CEDR) o rozdělování dotací v České republice od roku 1999 do současnosti. V druhé části dávám tato data do souvislosti s politickými konexemi založenými na darech politickým stranám a zkoumám, zda jsou alokace politicky napojených firem rozdílné. Firmy, které politickým stranám darovaly, páruji s firmami, které nedarovaly, za použití propensity score založeného na pozorovatelných vlastnostech. Výsledky ukazují, že podniky, které darují peníze politickým stranám, mají o 40% vyšší úspěšnost přidělení dotace. Tento efekt je silnější pro státního dotace než pro evropské, což je konzistentní s hypotézou vyšší regulace a kontroly evropských dotací.

Klasifikace	D72, D73, H2, H71, H81
Klíčová slova	dotace, dary, politické konexe
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Master's Thesis Proposal

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Proposed Topic:	EU and State Grants Distribution in the Czech Republic: The Effect of Political Connections

Motivation

The data from Czech central grants register (CEDR) have been published recently and therefore there hasn't yet been proper analysis of the dataset. There aren't even known any proper analyses made by the data holder (Czech government). It is a great opportunity to change this and it is the main motivation for the thesis.

The central goal of the thesis is planned to be a search for evidence of relation of political linkage of companies and success rate of grants' applications for both EU grants and Czech grants, to study this relation and to either confirm or reject mentioned hypotheses.

Many businesses in Czech Republic are subsidized by EU or Czech government grants. Both EU and Czech government grants are very thoroughly checked for possible political connections for various reason, mainly because such link could lead to corruption, e.g. company is owned by politician who puts pressure on grant application approval. Therefore, it is in theory harder for politically linked companies to succeed in these applications.

EU grants are believed to have more strict approval mechanisms than Czech grants, so it is believed it should be harder for politically linked companies to succeed in these applications. However, such beliefs are not based on hard data.

The other, wider goal of the thesis is to proceed with a more general analysis of data with respect to other information and data to shed some light on general drivers of grants distribution on the Czech Republic.

Hypotheses

Hypothesis #1: There is a significant difference in grants accessibility for politically linked firms

Hypothesis #2: It is harder for politically linked firms to get EU grants than Czech government grants

Hypothesis #3: The ex-post audits of EU grants are more likely to find problems for politically linked firms.

Methodology

To achieve the goals and hypotheses defined above, I plan to take these steps:

The first step is to obtain data for analysis. As a main source of data, we expect to use the ARES (Czech businesses register) and CEDR. Both of these sources are available online, however, the harvesting of these data sources contains many caveats. Due to the huge amount of records (base dataset has over 2 million records), this work is expected to take some amount of work, unlike with usually smaller datasets used in analyses. The data will be harvested from the company entries in register, linked together, cleaned for possible errors and mismatches and transformed to be usable for statistical analysis.

Second step will be general data analysis, both in the aim of preparation for validating listed hypotheses, but also in an aim of gaining more view in the data and presumably raising more hypotheses for statistical testing. It is also expected that more data sources will be found vital to be linked to the current data and processed.

The main step is statistical analysis of data in order to confirm or reject listed hypotheses. That is for the first hypotheses to identify correlations between success rates of companies, grants' amounts and their political background. This will be done by standard statistic framework. For the second hypotheses I will split the data to Czech

and EU grants, compare their specifics and proceed with a discussion of the drivers of the found differences.

In the conclusion part of the work I will then summarize findings, which I hope will uncover drivers of grants distribution in the Czech Republic backed by hard data evidence.

Expected Contribution

The grants data stored in the Czech central grants register (CEDR) have been made public as open data last year. This gives a great opportunity to study various influences of grants' applications. Since the data were not easily and publicly accessible before, such analyses are yet to be made.

The expected contribution of this paper is to uncover part of these influences, that revolves around political linkage of companies, utilizing the business register as another available source of company data. This way we expect to understand some of the mechanisms of grants allocation and possibly show some strengths or weaknesses of the grant application and most importantly support this by data evidence.

Outline

1. Motivation
2. Literature overview
    - Grants allocation mechanisms
    - Political connections of companies – overview of methods and consequences
3. Data
    - Sources of data
    - Qualitative data overview
4. Analysis
    - Methodology
    - Results
    - Discussion
5. Conclusion

Core Bibliography

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Vachudova, M. A. 2009. Corruption and Compliance in the EU's Post-Communist Members and Candidates

Introduction

Since the Velvet Revolution of 1989, the Czech Republic's public finances have always been an issue. In the so-called "wild nineties" when rules were not yet entirely set and outcomes of future court rulings were not yet known, there has been a widespread direct corruption, where bribes were handed in plastic bags[1]. Since then much has changed, new anti-corruption laws have been introduced, some people involved in the early scandals are being prosecuted, some are in jail. It is clear that the "old methods" of corruption are over. Even the perception of corruption has changed. To base this claim on some data, we can look at the ranking of the Czech Republic in the Corruption Perception Index. In 1996 when the index included the Czech Republic for the first time, it has been ranked on the percentile of 42.6, now the country has a percentile of 23.3.

Unlike in the nineties, money cannot be directly withdrawn from the public budgets to benefit the politically connected persons. Instead, a value has to be created to serve as a reason for the use of the money. Later in the early 00s lot of scandals with manipulating of the results of open competitions came up. It is also backed up by data that politically linked companies were more successful in the competitions (Palanský 2018). Some competitions were even based on flawed random generators or lotteries. In other cases, the mechanism was not found, however many sectors of public procurement were almost all covered by few companies whose revenue statements consisted of purely public sources. Needless to say, it cannot be directly said that these companies manipulated the competitions as it could be just that they were good at targeting the public procurement needs and fulfilling the needed qualifications (certificates, turnover, etc.), however, it is clear that in these sectors healthy competition was not present.

As the proclaimed fight against the corruption - a term used by most of the after revolution political parties – continued, even these methods became less successful and despite some sectors, where public spending is still being received by few

1 One such example from the press: https://www.idnes.cz/zpravy/domaci/secreet-record-major-kralovo-pole-bribing.A110421_1571162_brno-zpravy_bor

oligopoly companies, the trend turns toward new methods. One of the newer methods is bound to the distribution of grants.

This also applies to grant sources outside of the Czech Republic, most importantly after the Czech Republic joined the European Union. The redistribution of money in the EU has been an important topic in the Czech Republic ever since the country joined the union. As of writing this thesis, the Czech Republic is and since the acceptance always has been a net receiver of EU money. The total sum of money received and redistributed during the thirteen years of EU membership amounts to 1 211 billion CZK that is approximately 55 billion USD using the exchange rate of June 2018 (Ministry of Finance 2018). The redistribution of this amount is administered by the Czech Ministry of Regional Development and includes various mechanisms that control the money assignment. Mainly ex-ante evaluation of applicants and application validity checks, interim audits of spending and ex-post audits of the finished projects. These audits are done using on-premise check-ups on an individual basis per project on a sample of projects that is generated using various risk analyses and statistical methods that are specific to each operational programme.

The aim of this thesis is to have a wider look on recently published data concerning individual grant applications and the decisions of payments in the Czech Central Grants Registry (Centralni registr dotaci, CEDR) and to analyse this data in the context of political linkages. The datasets from the grants evidence system have been made public in September 2016 and no detailed analysis of the grants distribution has been made since. The deeper aim of this thesis is to analyse and report the inference found in the data, together with a discussion on possible drivers of the outcomes presented, as it is a task of a politician to make a decision and the task of academic to provide the data-based evidence required to make those decisions.

This thesis is divided into two parts. In the first part, Grants in the Czech Republic, I provide an overall description of the grants data in with the objective to help other researchers make use of this yet undervalued dataset and potentially motivate the creation of more analyses of the data. The second part, The Effect of Political Connections, covers the view of the grant distribution from the angle of political connections of involved parties, where not only the existence of political connections is discussed, but also analysis of financial outcomes of such connections and the effect of audits as to whether stricter audits of EU grants lead to less political linkages in the grant redistribution.

Grants in the Czech Republic

1 Introduction

The system containing the data about grants in the Czech Republic opened its data in September 2016, however, since that time only little academic works came into existence concerning this topic. One of the probable causes of the shortage is the complexity of this dataset both in its horizontal dimension, with many interconnected tables, as well as the vertical dimension containing millions of rows of data. Creating the basic picture of the information stored in this dataset is expensive on time and other resources and without having this basic picture one cannot assess the potential it could have for their research. The purpose of this chapter is to provide a general unopinionated analysis of both the data structure and the data contents in order help future users of the dataset quickly understand what it contains and possibly motivate them to use this dataset in their research.

This part of my thesis is divided into several chapters. The first chapter introduces IS CEDR, the system containing information about grants and shows how to obtain these data. The second chapter provides a description of the dataset structure and leads the reader to where and how the data can be used. The following chapters analyse the contents of the dataset and show the basic properties of the data contained. In the last chapter, I am providing a few notes on the data quality which should be taken into consideration when working with the data.

2 Data Source

2.1 IS CEDR

The data about grants distribution are all stored in the IS CEDR. IS CEDR is a set of IT systems for evidence, monitoring, analysis and audit of grants, financial support and other similar transfers supplied by the state budget, EU funds, or other sources. It consists of several parts which are operated by either the corresponding grant providers or the General Financial Directorate which is a part of the Ministry of Finance. The main parts of IS CEDR are the IS CEDR I, a system for the evidence of

mortgage loans, IS CEDR II, a support system for the management of audits conducted by the Financial Administration office and IS CEDR III which is the Central Evidence of Grants.

The IS CEDR III is the main source of data for this thesis as it contains all grants provided from the state budget, funds of the European Union, financial mechanisms of the European Economic Area and from the Swiss-Czech Cooperation Programme. It has been founded by the Government decree no. 584/1997 followed by decree no. 286/2007 Coll. in accordance with the law no. 2018/2000 Coll. which assigns the obligation for all of the budget chapters to introduce a registry of grant recipients.

The system contains basic data concerning information about grants recipients (name, legal status, address and identification numbers) and grants' details (amounts of agreed and provided subsidy, financial transfers, contract identifications). Part of the data was made public in the September 2016 following the RDF linked data specifications, both using SPARQL endpoints and CSV/RDF data bundles with the complete set of records. (Ministry of Finance 2018)

2.2 Obtaining the Data

The easiest way to obtain the data is to use the CSV bundles provided in the download section[2] which is unfortunately not available in English. The bundles are 7z compressed bundles which each contains a number of CSV files. These CSV files are numbered starting with zero, without left zero paddings, and contain each maximum of 50,000 lines, i.e. 49,999 records and a header. The CSV is comma separated with strings in UTF8 character encoding without string encapsulation in quotes, unless when the string contains a comma, then a double quote encapsulation is used. Numbers use a dot as a decimal point and leading minus. Dates are in the ISO 8601 string format including date, full time and time zone, e. g. 2019-05-10T23:59:59.999Z.

[2] http://cedr.mfcr.cz/cedr3internetv419/OpenData/OpenDataDumpPage.aspx

2.3 Working with the Data

Due to the size of the datasets, the data manipulations cannot be done in MS Excel or other simple software. I am using Google BigQuery[3] which came out as the fastest and easiest solution. The data can be loaded either manually from a Google Cloud Storage Bucket, or through the API using the NodeJS scripts linked in Appendix B – Thesis GitHub Repository. The CSV bundles as provided form without any modifications a working relational database structure including all the needed primary keys. The SQL scripts used to create needed datasets are also linked in Appendix B.

Some of the code list tables, including the financial source code list (table **`ciselnikFinancniZdrojv01`**) are using a tree structure in which linked item may be a child of another linked item. For these tables, I am creating modified code list tables which in addition from their standard data contain information of the tree level and link to all the parent items on the higher levels. Only then it is possible to make aggregations based on the desired level, e. g. for the financial source to make an aggregation of domestic and foreign grant sources, despite the linked financial source types for individual grants are of different tree levels. The script to create this table is also provided in Appendix B.

3 Data Structure

3.1 Overview

The data are divided into several main data tables, link tables and many code list tables. The main data tables are Dotace (grants), PrijemcePomoci (receivers of grant), Rozhodnuti (decision of grant assignments) and RozpoctoveObdobi (budget period). In Figure 3.1, a simplified data structure is provided. The full data model is enclosed as Appendix A. The meaning of the columns and description of the table contents is provided in the following chapters.

[3] https://bigquery.cloud.google.com

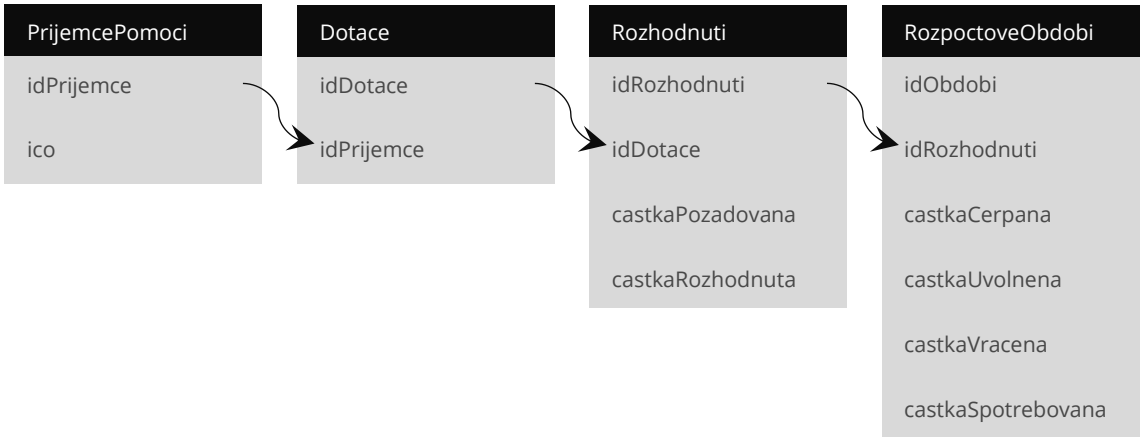

Figure 3.1 - Simplified Data Model of IS CEDR III

3.2 Receiving Persons

The table **`PrijemcePomoci`** contains all persons, both legal and natural which are in the system. Despite the column names being more or less self-explanatory, I am providing descriptions of the table columns for the English reader in Table 3.1.

Column	Description
idPrijemce	Table unique ID
ico	State-assigned organization ID
obchodniJmeno	Business name
jmeno	First name
prijmeni	Last name
iriPravniForma	Link to the legal form code list
rokNarozeni	Birth year
iriStat	Link to the state code list
iriOsoba	Link to the person in ROB[4]
iriEkonomikaSubjekt	Link to the person in ARES[5]
dPlatnost	Date of validity
dtAktualizace	Date of the last update

Table 3.1 – Description of the Columns of the Table PrijemcePomoci

[4] Registry of Persons
[5] Administrative Registry of Economic Persons, https://wwwinfo.mfcr.cz/ares/ares_es.html.en

You may notice there are two identification IDs in the table, the table unique ID and the state-assigned organization ID. There are two reasons for this. The first reason is that natural persons in the Czech Republic have their IDs assigned in a way that they contain their birth date, sex and place of birth which makes them unusable in this case so for natural persons **`ico`** field is null. The second reason is that the list of receiving persons is suffering from a huge multiplicity problem. To illustrate this, I have created a histogram of the number of times an organization with the same **`ico`** is on the list. For the sake of clarity, the histogram bins grow exponentially with the base of two. As you can see, there are even seven organizations appearing more than a thousand times in the table. Only 50% of organizations appear once and little over 20% of organizations are present two or three times.

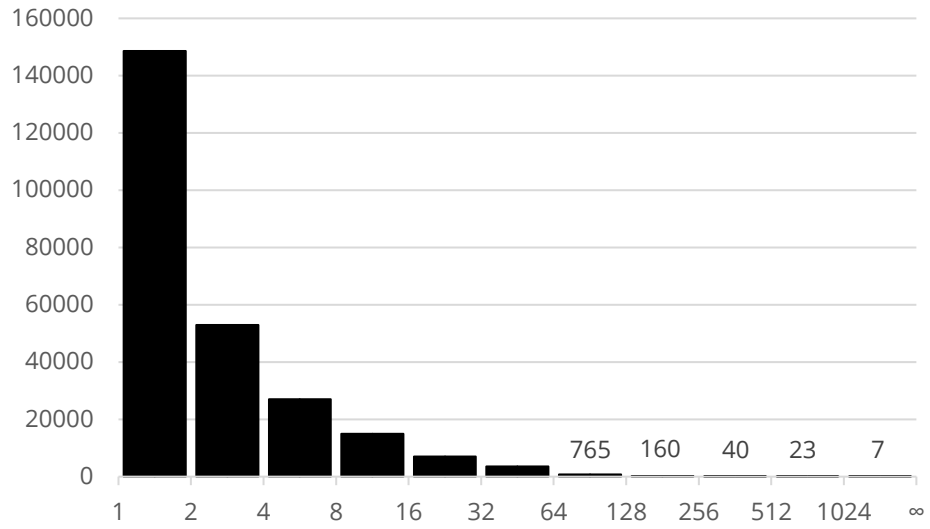

Figure 3.2 - Histogram of Number of Occurrences of one Organization ID in the PrijemcePomoci Table

3.3 Grants

The grants are located in the table **`Dotace`** which contains the list of all types of grants together with various metadata and links to other datasets. While the links to the other systems and datasets will not be covered in this section, their usage is simple and is well described in the documentation and for the basic data manipulation, a description of the columns of the grants table without the links will suffice.

Column	Description
idDotace	Unique ID of the grant
idPrijemce	Unique ID of the receiving person
projektKod	Unique ID of the project in the source system
podpisDatum	Date of signature of contract or agreement
subjektRozliseniKod	Type of subject
ukonceniPlanovaneDatum	Planned date of termination
ukonceniSkutecneDatum	The true date of termination
zahajeniPlanovaneDatum	Planned date of initiation
zahajeniSkutecneDatum	The true date of initiation
zmenaSmlouvyIndikator	True if the contract was amended
projektIdnetifikator	Unique ID of the project in the source system
projektNazev	Name of the project
iriOperacniProgram	Link to the operational programmes code list
iriPodprogram	Link to the sub-programmes code list
iriPriorita	Link to the priorities code list
iriOpatreni	Link to the measures code list
iriPodopatreni	Link to the sub-measures code list
iriGrantoveSchema	Link to the grant schemas code list
iriProgramPodpora	Link to the programme support code list
iriTypCinnosti	Link to the business activity type code list
iriProgram	Link to the programmes code list
dPlatnost	Date of validity
dtAktualizace	Date of the last update

Table 3.2 – Description of the Columns of the Table Dotace

3.4 Grant Decisions

As you probably noticed, the table of grants doesn't contain the amount of money granted. The reason is that the amount is not assigned in a single decision and also the decisions are done in a separate process than the grant application. As shown in Figure 3.3, over 83.2% of the grants have only one grant decision, 14.4% of grants have two and only 2.4% of grants have three or more grants decisions. The highest number of decisions is 629 and was made for the project of D3 Highway from Tábor to Veselí nad Lužnicí.

The important thing is there are no grants without a decision, as the grant data are put into the system only after the decision is made.

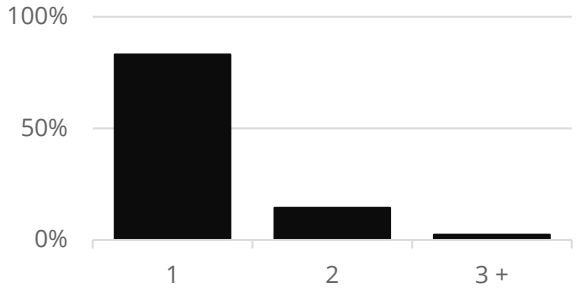

Figure 3.3 - Histogram of Number of Grant Decisions per Grant

To get the amount of the money decided to grant one must look inside the **`Rozhodnuti`** table which is described in Table 3.3. It contains both the amount requested, as well as the amount actually received. Also, the year of the decision is available for time analyses and a link to the financial categorisation of the granted amount.

Column	Description
idRozhodnuti	Unique ID
idDotace	Unique ID of grant
castkaPozadovana	Requested amount of money
castkaRozhodnuta	Granted amount of money
iriPoskytovatelDotace	Link to the grant issuer code list
iriCleneniFinancnichProstredku	Link to the financial type code list
iriFinancniZdroj	Link to the money source code list
rokRozhodnuti	The year of the decision
investiceIndikator	If true, the grant has the character of an investment
navratnostIndikator	If true, money was given as a returnable financial help
dPlatnost	Date of validity
dtAktualizace	Date of the last update

Table 3.3 – Description of the Columns of the Table Rozhodnuti

3.5 Budget Period

Despite having the requested and decided grant amount, the actually used grant money still can't be obtained from the previously mentioned tables. The amount of data in the greatest detail are stored in table **`RozpoctoveObdobi`**. This table further disassembles

the amounts specified in the **Rozhodnuti** table and tells what part of the **castkaRozhodnuta** amount was actually released (**castkaUvolnena**), drawn (**castkaCerpana**), returned (**castkaVracena**) and used (**castkaSpotrebovana**) over the time of the period which is always one year. Some metadata are also specified concerning the payments in the budget period.

Column	Description
idObdobi	Unique ID
idRozhodnuti	Unique ID of the corresponding record from the Rozhodnuti table
castkaCerpana	Drawn amount of money
castkaUvolnena	The released amount of money
castkaVracena	The returned amount of money
castkaSpotrebovana	The amount of money used in accordance with effectivity principle
rozpoctoveObdobi	The year of the budget period
vyporadaniKod	The financial settlement code: 0 = not specified, 1 = no violation of principles 2 = violation of principles.[6]
iriDotacniTitul	Link to the grant title code list
iriUcelovyZnak	Link to the purpose sign code list
dPlatnost	Date of validity
dtAktualizace	Date of the last update

Table 3.4 - Description of the Columns of the Table RozpoctoveObdobi

Same as with the grant decisions, there can be more budget periods, in case the grant spans more than a year, however looking at the data, such cases do not occur often. In fact, according to the Figure 3.4, 93.2 per cent of grant decisions have only one budget period, 6.1 per cent of grant decisions have two budget periods and only 0.7% of grant decisions have three or more budget periods linked.

[6] The value is defined by the regulation no. 551/2004 Coll.

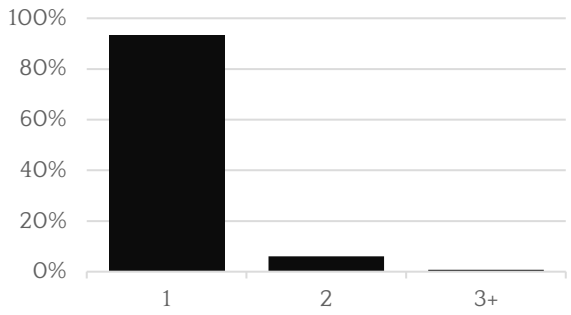

Figure 3.4 - Histogram of Number of Budget Periods per Grant Decision

4 Grant Sources

4.1 Overview

The division of grant sources starts on the top level with two categories – domestic (in the dataset where **`financniZdrojKod="t"`**) and foreign (in the dataset where **`financniZdrojKod="z"`**). The amount of grants in these groups is analysed in the figures below.

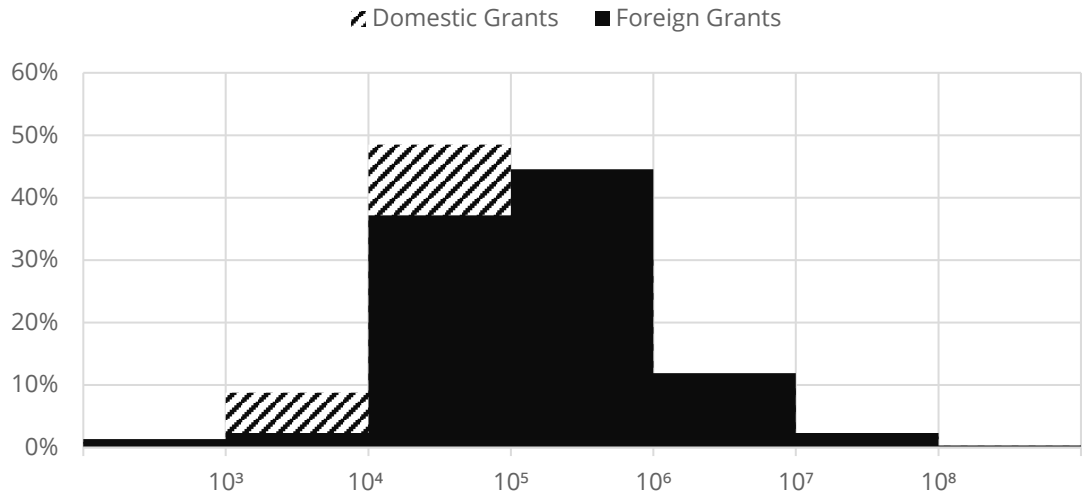

Figure 4.1 - Grants Value Histogram by Type

In Figure 4.1, a number of grant counts are shown for each grant amount bin. It is clear that the domestic grants are most often in the amount of 10,000 CZK to 100,000 CZK, but foreign funds are most often in the amount from 100,000 CZK to 1,000,000 CZK. Also, for both sources holds that 80% of grants is between 10,000 CZK and 1 million

CZK. In Figure 4.2, the amount of grants is shown in time. The total amount of foreign funds is only marginal to the total amount of domestic ones and in the last few years even shows a decreasing trend.

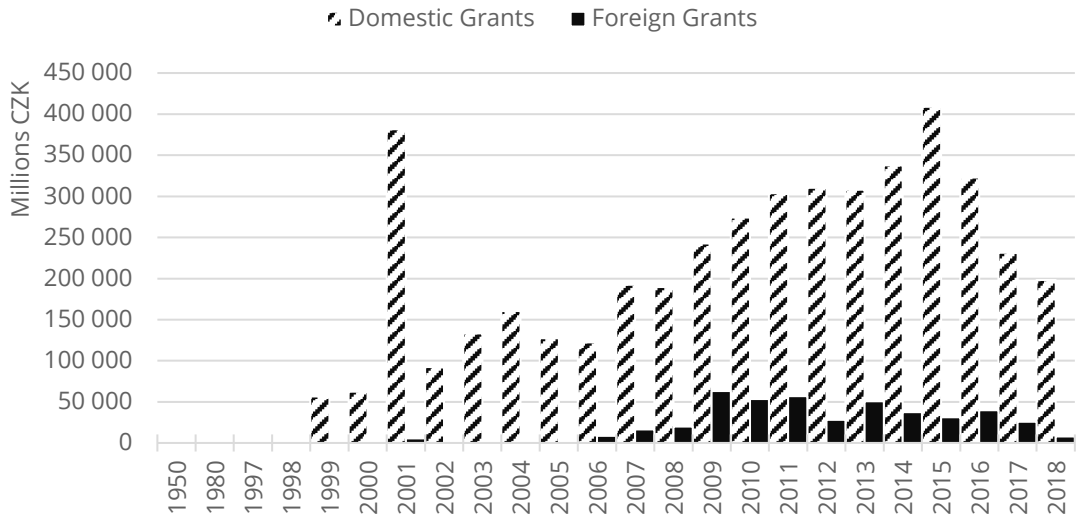

Figure 4.2 – Grants by Source (level 1) and Year

Looking at a level 2 grouping of the grant source in Figure 4.3, we can analyse what are the drivers in the previous Figure 4.2. In the domestic group which covers the first four columns is it the state budget which covers 87% of domestic grants.

The year 2001 standing has its top ten in grant on reconstruction of a hospital FN Motol for 6.7 billion CZK, a 4.8 billion CZK guarantee for a 200 million EUR loan used to finance repairing damages after 1997 flooding, numerous grants to finance construction of highways and other roads and also school campus of Masaryk University for 3.9 billion CZK.

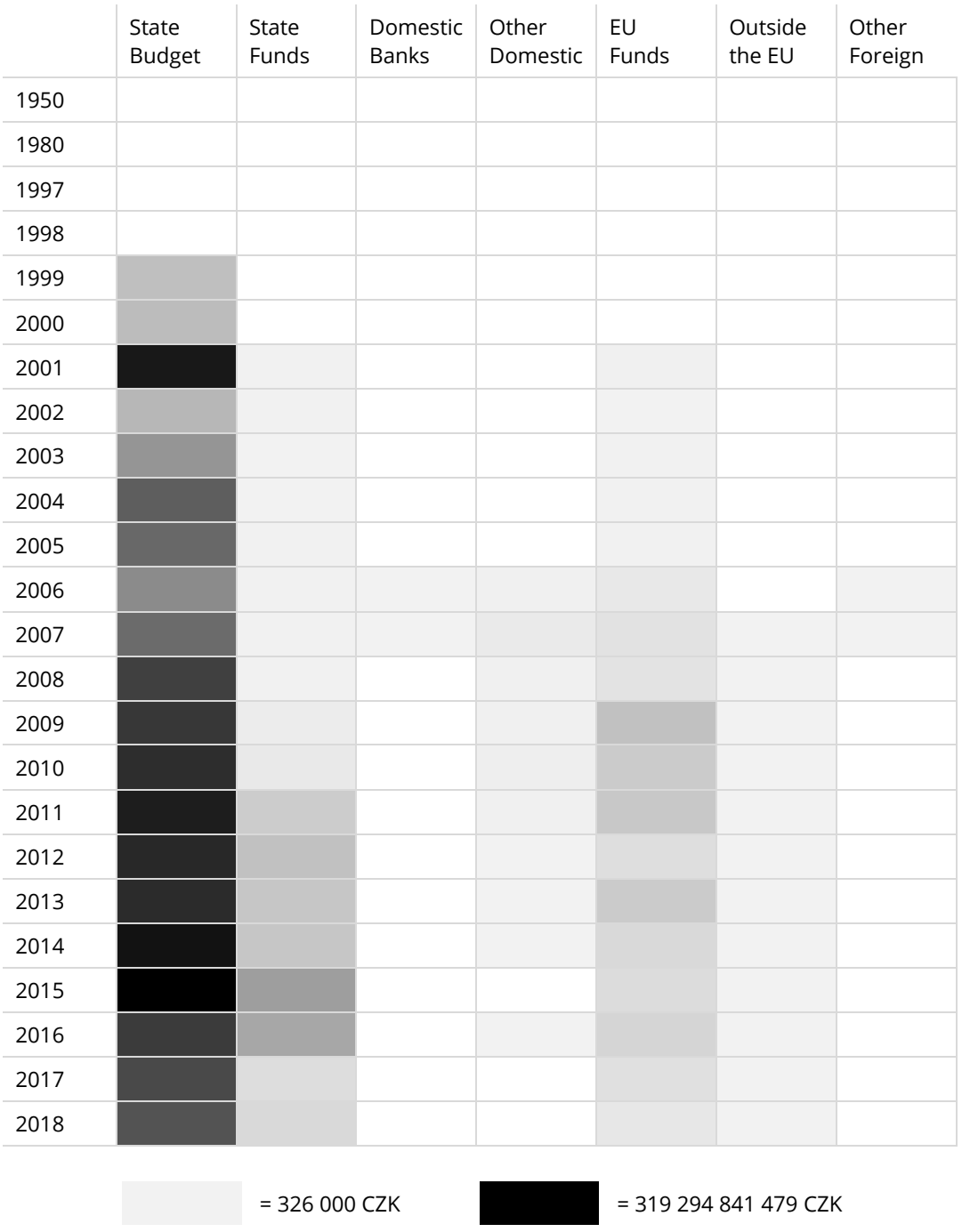

Figure 4.3 - Grants by Source (level 2) and Year

4.2 Domestic Sources

The domestic grant sources are divided into seven categories, however, only four categories are used in the grant decisions table, where grant source is stored. The largest total amount of a grant source is clearly for the state budget.

Code	Name	Amount of Grants
t1	State Budget	4,745,432,470,418 CZK
t2	State Funds	667,913,519,581 CZK
t3	National Funds	0 CZK
t5	Domestic Banks	729,738,000 CZK
t6	Regional Budgets	0 CZK
t7	Other Domestic Sources	40,411,541,384 CZK
t9	Own Sources of Recipient	0 CZK

Table 4.1 - Domestic Sources Grant Amounts

4.2.1 State Budget

The grants from the state budget are distributed by 47 central government organizations. Among these organizations are most importantly all of the 14 ministries, but also other organizations as the Office of the President. The overview of the top ten sources is provided in Figure 3.1.

t333	Ministry of Education, Youth and Sports	1,877,755,947,589 CZK
t329	Ministry of Agriculture	418,543,453,411 CZK
t398	General Treasury Management	394,918,227,797 CZK
t322	Ministry of Industry and Trade	337,613,460,804 CZK
t313	Ministry of Labour and Social Affairs	268,326,979,349 CZK
t315	Ministry of the Environment	243,720,011,947 CZK
t327	Ministry of Transport	267,457,245,458 CZK
t335	Ministry of Health	74,329,735,018 CZK
t361	Czech Science Foundation	58,355,175,750 CZK
t317	Ministry for Regional Development	70,122,557,999 CZK

Table 4.2 - Top 10 State Budget Grant Sources

The amount of state budget grants has been slightly growing in the recent years until the year 2018, however, the drop might be caused by the grants not being properly processed and saved in the system yet.

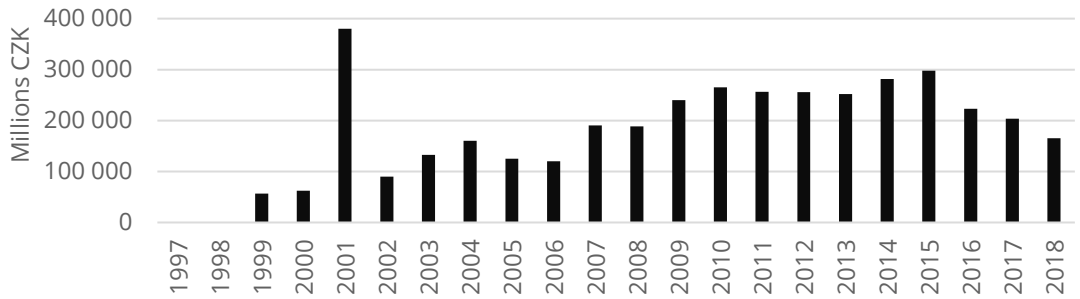

Figure 4.4 - State Budget Grants by Year

There is an interesting spike in the year 2001 which doesn't copy the overall trend and looks as though some error could be present however looking at the decomposition by the individual grant sources, the spike is present in all of them and the reason is going to be more complex.

For some of the grant sources, the grant targets are clear, somewhere it is less clear. In the following paragraphs, I will provide a brief insight into some of the grant sources.

Ministry of Education, Youth and Sports is the largest grant source by amount with the total amount of over 2 trillion CZK grants in the system. This amount is almost fifteen times its yearly budget and therefore doesn't look too right. Just looking at the largest donations, it is clear the data quality is not good. For example, the grant with the largest assigned amount of 42.5 billion CZK is for Junák, the Czech scout organization. Looking at the official documents online[7], one can find that the amount wasn't assigned but requested and it wasn't 42 billion CZK but 42 million CZK. The real assigned amount was 39.5 million CZK, which is reflected in the grant amount drawn, but not in the decision. The same problem is with few other grants from the top ten.

The other grants consist of mainly direct education expenditures with amounts of lower billions CZK each to various regional governments or to universities like the Charles University. The total share of these direct education expenditures grants is around 41% of the total.

Ministry of Labour and Social Affairs is the second largest item in the category, however since the ministry doesn't specify the grant details in the registry and all grants

[7] http://www.msmt.cz/file/40954_1_1/

are listed under the "other funds from the state budget" it is not clear from the data what is their nature.

The grants of the **Ministry of Agriculture** are almost completely covered by financial transfers to the State Agricultural Intervention Fund. Other grants are assigned for example to the water pipeline system or anti-flood measures.

Also, the **Czech Science Foundation** grants consist almost only by grants to other state institutions, more specifically, to state-owned research institutions. Among the largest receivers are the Institute of Physics, Institute of Molecular Genetics, or the Institute of Organic Chemistry and Biochemistry.

General Treasury Management grants consist mainly of grants defined by the law of the state budget[8] to regions and state institutions, however, some more targeted grants can be found to including reconstructions of elementary schools or modernization of vehicles in the Prague's public transport.

One of the smaller, but yet interesting is **the Office of the President** with only 150 grants in the period of 2001 – 2014 and the total amount of 2.3 billion CZK. The grant projects consist mostly of reconstructions of the historic buildings of the Prague Castle, the Lány Chateau and other buildings administered by the office, but also ordinary expenses, like software licenses, or lawn mowers.

4.2.2 State Funds

This grant source group consists of grants assigned by state funds. Namely, it is distributed by these six funds:

t21+t28	The Czech Film Fund	3,586,141,821 CZK
t22	State Environmental Fund	26,862,334,975 CZK
t23	The State Fund for Transport Infrastructure	489,344,312,481 CZK
t24	State Agricultural Intervention Fund	4,741,792,568 CZK
t26	The State Fund for the Culture	150,149,000 CZK
t27	The State Fund for Housing Development	16,829,932,820 CZK

Table 4.3 - State Funds' Grants Amounts

[8] The state budget of the Czech Republic is every year created as a new law

The main grant source in the State Funds group is the State Fund for Transport Infrastructure which registered grants in the total amount of 489 billion CZK. The main targets are easily anticipated. The Motorway Directorate and the Railway Directorate account for 95% of the state fund grants, more precisely 51% and 44% respectively and event from the remaining 5%, most of the grants go to road maintenance.

The time development of the State Funds is shown in Figure 4.5. While the grants in the year 2001 were only 1.8 billion CZK high, in the later years the amount grew rapidly, with a peak in 2015 with 112 billion CZK.

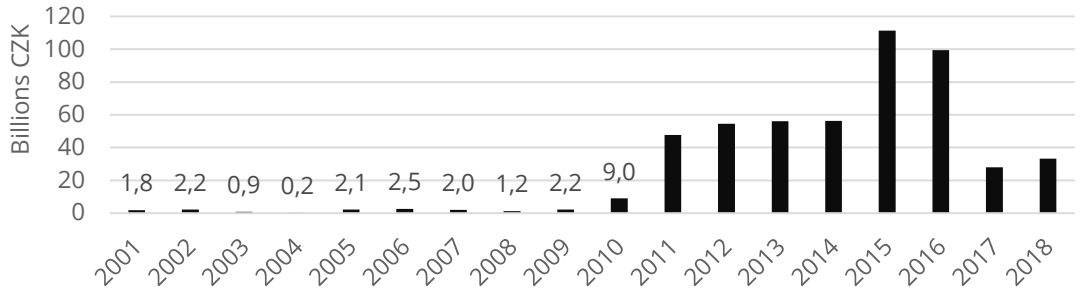

Figure 4.5 - Grants from State Funds by Year

While it may seem the railways and motorways were almost not funded in the early days, the case is that these grants are just missing from the registry. According to the annual reports, the expenditures of the State Fund for Transport Infrastructure since the establishment in 2001 never dropped below 40 billion CZK[9].

4.2.3 Domestic Banks

The grants from domestic banks are composed of solely grants for construction and maintenance of water pipelines, provided by the Czech-Moravian Guarantee and Development Bank (CMZRB), a bank created for financing development projects and owned by the state.

Among the top grants in this group are water pipelines in the city of Nymburk which were in total subsidized by 119 million CZK from the CMZRB, Hradec Králové, with a

[9] https://www.sfdi.cz/rozpocet/vyrocni-zpravy-a-ucetni-zaverky/, English version unavailable

subsidy of 81 million CZK and Vsetín with 54 million CZK, however also smaller grants in the order of millions were provided to smaller municipalities.

4.2.4 Other Domestic Sources

The other domestic grants consist of 10 grants, including industrial parks in Ostrava, Holešov and others, an extension of the subway in Prague from Ládví to Letňany but also a 1.1 billion CZK grant for the construction of the building, where this thesis was written, the National Library of Technology.

4.3 Foreign Sources

The domestic foreign sources are in the system divided into five categories, however, only three categories are used in the grant decisions table, where grant source is stored.

Code	Name	Amount of Grants
z2	EU Funds	461,271,903,499 CZK
z3	NATO Funds	0 CZK
z5	Foreign Banks	0 CZK
z6	Foreign Sources Outside the EU	5,440,111,620 CZK
z7	Other Foreign Sources	1,793,000 CZK

Table 4.4 - Foreign Sources Grant Amounts

The largest total amount of grant sources is clearly for the EU funds with the amount of 461 billion CZK, a 98.8% share of the foreign sources.

4.3.1 EU Funds

The Czech Republic entered the European Union on the 1st of May 2004, eight years after applying for the entrance in 1996. But despite that, as shown in Figure 4.5, there are grants from the European Funds in the grant registry in 2001. These were funded from pre-accession programs.

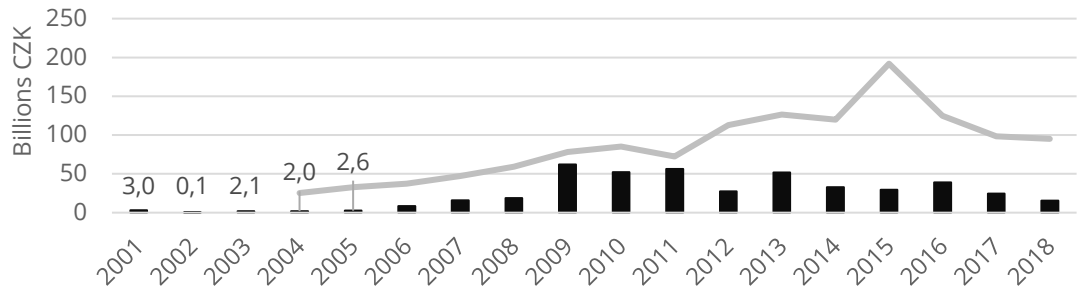

Table 4.5 - State Budget Grants by Year[10]

Also, interestingly, the evolution of the grant decisions a registered in the grant registry does not copy the Czech Republic's net position towards the EU. The reason for this difference is not clear directly from the data in the registry and would require analysis which is out of the scope of this thesis.

The complete structure of EU Funds s shown in Table 4.6 below and further examined and described in the following subchapters. For the simplicity, the EU Structural Funds have been merged with the Other EU Funds category, as the funds mentioned in the latter category have originated as a replacement for some of the funds from the former category. To provide the reader with a basic idea of the various grant sources that are important in the grant distribution the total amount of castkaCerpana variable is included in the Amount of Grants column.

Code	Name	Amount of Grants
z21	Instruments for Pre-Accession Assistance	8,922,942,572 CZK
z211	PHARE	4,310,879,000 CZK
z212	SAPARD	2,599,877,411 CZK
z213	ISPA	2,012,186,161 CZK
z22	EU Cohesion Fund	204,767,631,335 CZK
z23	EU Structural Funds	241,087,562,524 CZK
z231	European Regional Development Fund	117,563,375,257 CZK
z232	European Social Fund	112,623,405,669 CZK
z233	European Agricultural Guidance and Guarantee Fund[11]	962,186,793 CZK

[10] Net position source: Open Data of the Ministry of Finance, http://data.mfcr.cz/en/node/117
[11] The fund was replaced by the European Agricultural Fund for Rural Development in the 2007 by the European Council Regulation No 1290 (2005)

Code	Name	Amount of Grants
z234	Financial Instrument for Fisheries Guidance[12]	25,868,318 CZK
z24	EU Solidarity Fund	779,909,025 CZK
z29	Other EU Funds	5,713,858,043 CZK
z291	European Agricultural Fund for Rural Development	3,495,509,242 CZK
z292	European Fisheries Fund	655,751,194 CZK

Table 4.6 - EU Funds Grant Amounts

Instruments for Pre-Accession Assistance

These grants were sourced funds like PHARE (Poland and Hungary: Assistance for Restructuring their Economies), SAPARD (Special Accession Programme for Agriculture and Rural Development) or ISPA (Instrument for Structural Policies for Pre-Accession) which were as of 2007 replaced by the single IPA (Instrument for Pre-Accession Assistance).

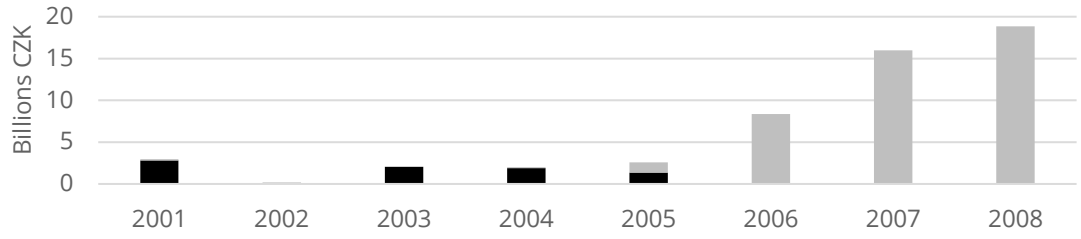

Figure 4.6 - Accession and Other EU Funds Comparison by Year

As the name suggests, these are grants that are distributed for countries before they join the EU. Looking at Figure 4.6, the data from the grant registry proves this. The grants from the accession funds in 2004 and 2005 were distributed from the prolonged period of the PHARE fund which was slowly phased out after entering the European Union (Ministry of Regional Development 2003).

EU Cohesion Fund

The Cohesion Fund is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90 % of the EU average. It aims to reduce economic and social

[12] The fund was replaced by the European Fisheries Fund in the 2007 by the European Council Regulation No 1198 (2006)

disparities and to promote sustainable development. (European Commission 2019-04-29). The grant distribution in time is shown in Figure 4.7.

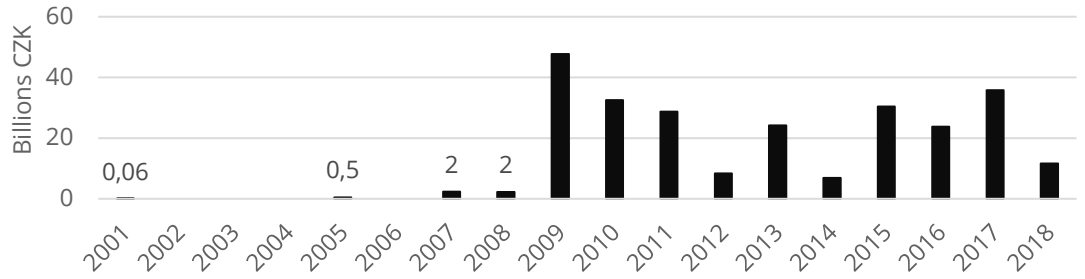

Figure 4.7 - Cohesion Fund Grants by Year

EU Structural Funds & Other Funds

The main sources for the structural funds' grants are the European Regional Development Fund and the European Social Fund. Together they account for 99.4% of the total amount (50.9% and 48.5% respectively).

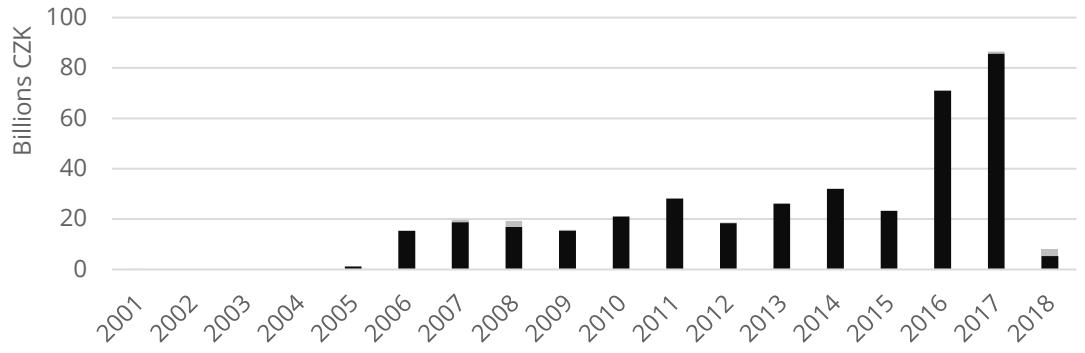

Figure 4.8 - EU Structural Funds and Other Funds by Year

EU Solidarity Fund

The European Union Solidarity Fund (EUSF) was set up to respond to major natural disasters and express European solidarity to disaster-stricken regions within Europe. The Fund was created as a reaction to the severe floods in Central Europe in the summer of 2002. (European Commission 2019-04-29) The value of the grants is positive only for the years 2010 – 2013 with an increasing trend, as shown in Figure 4.9.

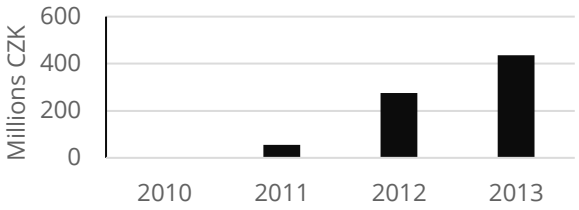

Figure 4.9 - EU Solidarity Fund Grants by Year

4.3.2 Foreign Sources Outside the EU

These are mainly EEA grants and Swiss Contribution grants. The EEA and Norway Grants are the financial contributions from Iceland, Liechtenstein and Norway to European solidarity and cohesion. In the programming period 2014-2021, 2.8 billion EUR has been made available for projects, reinforcing EU investments in central and southern Europe. (European Commission 2019-04-29)

The Swiss Contribution is a programme, since 2007, in which Switzerland has been participating in various projects designed to reduce the economic and social disparities in an enlarged EU, with the total amount of 1.302 billion CHF. Switzerland decided autonomously which projects it supported and agreed on this directly with the partner countries. Switzerland's commitment to EU enlargement is an expression of solidarity. (Swiss Confederation 2019-05-04) The data about grants from the Swiss Contribution are only in the year 2012 of grants drawn (which is used in Figure 4.10). Looking at the grant budget year, it is spread among the years 2016, 2017 and 2018.

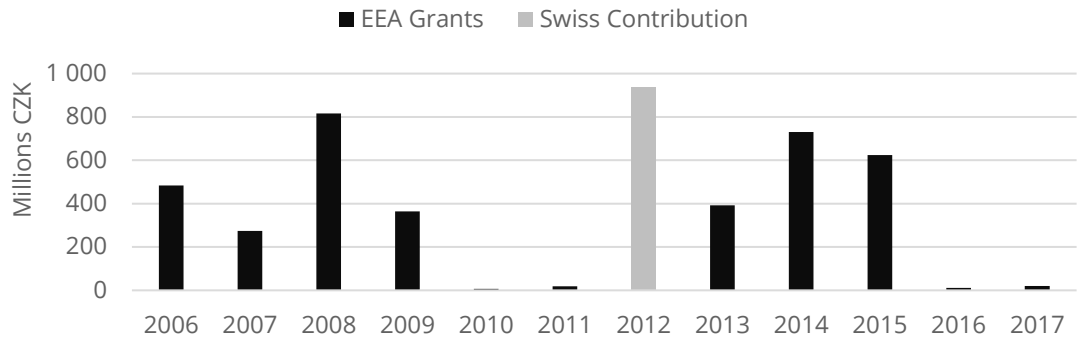

Figure 4.10 - Foreign Sources Outside EU by Year

4.3.3 Other Foreign Sources

The two years, 2006 and 2007, with non-zero grants from the other foreign grants visible in the Figure 4.3 are consisted of only two grants, one from Ministry of Health to

build a therapeutic centre Kolpingovo dílo and a second one a grant from the General Treasury Management for the reconstruction of an elementary school in the city of Jablonec nad Nisou. It seems both of these grants were categorized as other foreign grants by mistake and this category is otherwise empty.

5 Receivers of Grants

There are many types of grants in the grant registry. In the second part of this thesis, I am using only grants distributed to companies (stock companies and limited liability companies, etc.), however, they are not the largest group of receivers in the registry.

The largest amount of grants goes to the regional governments[13], they have 1.39 trillion CZK that is 26.6 per cent of the grants stored in the registry. That is almost three times more compared to the second largest receiver tertiary education schools (universities and colleges) which have a share of 497 billion CZK that is 9.5 per cent. The stock and limited liability companies account together to 12 per cent of the grants.

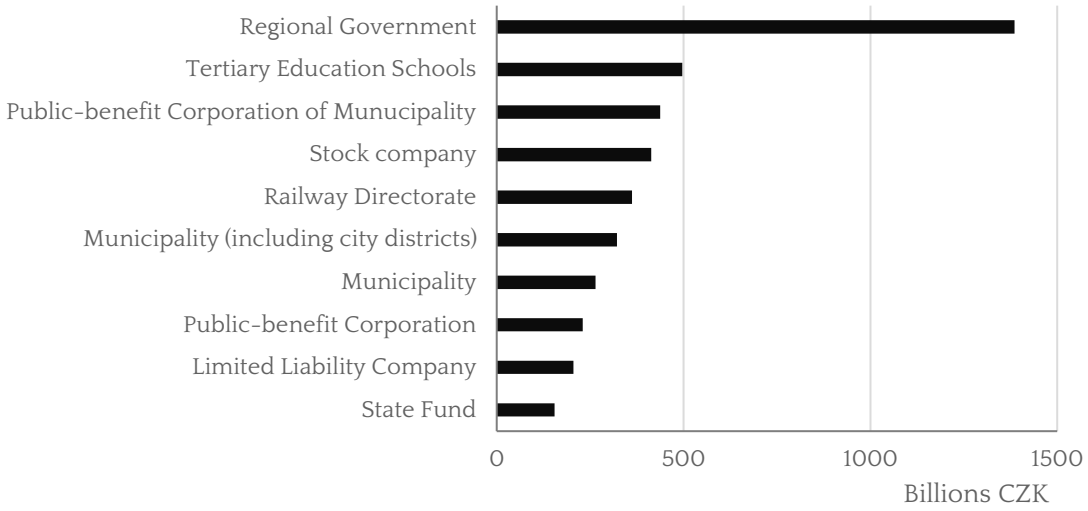

Figure 5.1 - Top Ten Legal Forms of Receivers of Grants

[13] Here the regional governments are the second highest administrative-level administrative unit in the Czech Republic after the state government.

Taking a simple view of aggregation over the grant money assignment decisions, we can get a list of counterparties with their assign amounts. Note that these are government, European and other grants all together for the whole timespan contained in the CEDR database. Unsurprisingly the largest amount assigned is to the three big state-owned companies: Road and Motorway Directorate a state-owned company managing the construction of highways, Railway Directorate, a company for railroad construction and railroad stations operations and the State Agricultural Intervention Fund. The next five entities are regions of the Czech Republic. Capital City of Prague, Moravian-Silesian Region, Central Bohemian Region, South Bohemian Region and Region of Usti. The last in the top ten is the Charles University, the largest and oldest university in the Czech Republic.

Name	Grant Amount
Road and Motorway Directorate	491 billion CZK
Railway Directorate	341 billion CZK
The State Agricultural Intervention Fund	272 billion CZK
Capital City of Prague	170 billion CZK
Moravian-Silesian Region	167 billion CZK
Central Bohemian Region	148 billion CZK
South Bohemian Region	146 billion CZK
Region of Usti	117 billion CZK
Charles University in Prague	102 billion CZK

Table 5.1 - Top Ten Receivers of Grants

6 Grant Projects

In Table 6.1, the most subsidized projects as shown in the registry, are listed. The largest subsidy project is aimed at direct education expenditures. It is quite positive that the second largest subsidy project despite being more than eight times smaller, is aimed at renewable energy sources. Followed are more projects aimed at education and also road construction and construction of the subway in the Czech Republic's capital.

Project[14]	Grant Amount
Direct Education Expenditures	659 billion CZK
Renewable Energy Sources	77 billion CZK
Regional Schools	71 billion CZK
Maintenance of Railroads	61 billion CZK
Private Schools	34 billion CZK
Maintenance of First-Class Roads	21 billion CZK
Freeway D3	19 billion CZK
Highway R6	18 billion CZK
Subway in Prague	16 billion CZK
Freeway D1	16 billion CZK

Table 6.1 – Most Subsidized Projects

7 Conclusion

The amount of money distributed using the grant channels amounts to more than a quarter trillion CZK. It is true that most of those are grants are provided by state for state, i.e. provided to state organizations on the base a law, but almost 12% of the grants, 620 billion CZK have been distributed to stock and limited liability companies. The distribution of these grants is diversified to 254,814 companies. The distribution is however far more skewed than the pareto principle (which would say 80% of grants being distributed to the 20% of companies) as 70% of grants have been distributed to only 1% of the companies.

Despite the foreign grants being of higher amounts per grant, they amount to only 8.95% of the total grants in the registry and unlike with the domestic grants, where we can see an overall rising trend, the foreign grants have a decreasing trend since their peak in 2009.

Realizing the amounts of grants described in this part, it is clear that analysing the data from grant registry is very important and may provide vital hard data foundation to base economic policies on.

[14] Names of the projects were translated and generalized.

The Effect of Political Connections

1 Introduction

As noted in the previous part of this thesis, the amount of grants in the Czech Republic is vast. Distribution of such amounts needs to be as fair and as controlled as possible, without leaving an opportunity of influencing this distribution. But despite the hard effort some influence can always be present. It is a task for economic research to watch and analyse the operation of government in these cases and to search for such incorrect behaviour.

Thus, while the first part of this thesis tried to describe the data as statically and as unopinionatedly as possible, the second part will try to connect the political connections of the companies which is here proxied as donations to political parties to the received grants by these companies. Also, while the first part was looking on the data as a whole, this part is targeting only the subset of the grants received by companies.

The results the econometric analysis show that a relation between political donations and grant decisions is present, significant and positive in the means of binary outcomes, i.e. companies donating to a political party have a higher success rate at receiving a grant. These results are valid for grants from the state budget and also, although with lower magnitude, for grants from the EU Funds. The proportional relation, i.e. if companies donating have higher grants was not found.

The data on grants in the Czech Republic lack a corresponding attention by economic analyses, despite being publicly accessible. The results presented here help to fill in this gap by connecting this data to the data about political donations, which is an analysis that hasn't been done in the Czech Republic before and the yielded outcomes should be very important for the development of the future economic policies.

This part of my thesis is divided into several chapters. Firstly, I am providing the reader with a context in which my analysis is done, using mainly findings and discussions of previously published works of researchers doing similar analyses. In Chapter 3 I am describing the data used for the analysis, most importantly the company information and political donations datasets, as those weren't described in the first part of this

thesis, and also the transformations of the data that have been made before the analysis. In the Methodology chapter, I am describing the process that was used to get the results, what methods were used, how and also what is the theory behind these methods. The last two chapters are dedicated to presenting the results and discussing the inference that may be taken from these results.

2 Context

The purpose of this chapter is to set grounds for the data analyses following in the next chapters and define the context in which these analyses are going to be performed. The various ways of political connections, as well as various means of impact on the connected entities well-beings, are discussed and defined in order to minimalize possible misunderstandings while analysing the data.

The other purpose of this chapter is to introduce the work of others concerning this topic, as for one it is a part of the context and the reader should have the opportunity to compare and for two, as much has already been written on the topics of political connections and influencing the politicians that I feel I need to describe the empty space this thesis is hoping to fill in.

This chapter will try to fulfil both of these purposes simultaneously.

2.1 The Value of Political Connections

One might argue the political connections of the firms are not a problem. The sole fact of the firm being owned or co-owned by a politically active person or being differently connected might have various reasons and doesn't necessarily mean there is anything bad. From one point of view, nations should even encourage successful entrepreneurs and company owners to join politics to share their experience and help build a better country. On the other hand, we see countries swarming with corruption, where politically linked firms benefit from their connections and lower the state procurement efficiency. The important part is not in the political link of a subject, but the gained value because of this link.

There is solid evidence of value being gained from political connections throughout countries of the world. In Denmark which is a country with one of the lowest corruption index values Amore and Bennedsen proceeded with an analysis of

changing corporate performances of companies with and without political connections. They analysed over 400 firms around 2005 elections and watched for the changes of profitability linked to changes in political positions connected with both elections and an administrative reform that was merging municipalities. Their findings confirm that political networking at a local level can be a powerful business strategy and also that the value of political connections is higher among less productive firms. (Amore and Bennedsen 2013)

Also, in the Czech Republic, a work by Miroslav Palanský suggests that being connected to political parties through donations of persons to parties does pay off. His study analysed the entire population of firms in the Czech Republic together with the data on political linkages and political donations. As a conclusion from his analyses, he states that the effect of being politically connected is +1.06 percentage points in return on equity and +0.331 percentage points in return on assets. His study also finds that amount of the donations does not have a significant effect which might mean it is the link to the politician not the donated money that makes the value of the political connection. (Palanský 2016) Later in 2019, Titl and Geys did similar research for the period from 2007 to 2014 and they found that firms donating 10% more to a political party gaining (losing) power witness an increase (decrease) in the value of their public procurement contracts by 0.5–0.6%. Moreover, they discovered that donating firms receive more small contracts allocated under less regulated procurement procedures face less competition in more regulated and open procurement procedures, and tend to win with bids further above the estimated cost of the procurement contract. (Titl and Geys 2019)

In Italia, Ciangano and Pinotti conducted analysis on the employer-employee data on a sample of firms combined with the list of individuals appointed to local governments and quantified the revenue premium granted by political connections to 5.7% by increasing domestic sales when company politically linked. They also found out that this premium is valid only for producers for the public administration and is higher for areas with and high corruption levels. (Cingano and Pinotti 2013)

In Indonesia, Raymond Fisman made an analysis on a sample of 25 business groups with the data on their political connections to the president Suharto. These groups experienced a drop in their stock values just following the news about his worsening health. (Fisman 2001)

So, as you can see, the political connections have a significant influence on the firms and therefore on the economy as a whole. It is important to analyse different sources of this influence, to understand its motives and methods in order to be able to formulate steps that need to be taken to straighten the firms' relations.

2.2 Defining the Political Connection

Reading previous paragraphs, you might notice that we were talking about impacts of political connections on either direct financial well-being of firms, or on indirect consequences as public procurement competition imperfections or misuse and misassignment of financial subsidies, but we have not defined what are these political connections, where do they come from, how are they created, and most importantly: how can they be identified or even better, how can they be measured.

Looking at the literature, political connections don't have a commonly used definition. It is probably because most data-based large-scale works done in this field were published only in recent years. The first rigorous international study that focused on personal ties between politicians and firms was Politically Connected Firms by Mara Faccio (2006). She identified a firm to be politically connected if one of the company's large shareholders or top officers either was a member of parliament, a minister, head of state or a close relative to a top official. In her work, she focused on the correlation of this political link and the company stock prices. As a result of her analysis she proved that the stock prices tend to increase after the political link has been established, i.e. a large shareholder of the firm becomes a politician.

The personal ties are one of the widely used definitions of companies' political connections, however not the only one. Data on personal affiliations with companies don't have to be public or may be hard to access due to either legislative or technical obstacles. Besides, even when the dataset on company ownership is public and easily accessible, the companies can be owned through intermediaries, such as offshore companies or other entities acting as straw persons. Moreover, personal relationships other than ownership may play an important role in political connections. Many cases of using relatives which are as per business register and other official sources of information independent persons to hide the true link between companies and politicians have been encountered in the Czech Republic in the recent years. These data are hard to obtain due to either their physical availability or due to personal data

protection laws, including the recent European General Data Protection Regulation (GDPR)[15]. There were studies outside the Czech Republic which incorporated family relationship data namely Amore and Bennedsen (2013), who managed to obtain family relations for people in Denmark, however there might be other relationships that simply can't be covered and therefore it is important to keep in mind that the political connections made using personal relationships will always be underestimated.

Another method of identifying the political connections used is using some available, well-defined proxy. It does not have to be proxy for personal connections as discussed in the previous paragraph, but just some variable which could indicate a political link of some type. One such possible proxy is the total amount of donations and/or campaign contributions to the political parties or election candidates. It is a narrowly defined measure which can be quantified and it is usually easily obtained, as these donations are usually published on the internet, either in separate reports or as a part of transparent accounts of the candidates or political parties. This proxy has been used in previous studies, for example in the United States by De Figueiredo and Edwards (2007) who used panel data on campaign contributions to politicians, and also other studies which analysed data on firms contributions including Ansolabehere, Snyder and Ueda (2004), Cooper, Gulen and Ovtchinnikov (2010), Jayachandran (2006), Snyder (1990) and Witko (2011). Another example is from Brazil, where Claessens et. al. (2008) analysed a dataset of firms and candidates and their campaign contributions and found that Brazilian firms that provided contributions to (elected) federal deputies experienced higher stock returns around the 1998 and 2002 elections.

There are also some papers analysing donations to political parties instead of individual candidates. Namely Baltrūnaitė (2016) who found that firms that donated money to political parties of Lithuania were more successful in public procurement competitions, and soon after that Palanský (2016) who assessed the financial performance on companies that donated money to political parties in the Czech Republic and estimated the effect of the political connections on the profitability of companies donating to the political parties to be as high as 20 to 30%. Moreover, as the use of donations to the political parties is not just a binary variable, it can be measured

[15] General Data Protection Regulation

and we can watch if the higher profitability from the political connection is connected just with the donation or rises with its amount. Palanský executes this analysis and reports that the correlation is significant and positive, therefore as he quotes, "the results suggest that the connections established through corporate donations to political parties may be regarded as a form of short-term investment". (Palanský 2018)

2.3 Subsidy as a Benefit of the Political Connection

In the previous chapter, we have seen many cases of companies benefiting from political connections. The main variable being pursued was usually the profit of the companies before and after the change in political ties or political coalitions in the government. In many cases, the monitored companies benefited from these connections and their profit grew.

But what are the ways the profit was maximized? Previously mentioned works suggest a relation with the amount of public procurement targeted towards connected companies. In the Czech Republic, these correlations can be found mainly in the sector of construction. There can however be ways to "help" connected company, some of which even don't have to maximize their profit, but ease their operation, or allow their operation at all.

Since the entry of the Czech Republic to the European Union, one of the most closely monitored issues besides public procurement have been European Union subsidies. Just to stress the fact, only recently the prime minister of the Czech Republic, Andrej Babis, has been accused of misuse of these funds. But he is definitely not the only one accused of misuse of either European or Governmental subsidies at the same time when connected to a political party. Despite the recent popularity of European subsidies, the same goes for national subsidies or subsidies from different sources.

As far as I know this is the first study to examine the relation of subsidies and political connections. The aim of this thesis is therefore to shed light on the correlations of political connections and use the allocation of the subsidies. I, as a public servant on the Ministry of Finance, am aware of the ways these funds are allocated and that it is not simple to influence the allocation of e. g. European subsidies from the position of a politician, however, this help does not have to be that direct. The allocation of European subsidies is a very complex process and the ones who know its details (e. g.

how to write a successful application) or even some inside information, can be significantly more successful in these assignments.

As stressed in the past paragraphs and in the introduction, the success in subsidy assignment process does not necessarily mean unhealthy, fraudulent or otherwise unwanted actions. There are in my opinion always two parts of true econometric analysis and that is a rigorous mathematical and statistical analysis of the data and resulting correlations and discussion over this data where data quality, properties of the models used and overall context of the data are taken into account.

3 Data

3.1 Overview

The data I am using come from three sources: the grants registry which is described in the first section of this paper the political donations data and company information data. In Table 3.1, I present the total amounts and counts of data contained in these sources for the reader to create the idea of the data volume used.

The amounts provided are raw counts and sums taken straight from the database and are therefore different than the numbers presented in chapter 3.6 Datasets Used for Calculation. Especially the values for the Grants Registry are expected to be exaggerating, as in this form they were not treated by any filtering or more sophisticated aggregation that just simple sum of amounts.

Political Donations	
Amount of Donations	3.597 mil CZK
Amount of Donations by Legal Persons	1.898 mil CZK
Average Yearly Amount of Donations	156 mil CZK
Average Yearly Amount of Donations by Legal Persons	83 mil CZK
Number of Persons	6,917
Number of Legal Persons	6,421

Grants Registry	
Amount of Grants	12,103,643 mil CZK
Average Yearly Amount of Grants	504 318 mil CZK
Number of Persons	255,105
Number of Legal Persons	141,365
Number of Private Companies (stock and LLC)	69,286
Company Information Database	
Number of Companies	478,478

Table 3.1 - Overview of Data Sources

3.2 Data Sources

3.2.1 Grants Registry

A thorough description of the Grant Registry and its data is done in the first section of this paper, Grants in the Czech Republic.

3.2.2 Political Donations

The data on political donations have been acquired through a Czech NGO called EconLab which publishes the structured dataset on their website politickefinance.cz[16] (aka "Political Finances") either as CSV bulk download or accessible using an application interface where one can obtain information on just the donors he or she is interested.

The true source if this data is however not so easily accessible. The information about donations and donors are indeed accessible and must be published by law, however, most political parties fulfil this requirement by appending a scanned image of a table with donors to their annual reports. These data have been manually gathered and structured by EconLab[17] for the years 1995 – 2016 which enabled writing of many analytical and academic papers including this thesis. As we will see further, the data is available also for the year 2017 which has been provided by another NGO Hlidac statu,

[16] English version: http://www.politickefinance.cz/en/
[17] English version: https://www.econlab.cz/en/?force=true

z.s.[18] (aka "State Overseer") which is harvesting data from the transparent accounts of political parties which are compulsory by the law no. 247/1995 Sb. concerning elections to the Parliament of the Czech Republic, as successively amended with effect from January 2017.

The dataset contains 88,305 individual donations by both natural and legal persons of the total amount of 3.59 billion CZK. The structure is presented in Table 3.2.

Legal Form	Amount	Count
Natural Person	1,698,172,644 CZK	75,921
Legal Person	1,898,343,545 CZK	12,384

Table 3.2 - Legal Form Structure of Political Donations Dataset

It is important to note that the donations I am using for my analysis will be only those from legal persons as only those I am able to connect with received grants. Therefore, the effects found in chapter 5 might be underestimated as donations are often made by natural person middlemen such as the company owners or their relatives.

The time evolution of donations is shown in Figure 3.1 below. For relevancy reasons, two non-financial donations to the Czech Social Democratic Party from years 2001 and 2003 were removed as they came from a company that is 100% owned by the party. The black columns are years when the most important elections to the Chamber of Deputies took place, grey columns are years when only elections to The Senate took place and white are when none of the proper parliamentary elections had taken place.

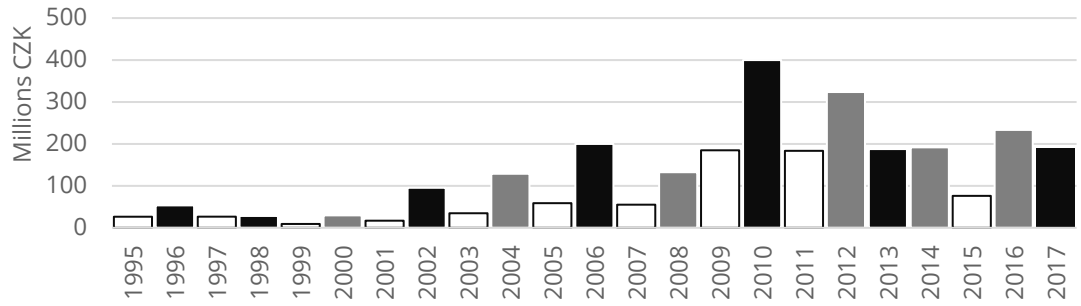

Figure 3.1 – Donations to Political Parties by Year

[18] https://www.hlidacstatu.cz/ucty, English version not available

A more detailed look presented in the next two figures shows the distribution of the donations among political parties and also among political parties in time. The greatest receiver of political donations is clearly the right-wing party ODS, with main donations from the famous hockey player Jaromír Jágr (total amount of 21.6 million CZK) during the years 2006 – 2012 and a dataset-wide individual largest donation of 15 million CZK in the year 2010 by Zdeněk Bakala, a controversial Czech billionaire. Despite being founded as late as 2012, the second biggest receiver of donations is a party ANO (aka "Yes") founded by another controversial Czech billionaire, Andrej Babiš, who, as mentioned in the Introduction, is currently being investigated for misuse of EU Funds. Closing the third place is TOP09 a conservative, party, with donations in the total value of 12 million CZK from Dušan Novotný, an entrepreneur from Brno, and also 8 million CZK from the already mentioned Zdeněk Bakala.

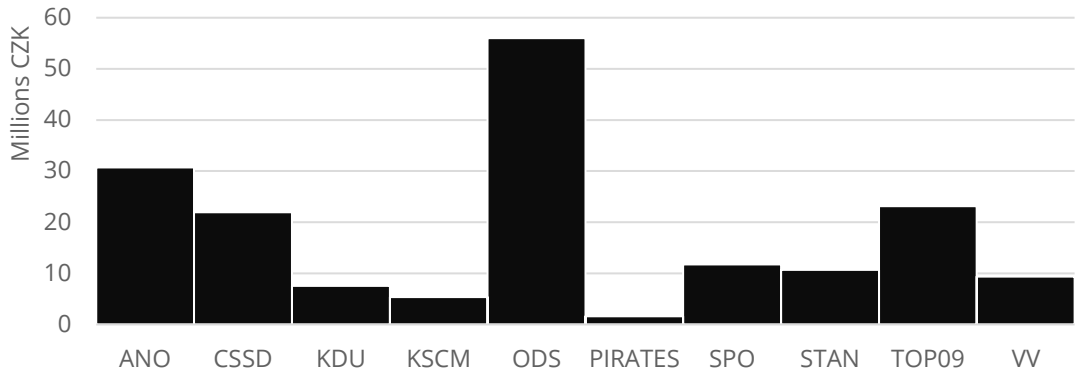

Figure 3.2 – Yearly Donations to Political Parties Averaged by Party

	ANO	CSSD	KDU	KSCM	ODS	PIRATES	SPO	STAN	TOP09	VV
1995										
1996										
1997										
1998										
1999										
2000										
2001										
2002										
2003										
2004										
2005										
2006										
2007										
2008										
2009										
2010										
2011										
2012										
2013										
2014										
2015										
2016										
2017										

= 80,694 CZK = 57,423,486 CZK

Table 3.3 - Donations by Political Party and Year

3.2.3 Company Information

The company info is taken from Magnus, a private database created by the company Bisnode Czech Republic which contains mostly hand-collected data from the firm's annual reports on all of the firms that had operated in the Czech Republic since 1993 until 2014. The variables provided re the volume of operating assets, capital, financial result, number of employees, NACE section, turnover category and location of the company. The time structure of the dataset is shown in the following figure.

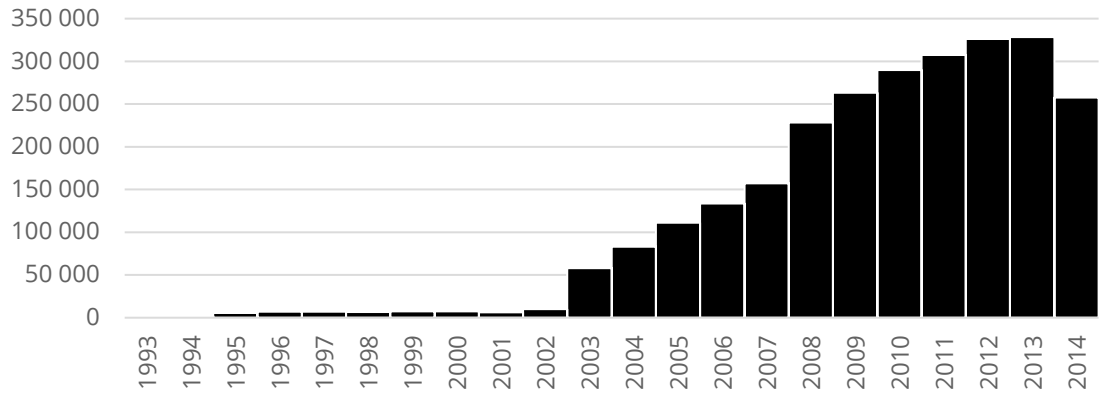

Figure 3.3 - Magnus Database - Company Count by Year

3.3 Timespan

I will be combining several different datasets and each of these datasets had been gathered in a different timespan. And moreover, event inside the dataset of grants, different grant sources have a different data timespan. The different timespans are visualized in the following figure.

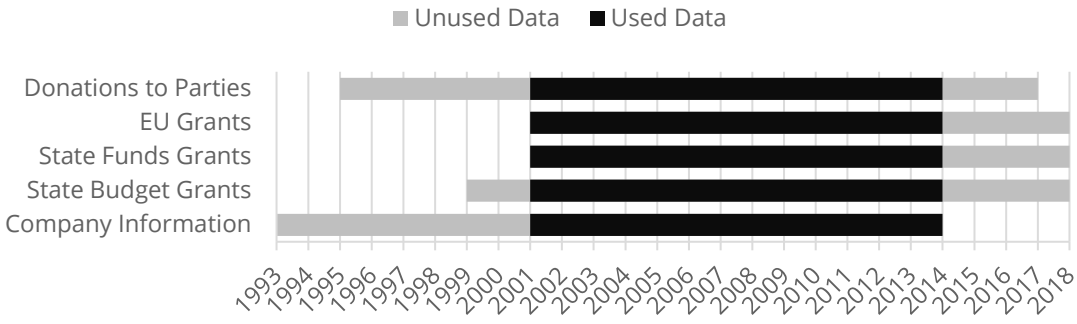

Figure 3.4 - Timespan of Data Sources

While grants datasets have been gathered up until the present year, but only since the year 2001 (1999 for state budget), the company information dataset that I have available is since the beginning of the existence of the modern Czech Republic state, the year 1993, however only up to the year 2014.

For the main analyses of grants and political donations dependence, I will, therefore, use the intersection timespan of all of the needed datasets that is data of 14 years length from the years 2001 till 2014.

3.4 Merging the Data

Each of the used data sources has a different extent. To form a single dataset that can be used for the calculations, in some cases observations have to be dropped, in other cases, zero values will be assumed.

For creating the control group using the propensity score matching method, the bigger the dataset of firms, the better. As the base dataset, I am therefore taking the company information data described in 3.2.3. To this data, I am joining grants amounts from the grant registry and political donation amounts from the political donation data, both using LEFT JOIN operation[19].

The company information dataset promises to include all of the companies since the year 1993, however according to my findings, this is not entirely true.

Merging with Grants Registry

Taking the 69,286 unique ids of either limited liability companies (s.r.o.) or stock companies (a.s.) from grants registry and matching them with company information data provides 18,973 unmatched ids, i.e. 27% of companies have to be dropped. In the resulting dataset, there are therefore observations for 478,478 company ids (the count of company ids in the base table), with 50,313 companies (10.5%) having at least one matched grant amount.

Merging with Political Donations

The political donations dataset contains 6,421 unique legal person organisation ids. When joining the company information database, for 1,530 companies (23.8%), a matching company in the company information dataset is not found. For 4,891 companies out of the 478,478 companies in the company information dataset, political donations information is added.

[19] This operation leaves all records in the base table and appends information from the corresponding rows in the joined table

3.5 Subsampling and lagging

I have computed average treatment effect on the treated (ATT) for both the actual amount of received grants and for the indicator of any grants received on the various grant sources. Also, I included separate results for different time of donation relative to the received grant. The results are grouped into 4 categories of grant source:

- All Sources – all sources added up
- EU Funds
- State Budget
- State Funds

and 3 categories of donation time:

- Same Year – donation in the same year as received grants
- 3Y Fwd – donation in the three years following the year when grants were received
- 3Y Back – donation in the three years preceding the year when grants were received.

As it might seem these are subsamples of the original dataset, the reality is not so straightforward. In all of the models I am computing, the same, the full number of observations is used. The number of companies and years stays the same. The difference is not done by selecting observations, but by how the aggregations of grants are made. For example, in the EU funds grant source for each company in each year, only grants of the EU funds source will be summed up. This also means that the company will have its **grants_amount** variable equal to zero despite receiving grants in a certain year if the grant wasn't of the required type.

The interpretation of the donation time grouping is more straightforward. For the 3Y back data, I am adding a new variable which equals one if and only if the lags of the **pd_amount** variable for the previous three years were positive. For the 3Y Fwd, I am doing the same, except I am searching for forward lags of the variable.

Due to the lags, the different donation time groups limiting the timespan will have different numbers of observation. The overview of a number of observations is provided in Table 3.4.

	Total count	Treated Count
Same Year	1,097,132	4,142
3Y Back	1,042,322	7,655
3Y Fwd	791,581	7,458

Table 3.4 - Numbers of Observations for Different Donation Time Groups

3.6 Datasets Used for Calculation

After the data transformation steps described above, three datasets were created to be used in my calculations. The first dataset containing all grant sources aggregated and two datasets grouped by grant sources by level 2 and 3 in a way that allows for basic subsampling using the SQL WHERE constraint.

Aggregation	# of Records	Disk Size
All Grant Sources	2,575,854	420 MB
Level 2 Grant Sources	10,303,416	1,680 MB
Level 3 Grant Sources	162,278,802	27,330 MB

Table 3.5 - Overview of the Final Datasets

All of the datasets have the same structure which is described in the following table:

Field name	Type	Description
organization_id	STRING	State-assigned identification number of the organization.
year	INTEGER	The year of data validity.
type	STRING	Grant source type. Only for the second and third dataset, contains a grant source of level 2 and level 3, respectively.
assets	FLOAT	Amount of assets from the company's annual report
o_assets	FLOAT	Amount of operating assets from the company's annual report
capital	FLOAT	Amount of capital from the company's annual report
o_result	FLOAT	Amount of operating result from the company's annual report
f_result	FLOAT	Amount of financial result from the company's annual report
registered_capital	FLOAT	Amount of registered capital from the company's annual report
location	STRING	City, where the company is registered.
employees	FLOAT	Number of employees from the company's annual report
turnover_category	STRING	Turnover category interval
nace	STRING	Classification of economic activity using the NACE code

Field name	Type	Description
nace_section	STRING	Classification of economic activity using the NACE section code
grants_amount	FLOAT	The total amount of received grants in the given year
pd_amount	FLOAT	The total amount of donated money to political parties in the given year

Table 3.6 - Final Datasets' Columns Description

4 Methodology

4.1 Comparing the Effects of the Political Donations

The main goal of this thesis is to compare the effects of the political donations on the grants received, both the binary whether any were received and also how much. This is a comparison that is similar to analysing treatment effects of medicine, where the political donations are the treatment and grants amount is the outcome. From now on I will, therefore, refer to companies giving political donations to parties also as those that received the treatment.

It is of course not possible to observe outcome (grants amount) for a single company both with and without treatment. If the groups of treated and not treated were well selected, an average could be used.

My dataset is however greatly unbalanced in the means of the count of politically connected vs. not politically connected and those, who did receive grants and did not. From the total count of 475,029 organizations in the dataset throughout the years 1999 – 2014 only 50,018 (9.5%) were assigned a grant of any kind, 4,007 (0.84%) have given a donation to a political party and only 2,165 (0.46%) have both donated to a political party and received a grant.

Making a sample of companies not donating to political parties is not viable. The fact that these companies did not donate to a political party might have the same or similar driver as the reason they received grants. These groups were not chosen in a study randomly and they were not assigned the treatment (the political donations) randomly so that the treatment and control group would not be a statistical representation of the population. Instead, these groups were created based on various biases that made them more or less likely to receive grants.

For a proper analysis, I would need firms that are similar to those that have received the treatment, i.e. donated to a political party. For this analysis, I am using the data from the Magnus database which includes various information about firms including their field of operation, a number of employees, a region of operation, amount of assets, financial results and more. Thanks to this data I will match similar firms from the group that received the treatment and group that did not and asses if any of these groups received a significantly different amount of grants.

To formalize this discussion with the argumentation of Caliendo and Kopeinig (2008), I will denote

$$\tau_i = Y_i(1) - Y_i(0)$$

as the treatment effect on individual i where $Y_i(1)$ is the outcome while being treated and $Y_i(0)$ the outcome while not being treated. As mentioned earlier both of these outcomes cannot be observed at one and we have to resort to group averages. The average treatment effect on the treated, τ_{ATT}, is defined using $D = 1$ (meaning treated group) as

$$\tau_{ATT} = E(\tau|D = 1) = E(Y(1)|D = 1) - E(Y(0)|D = 1),$$

however, in a non-experimental study like this, individuals are not selected into treatment groups by random, but by factors that could influence the outcome and we would encounter the (self) selection bias and the outcomes from treatment and comparison groups would differ even in the absence of treatment:

$$E(Y(1)|D = 1) - E(Y(0)|D = 0) = \tau_{ATT} + E(Y(0)|D = 1) - E(Y(0)|D = 0)$$

The difference on the right-hand side is the selection bias. One possible strategy is to assume that given a set of observable covariates X which are not affected by treatment potential outcomes are independent of treatment assignment, e. g. if we split individuals to groups with same covariates X we could inside these groups observe the true ATT effect. As discussed in detail below, the number of these groups would be vast and a lot of treated companies would not get matched.

According to Rosenbaum and Rubin (1983), one of the ways is to use a balancing score, i.e. if potential outcomes are independent of treatment conditional on covariates X, they are also independent of treatment conditional on a balancing score $b(X)$. They propose using the propensity score as the balancing score.

In order to create matching groups mentioned in the previous chapter, I need a means of deciding which companies from treated and not treated groups are most similar. There are many ways for this, the easiest being categorization of companies by their information, where only the companies falling into the same categories will be compared. This method is however not ideal as with the number of variables, the number of matched groups grows exponentially. To illustrate, I will borrow an example from Rosenbaum and Rubin (1985). If we had 20 variables and all of them had just two categories (e.g. 20 indicator variables), we would have 1,048,576 matching categories. Also, a number of unmatched individuals would be large, resulting in omitting vast amounts of input data, including some of the 0.46% of companies having received the treatment.

4.2 Propensity Score

The metric I chose to solve the matching problem is called the propensity score and was firstly introduced by Rosenbaum and Rubin (1985). One of the upsides is that all of the companies that received the treatment can be matched.

As a treatment indicator, I will be using a variable $\mathrm{pd\_amount\_in}_{i,t}$ defined as

$$\mathrm{pd\_amount\_in}_{i,t} = \begin{cases} 0, & \text{for } \mathrm{pd\_amount}_{i,t} = 0 \\ 1, & \text{for } \mathrm{pd\_amount}_{i,t} > 0 \end{cases}$$

where $\mathrm{pd\_amount}$ is the total amount of political donations of the company i in the time t. For the simplicity of formulas, I will alias the variables as $z = \mathrm{pd\_amount\_in}$. The propensity score $e(X)$ is then defined as the probability of treatment exposure given the covariates X:

$$e(X) = P(z = 1|X)$$

I will estimate this probability using the probit model

$$e(x) = P(z = 1|X) = \Phi\left(X^T\beta\right)$$

where Φ is the cumulative distribution function of the standard normal distribution and β are coefficients that will be estimated as $\hat{\beta}$ by the maximum likelihood estimation, creating the propensity score estimate $\hat{e}(x)$.

The vector X in my case is consisting of the following company-specific variables:

- Operating assets
- Capital
- Financial Result
- Number of Employees
- NACE Section
- Turnover Category
- Location
- Year

4.3 Matching the Companies

Having the propensity score as a continuous function, we haven't yet solved the matching algorithm, as matching by equal propensity score would probably produce little matches. The solution is to choose for every treatment group member a member from the control group with the closest propensity score. For this, I have chosen the Nearest neighbour matching algorithm which should require less computing power needed for the vast number of observations while still well serving its purpose of removing bias (Rosenbaum and Rubin 1985).

In the Nearest Neighbour Algorithm, (a) companies from treated and control groups are ordered randomly and then (b) the first treated company is matched with the control company with the nearest maximum likelihood estimate $\hat{e}(x)$ and both companies are removed from the set. The step (b) is then repeated until all the treated companies are matched. (Rosenbaum and Rubin 1985)

4.4 Common Support

To further secure the correct selection of the control group I will impose a statement of common support which in case of propensity score matching says that for any treated company its propensity score cannot fall outside of the propensity score interval of the control group. I will do this by removing all the treated companies with propensity score higher than the highest propensity score from the control group and the same for lower propensity score. This way treated companies that have their propensity score out of bounds will not match with the edge companies of the control group propensity score distribution.

4.5 Computing the Difference in Grants Received

Once I have the treatment group and control group with a one-to-one matching, I need to compute the difference of the outcome (in my case the value of grants received and the binary variable stating if grants received). For this computation, I am using a metric called the Average Treatment Effect on the Treated (ATT). This metric takes each of the pairs generated by the propensity score matching algorithm, computes the difference of their outcomes and then makes an average of these differences. More formally I have N units labelled by i, where each of these units has an outcome when treated $Y_i(1)$ and outcome when not treated $Y_i(0)$. Then the Average Treatment Effect on the Treated is computed as follows:

$$\tau_{ATT} = \frac{1}{N}\sum_{i=1}^{N}\left(Y_i(1) - Y_i(0)\right)$$

4.6 Standard Errors

One culprit of my approach is that the common standard errors from the average effect on the treated cannot be used here. It would be possible only if the propensity score was a real exact value, however, my propensity score is estimated, as explained in chapter 4.2, and therefore as every estimation, it brings more uncertainty into the model. For calculating the standard errors including the propensity score estimation, I will use the method of Abadie and Imbens (2006).

5 Results

The results are divided into two main chapters: Basic Statistics and Propensity Score Matching. While the latter is the main scope of this thesis, I believe it is important to combine the basic raw data statistics, unencumbered by assumptions required for sophisticated methods with results of the more fine-tuned approach.

5.1 Basic Statistics

Firstly, let's look at the grant distribution in time. For each company, I took the number of years from the period 2001 – 2014, during which the company had received any grants, and grouped the results by an indicator specifying if the company had donated

any money to a political party in the whole period. The result is presented in the figure below. It is clear that companies that donate money to political parties are receiving grants repeatedly more often, than those that don't donate.

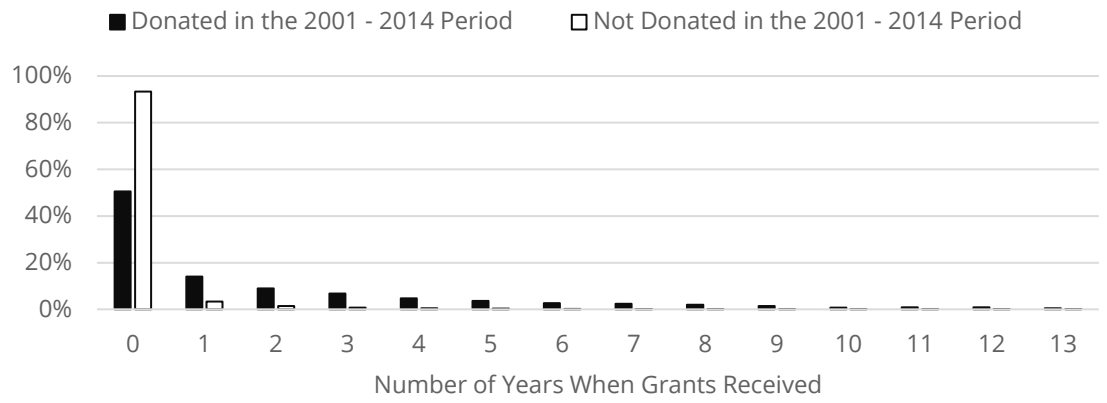

Figure 5.1 - Number of Years When Grants Received by Donation in Period 2001 - 2014

Another interesting comparison is whether companies on average got higher mean grants before they first donated to a political party. In the following table we can see that after donating the average mean grant is 73% higher than before. This could be, however, caused by donations being generally higher in the later years than in the early ones and we will have to account for that in the deeper analyses.

	Average Grants	%
Before Donations	571,029 CZK	100%
After Donations	988,940 CZK	173%

Table 5.1 - Grants before and after donation

The most straightforward analysis we can make is to compare average received grants for companies that had donated their money to the political parties at any time during the analysed period and compare them to companies which hadn't donated. From the following results, we see that donating companies had an average higher mean grant by as much as 28%.

	Average Grant	%
Not Donated	537,860 CZK	100%
Donated	689,001 CZK	128%

Table 5.2 - Average grants by donation indicator

5.2 Propensity Score Matching

5.2.1 Overview

For the whole sample undivided by grant types, there is an over 6 percentage points higher average grants allocation for companies that donated to political parties. For the donation in the same year as receiving grants, the difference is almost 7 percentage points.

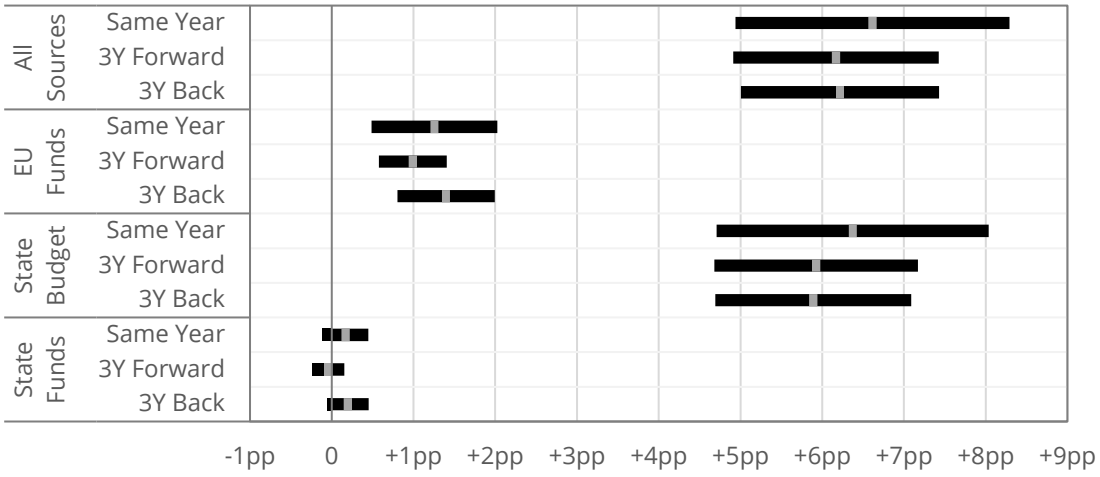

Figure 5.2 – ATT of Grants Indicator, Mean and 95% Confidence Intervals

Looking at the subsamples by grants source type, the strongest effect of political donations is for the grants distributed from the State Budget, where companies that have given a political donation have higher average success rate of grant allocation by around 6 percentage points than companies from the control group. Proportionally this means the treated companies have around higher 40% success rate. This effect is higher for the political donations made in the same year as they received grants allocation.

The same effect is visible for EU grants, but the magnitude is only around 1 percentage points. Also, the highest effect is observed when the treatment group is consisting of companies that have donated to a political party in the 3-year period before the year they received grants. The results for donations in the 3-year periods are significant on the 99,9% level, the result for the same year donations is still solidly significant on the 99% level. The possible explanations for the lower effect will be discussed in the chapter 5.2.3 EU Funds.

For the state funds' grants, the situation is different. All of the three results' means are closely around zero, with the non-zero value probability under 90%. For the donations in the 3-year period before receiving grants, the significance is close at 87%, but for the same year it is only 76% and for the 3-years period after grants, it is as low as 31%. I will try to discuss the possible explanations of the insignificance in the chapter 5.2.5 State Funds.

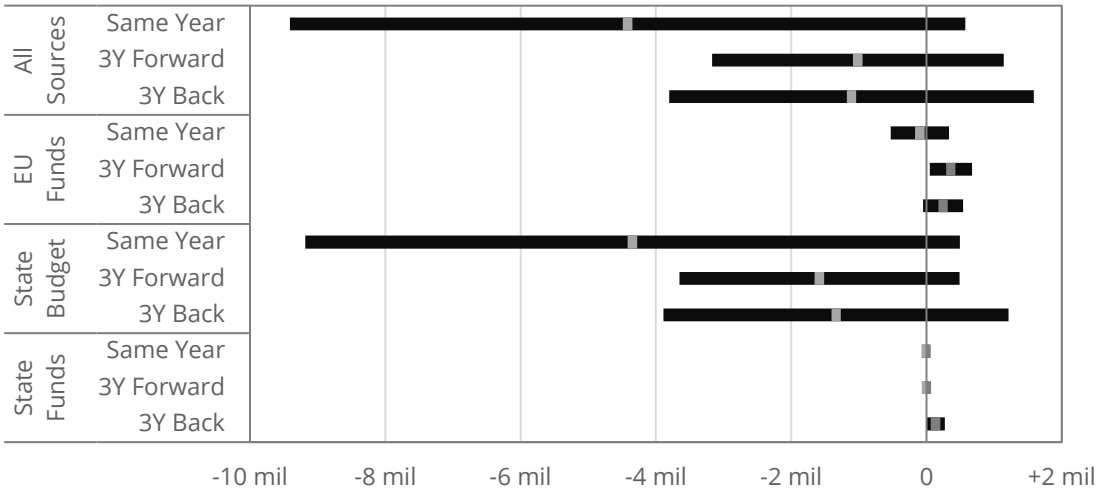

Figure 5.3 – ATT of Grants Value by Grant Type and Donation Time; Mean and 95% Confidence Intervals

The previous results laid a solid ground for claiming that for State Budget Grants and EU Funds Grants, companies donating to political parties have a higher average score of receiving a grant. The following figure tries to widen this claim by extending it not only to a binary variable of receiving the grant but to target the actual value of the grant, i.e. if the grant value received is higher for companies donating to a political party.

Looking at the results in the Figure 5.3, we cannot say much. There is only one result on the 95% level of significance which claims that companies that have given donations to a political party in a three-year period after receiving a grant from EU funds had this grant higher on average by almost 360 000 CZK. Results on 90% level of significance suggest opposite for the state budget grants same year donations, i.e. companies donating to a political party the same year as receiving grants had the amount of these grants in average lower by 4.3 million CZK.

5.2.2 All Grants

	Variable	Sample	Treated	Controls	Difference	S.E.	T-stat	
Same Year	grants_amount	Unmatched	6232002	3808764	2423238	9416884	0.26	
		ATT	6232002	10650084	-4418082	2547218	-1.73	.
	grants_amount_in	Unmatched	0.222	0.067	0.155	0.004	39.60	***
		ATT	0.222	0.156	0.066	0.009	7.74	***
3Y Back	grants_amount	Unmatched	6498388	3728921	2769467	7099868	0.39	
		ATT	6498388	7606164	-1107776	1374153	-0.81	
	grants_amount_in	Unmatched	0.205	0.063	0.142	0.003	50.63	***
		ATT	0.205	0.143	0.062	0.006	10.06	***
3Y Fwd	grants_amount	Unmatched	4871037	3346778	1524258	6167272	0.25	
		ATT	4871037	5886149	-1015113	1099595	-0.92	
	grants_amount_in	Unmatched	0.220	0.071	0.150	0.003	49.78	***
		ATT	0.220	0.158	0.062	0.006	9.62	***

*** p<0.001, ** p < 0.01, * p < 0.05, . p<0.1

Table 5.3 - Results: All Data

All of the results for the grants indicator variable are significant on the 95% level and positive with the difference between the treated and controls ranging from 6.1 percentage points to 6.6 percentage points, that is 42% higher rate for treated than for not treated. This gives us a strong argument that on average, companies which donate to the political parties have over 6 pp higher success rate at receiving grants.

I haven't found any significant difference for the grants amount variable. This would mean that the magnitude of the grants is not correlated with political donations, only the presence of the grant itself. It may also signal that despite my attempts to pair companies using propensity score matching, big companies would be paired with small ones and therefore diminish the effect of the political donation by larger differences caused by the magnitude of the grant being more decided by the size of the business.

These mentioned results are similar for all of the time groups of donations that is for the donations that were given to a political party by the company the same year it received grants, the three years before it received grants and also the three years after it received grants. I have expected the 3Y Back and 3Y Fwd differences to be much lower, compared to the Same Year group, than the results. The magnitude of these

results might signal there are other influences of grant assignment that are common for firms donating to political parties, e.g. their overall business attitude towards the state and haven't been filtered out by the propensity score matching. Despite this, the difference between donating and not donating companies is undoubtedly present.

5.2.3 EU Funds

	Variable	Sample	Treated	Controls	Difference	S.E.	T-stat	
Same Year	grants_amount	Unmatched	369059	679151	-310092	4406250	-0.07	
		ATT	369059	467469	-98410	219923	-0.45	
	grants_amount_in	Unmatched	0.038	0.010	0.027	0.002	17.19	***
		ATT	0.038	0.025	0.013	0.004	3.20	**
3Y Back	grants_amount	Unmatched	529006	707166	-178161	3331253	-0.05	
		ATT	529006	284805	244200	150538	1.62	
	grants_amount_in	Unmatched	0.041	0.011	0.031	0.001	25.75	***
		ATT	0.041	0.027	0.014	0.003	4.60	***
3Y Fwd	grants_amount	Unmatched	632831	777879	-145049	3784830	-0.04	
		ATT	632831	274042	358789	159254	2.25	*
	grants_amount_in	Unmatched	0.022	0.005	0.017	0.001	19.69	***
		ATT	0.022	0.012	0.010	0.002	4.70	***

*** p < 0.001, ** p < 0.01, * p < 0.05, . p < 0.1

Table 5.4 - Results: EU Funds

In the EU Funds group, as well as with the State Budget group, I found all of the coefficients of the indicator variable of grants amount significant on the 95% level and positive. However, the differences found in these results are much lower. For All Data, the differences were over 6 percentage points and here they are only around 1 percentage points. This still signals that companies donating money to the political parties have a higher success rate at receiving grants.

The lower difference compared to the State Budget group might answer of the main hypotheses of this thesis that is whether when EU Funds are under stronger supervision by the member states but also by the European Commission, the effect of political donations on the grants distribution of EU Funds should be lower than to the State Budget grants. From these results, it indeed seems this might be the cause.

I also found in this group one significant and positive result for the variable with the actual amount of grants. This might mean that the higher political donations mean a higher amount of assigned grants and that not only companies which donate to political parties have a higher success rate at receiving grants, but also receive higher grants. This result is however in the group of 3Y Fwd which means that the higher grant would be assigned before the donation was given to the political party. Despite such possibility, when a company has pre-negotiated a grant amount and sent the donation afterwards, I believe this is just a coincidence.

5.2.4 State Budget

	Variable	Sample	Treated	Controls	Difference	S.E.	T-stat	
Same Year	grants_amount	Unmatched	5659077	2466104	3192973	4803414	0.66	
		ATT	5659077	10005223	-4346146	2467828	-1.76	.
	grants_amount_in	Unmatched	0.217	0.065	0.152	0.004	39.32	***
		ATT	0.217	0.154	0.064	0.008	7.51	***
3Y Back	grants_amount	Unmatched	5584549	2326029	3258520	3592985	0.91	
		ATT	5584549	6920541	-1335992	1300858	-1.03	
	grants_amount_in	Unmatched	0.197	0.061	0.136	0.003	48.96	***
		ATT	0.197	0.138	0.059	0.006	9.64	***
3Y Fwd	grants_amount	Unmatched	3921495	2364644	1556850	3515541	0.44	
		ATT	3921495	5504282	-1582787	1055618	-1.50	
	grants_amount_in	Unmatched	0.213	0.068	0.145	0.003	48.91	***
		ATT	0.213	0.154	0.059	0.006	9.33	***

*** p < 0.001, ** p < 0.01, * p < 0.05, . p < 0.1

Table 5.5 - Results: State Budget

The State Budget group is the most important driver of the All Data results. The grants indicator variable for all of the time groups is significant on the 95% level and positive and the magnitude of the difference is around 6 percentage points. This means that companies which donated to a political party in either the same year in the three years period before or in the three years period after had in average higher success rate on receiving a grant. These results lay solid ground for an argument that political donations influence the allocation of grants from the state budget.

The grants amount differences have again not turned significant which might mean that there is no strong correlation between the political donation and the magnitude of the grant, despite the described above.

The State Budget grants originate from central state organizations, mainly ministries, however also organizations like State Office for Nuclear Safety. Analysing is however not always possible, as the observation counts drop rapidly. In Figure 5.4, I have computed the ATT for those central state organization which had distributed grants and have the ratio of at least 1% of treated companies (i.e. those that have given a political donation) in the reference period 2001 – 2014.

According to the results in Figure 5.4, the main drivers of the State Budget Grants are only two ministries, The Ministry of Labour and Social Affairs and The Ministry of Industry and Trade. The former having the difference of average grant allocation of the treated group to the control group of 5 percentage points and the latter of 2 percentage points. Again, as with the results presented in the Overview, the resulting number of the aggregated Stat Budget grants being higher and not average of the fine-grained results is the property of the subsampling method described in chapter 3.5 - Subsampling and lagging.

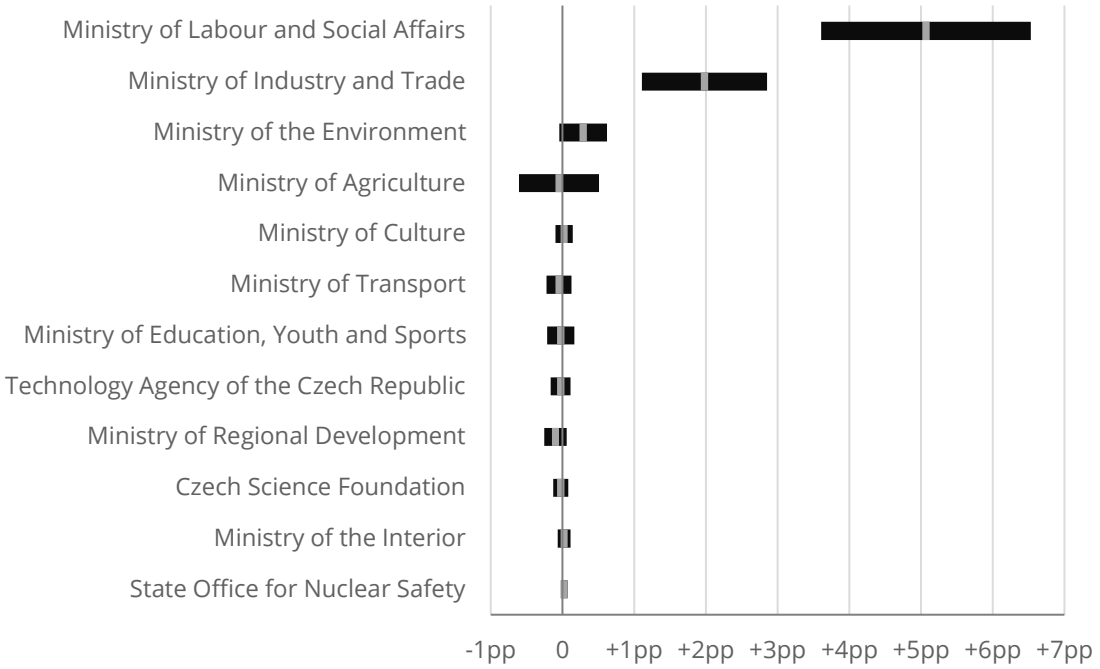

Figure 5.4 – ATT of Grants Indicator for Individual State Budget Grants, Mean and 95% Confidence Intervals

5.2.5 State Funds

	Variable	Sample	Treated	Controls	Difference	S.E.	T-stat	
Same Year	grants_amount	Unmatched	40760	630016	-589256	5030366	-0.12	
		ATT	40760	47060	-6300	28995	-0.22	
	grants_amount_in	Unmatched	0.005	0.002	0.003	0.001	4.02	***
		ATT	0.005	0.003	0.002	0.001	1.18	
3Y Back	grants_amount	Unmatched	190784	661128	-470344	3803117	-0.12	
		ATT	190784	57125	133660	70683	1.89	.
	grants_amount_in	Unmatched	0.007	0.002	0.005	0.000	10.74	***
		ATT	0.007	0.005	0.002	0.001	1.52	
3Y Fwd	grants_amount	Unmatched	44069	161610	-117540	1420343	-0.08	
		ATT	44069	45495	-1425	16984	-0.08	
	grants_amount_in	Unmatched	0.003	0.002	0.001	0.000	2.82	**
		ATT	0.003	0.004	0.000	0.001	-0.40	

*** p < 0.001, ** p < 0.01, * p < 0.05, . p < 0.1

Table 5.6 – Results: State Funds

Unlike the rest groups, the results for this grant source group are all insignificant. This is caused by two main reasons. The first is the low number of grants in this category and a low number of political donations by companies receiving these grants, the number for the individual state funds is depicted in Table 5.7. This way it is possible to say that grant assignments are not driven by political donations, as they almost don't exist, however, it is not possible to say whether if those donations would exist, the same would still hold.

Moreover, many of these grants are assigned by fixed algorithms specified by the law (e.g. agricultural grants being assigned by area of the land) and therefore cannot be directly manipulated.

	Sum	Number of Observations	
Grant Source	grants_amount	grants_amount > 0	grants_amount > 0 pd_amount > 0
The Czech Film Fund	5,259 mil CZK	236	0
The State Fund for Transport Inf.	666,166 mil CZK	17	0
The State Fund for the Culture	33 mil CZK	48	0
The State Fund for Housing Dev.	2,173 mil CZK	16	0
State Environmental Fund	13,161 mil CZK	1,066	18
State Agricultural Intervention Fund	5,822 mil CZK	953	1

Table 5.7 - Observations Count for the State Funds Grant Source

5.2.6 Robustness Checks

To further support the significance of my results I have created three robustness check models which test whether the significance and results magnitude persists across different model settings. The results of these models are shown in Table 5.8.

	Variable	Sample	Treated	Controls	Difference	S.E.	T-stat	
Original	grants_amount	Unmatched	6232002	3808764	2423238	9416884	0.26	
		ATT	6232002	10650084	-4418082	2547218	-1.73	.
	grants_amount_in	Unmatched	0.222	0.067	0.155	0.004	39.60	***
		ATT	0.222	0.156	0.066	0.009	7.74	***
Amount Drawn	grants_amount	Unmatched	757251	457582	299669	1142790	0.26	
		ATT	757251	1307055	-549805	316935	-1.73	.
	grants_amount_in	Unmatched	0.222	0.067	0.155	0.004	39.60	***
		ATT	0.222	0.156	0.066	0.009	7.74	***
5 Neighbours	grants_amount	Unmatched	6232002	3808764	2423238	9416884	0.26	
		ATT	6232002	7582251	-1350250	2259624	-1.73	
	grants_amount_in	Unmatched	0.222	0.067	0.155	0.004	39.60	***
		ATT	0.222	0.160	0.062	0.007	7.74	***
Logit	grants_amount	Unmatched	6232002	3808764	2423238	9416884	0.26	
		ATT	6232002	7830403	-1598401	1657703	-1.73	
	grants_amount_in	Unmatched	0.222	0.067	0.155	0.004	39.60	***
		ATT	0.222	0.164	0.058	0.008	7.74	***

*** p < 0.001, ** p < 0.01, * p < 0.05, . p < 0.1

Table 5.8 - Results: Robustness Checks

Original

This is the All Grants, Same Year model used in Table 5.3, in the chapter 5.2.2, i.e. probit model is used for the estimation of the propensity score, the **castkaRozhodnuta** (decided amount) amount is used for the **grants_amount** variable.

Amount Drawn

In this model, the **castkaCerpana** (amount drawn) variable is used. This is the money that was actually drawn from the grant amount allowed to draw in the grant decision. This amount is generally lower which is visible in the Treated and Controls columns of the **grants_amount** variable. But despite this magnitude difference, the significance and the sign of the effect remains unchanged.

5 Neighbours

In the original model, one to one matching was used that is a control group of the same size as the treated group was created which matched the treatment group the most in the means of the propensity score. But using this approach, the results are then created on a sample of the size of two times the size of the treatment group only. This could be more prone to outliers or other bad matches. This model is doing one to five matchings, where the control group is created by assigning five companies with the closest propensity score to each company from the treatment group. The results are again very similar, with the magnitude little bit lower, same signs and similar significance.

Logit

In this robustness check, the logit model is used instead of the probit model to estimate the propensity score of the companies to give a political donation. The magnitude is again a little bit lower, however, the signs still stay the same and the results remain with the same significance.

6 Conclusion

The main purpose of this thesis was to analyse the distribution of grants in the Czech Republic and shed some light on the relation of the distribution of grant and political connections of receivers of these grants. I used data from the Central Grant Registry (CEDR) which despite being recently published as open data were as of now investigated only by few economic analyses.

The primary hypothesis of this thesis was that firms which donate to political parties have a higher success rate in getting a grant. Using the Propensity Score Matching method, to filter out unobserved firm differences that might affect both treatment and outcome, I conclude that this hypothesis holds. The relation is present for the whole dataset, as well as for state budget funds and EU funds individually. The relation is found not significant for the state fund grants which are distributed by algorithms specified by law and cannot be easily influenced. The magnitude of the relation is that politically connected companies have the grant received success rate 6.4 percentage points higher than those that had not donated in the same year. Very similar coefficients also hold for the political donations in the three-year periods before and after receiving the grant.

For the individual sources inside the state budget grants, the results are valid only for the Ministry of Labour and Social Affairs and the Ministry of Industry and Trade. This could be caused by either the relation not being present for the other grant sources, but also by the low observations count in the sample.

The secondary hypothesis of this thesis was that for EU grants which are believed to be more controlled and therefore less likely manipulated this relation is lower than the relation for state grants, or not present at all. By comparing the results for the state budget grants and EU funds grants, I conclude this hypothesis holds. The firms which have given a donation to a political party have by 6.4 percentage points higher success of reviving grant from the state budget, but only by 1.3 percentage points higher success of receiving grants from the EU funds.

A supplementary hypothesis of this thesis was that these relations work not only for the binary nature of receiving grants but also for the size of the grant, i.e. that firms donating to political parties receive higher grants than those not donating. Here I conclude that the hypothesis does not hold. The results or this hypothesis have not been found significant for any group, except when a company made a donation to a political party in the three-year period after receiving a grant from the EU funds. The sign of this result is positive, meaning the political donation correlated with a higher magnitude of the grant, however, the difference is only 359 thousand CZK.

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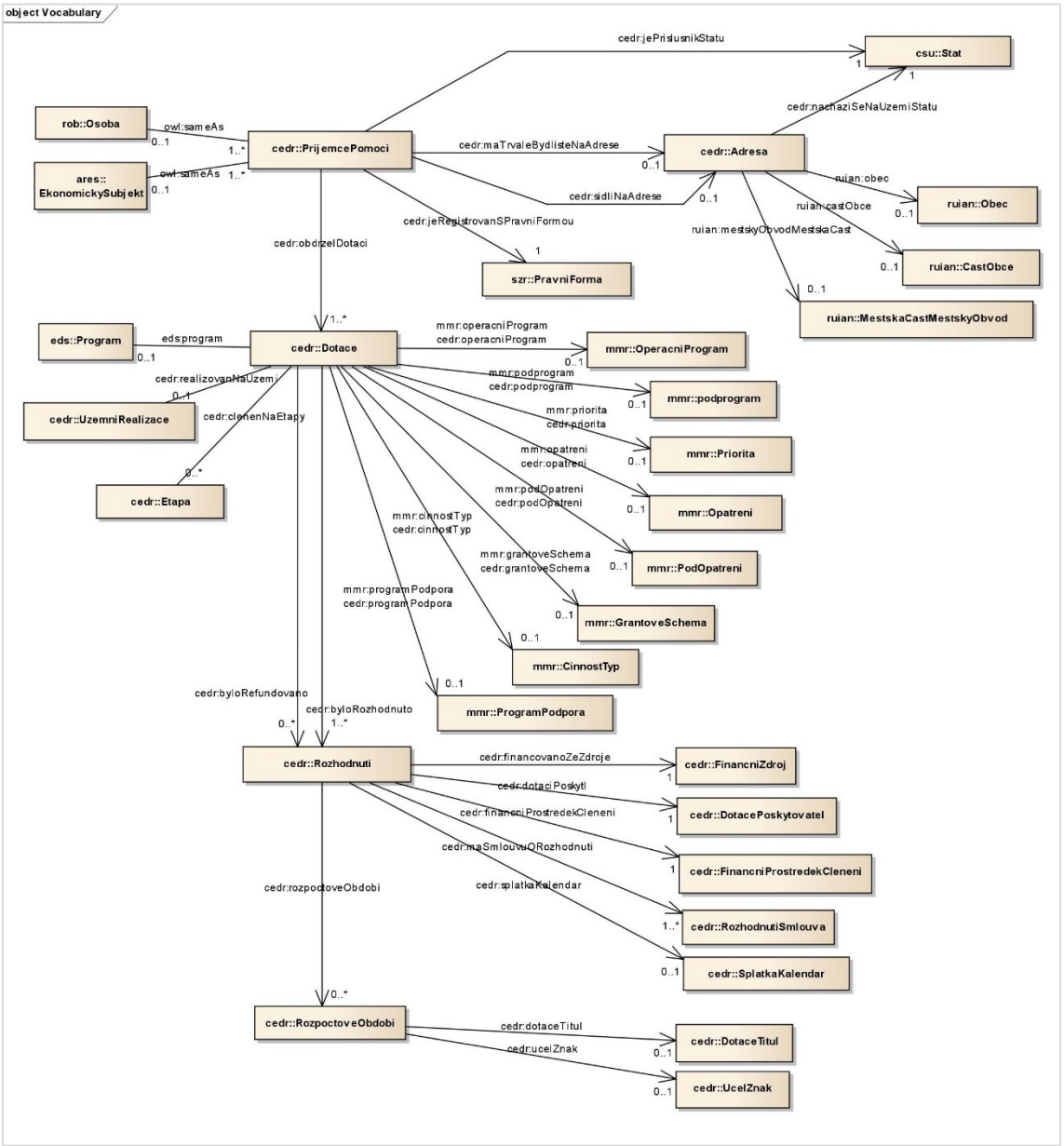
Appendices

Appendix A – Data Model of IS CEDR III



Appendix B – Thesis GitHub Repository

GitHub is a Git-based hosting service for version control. Thanks to this service all of the code is published, changes are tracked and new changes can be proposed using either filing an issue or directly proposing the changes by editing the code of the repository and filing a pull request to merge the changes into the master codebase. The GitHub repository for this thesis includes:

- Readme explaining how to replicate findings in this thesis
- NodeJS scripts to load the data from IS CEDR III to Google BigQuery
- SQL scripts to create the used datasets and helper tables
- Stata® scripts to run the all of the presented models

All of the provided scripts and other files are made freely available within the limits of the GNU General Public License, Version 3.

The repository is located online at https://github.com/smallhillcz/diplomka.