The economic consequences of the Fidesz government on the Hungarian economy and the regional economic inequality in Hungary

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Abstract

The Fidesz government has likely had an impact on the Hungarian economy through the "nationalistic" policies implemented. The analysis in this thesis aims to calculate the extent of the economic impact of the Fidesz government on the Hungarian economy in the period 2010 till 2018. Moreover, in Hungary the regional economic inequality is significant. The second aim of the analysis is to see how the Fidesz government influenced the regional economic disparity. The causal effects of the Fidesz government are measured by using the synthetic control method. With the synthetic control method, Hungary and its regions are compared with their "synthetic" counterparts. The "synthetic" counterparts consist of other European countries/regions which best resemble the economic output determinants of Hungary and the Hungarian regions in the pre-Fidesz period. With the synthetic control method, it was found that there was likely no slowdown experienced by the Hungarian economy. Moreover, it seems that the Fidesz government has resulted in an increase in regional economic inequality.

Keywords: Real GDP per capita, synthetic control method, Fidesz government, economic impact, regional economic inequality

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1. Introduction

With the election of the Fidesz political party in 2010, the political landscape of Hungary changed fundamentally. A shift was made towards a nationalist, conservative, and right-wing populist political party. This shift had likely a direct effect on the policies implemented by the government as political parties (such as Fidesz) pursue policies that cater to their core constituencies (Born et al., 2019). The policies pursued by the Fidesz government are unconventional and include high and uneven tax rates, and heavy regulatory burden (IMF, 2013). According to the IMF country report of 2013, the policies pursued by the Fidesz government have decreased the confidence of investors and contributed to a sharp decline in investments into the Hungarian economy. The decline in investments is found to be the main reason why the growth prospects of Hungary have declined in the post-Fidesz election period.

Specifically, the decline in investments has resulted in lower growth prospects of Hungary by reducing the positive effect of foreign direct investment (FDI) on economic growth. According to several researchers, FDI has a positive effect on economic growth through several indirect factors (Borensztein et al, 1998; Balasubramanyam et al; De Mello, 1999; OECD, 2000; Dritsaki and Stiakakis, 2014). In particular, according to the OECD (2002), the indirect factors include technological spillovers, assist human capital formation, contribute to international trade integration, and contribute to a more competitive business environment and enhances enterprise development. Moreover, according to Dritsaki and Stiakakis (2014), the indirect factors include the provision of funds for domestic investments, encourages the creation of new jobs, and reinforces the technology transfer.

In Hungary, the positive effect of FDI on economic growth will have been reduced due to the decline in investments into the economy. The IMF country report of 2013 mentions that the decline in investments is the main reason why the growth prospects of Hungary have declined in recent years. Moreover, the IMF country report of 2014 mentions that the growth prospects are expected to remain weak in the period 2013 till 2019 due to low investments. However, the reports do not calculate what the economic consequences are of the reduced growth prospect of Hungary. Moreover, the IMF country reports focus on the changes in potential GDP growth caused by the Fidesz government instead of changes in the actual economic growth. The aim of this thesis is to calculate the economic consequence of the Fidesz government for the Hungarian economy. The first research question of this thesis is therefore: *What has been the economic consequence of the Fidesz government for the Hungarian economy?* The measure used to calculate what the economic consequence is for the Hungarian economy is the real GDP per capita. The expectation in this thesis is that the Fidesz government has caused a slowdown for the Hungarian economy by executing policies that have led to a decline in investments.

Within Hungary there is a large economic disparity between regions. Not only in terms of economic output, but also the FDI going into the regional economies is unequally divided. The regions with the largest share of FDI going into their economies in the pre-Fidesz period, will be the region's most affected by the policies (which result in a decline in investment) implemented by the Fidesz government. The notion that regions are differently affected by the

policies implemented indicates that these policies will have variance effects on the economic growth between the Hungarian regions. The variance in the effects of the Fidesz policies on the regions indicates that these policies will have had an influence on the economic inequality between Hungarian regions. Therefore, the second research question is: *What has been the impact of the Fidesz government on the economic inequality between the Hungarian regions?* The expectation is that the Fidesz government has caused a decline in the economic inequality between the Hungarian regions in the post-Fidesz election period. This is caused by that in general the richest Hungarian regions are also the regions that have a larger share of FDI going into their economies.

To my knowledge there has been no study yet which has calculated the causal effects of the Fidesz government on national or regional level. Therefore, the main contribution of this thesis is to calculate the causal effects in terms of real GDP per capita of the Fidesz government on national and regional level. Moreover, the second contribution of this thesis is to see whether the causal effects experienced by the Hungarian regions have affected the regional economic inequality. To calculate the causal effects of the Fidesz government for Hungary and the Hungarian regions there are two main datasets used in this thesis. These two datasets are constructed by using two main databases: Eurostat (regional), and the OECD (regional) database. The dataset on national level in this thesis consist of all the European countries (including the UK). In addition, the dataset on regional level consist of all the European regions for which the data of the outcome and predictor variables was available during the time period researched.

The method which is used in this thesis to calculate the causal effects is "the synthetic control method". With the synthetic control method a "synthetic" Hungary and Hungarian regions are constructed based on the economic output determinants of the actual Hungary and Hungarian regions in the pre-Fidesz period. The synthetic Hungary and Hungarian regions give this thesis the opportunity to calculate what would have happened if the Fidesz political party had not been in power from 2010 onwards in Hungary. In other words, the synthetic Hungary and Hungarian regions show how Hungary and the Hungarian regions would have developed if the Fidesz government would not have been elected. The synthetic Hungary and Hungarian regions are constructed such that they best resemble the economic output determinants of the actual Hungary and Hungarian regions in the pre-Fidesz period. Moreover, the synthetic Hungary and Hungarian regions consist of EU countries/regions which have not experienced causal effects of the Fidesz government.

This thesis is structured as follows. The following section provides a description of the situation in Hungary before and after the Fidesz government and constructs the two hypothesis researched in this thesis. In section 3, the methodology used (synthetic control method) for calculating the causal effects of the Fidesz government on both national and regional level is explained. Moreover, it includes an explanation on the placebo studies done on national and regional level. The placebo studies are included in the analysis to investigate the credibility of the results found with the synthetic control method. Section 4 contains information about where the data has been obtained from and why certain variables are used. Section 5 includes the

empirical results found with the synthetic control method and placebo studies. Moreover, it includes a discussion of the results from this thesis. The last section of this thesis concludes.

2. Literature review

The national-conservative, right-wing political party Fidesz won the Hungarian parliamentary elections of 2010 which has shaken the structure of Hungary as a country. In an astonishing short period, a wide range of political, legal, economic and administrative changes were implemented by the Fidesz government. The focus of this thesis will be on the economic consequences of the election of the Fidesz political party on national and regional level for Hungary. Specifically, this thesis focuses on what the economic consequence was of the Fidesz government for the Hungarian economy. Moreover, on regional level the focus is on the impact of the Fidesz government on the economic inequality between the Hungarian regions. The literature review is structured as follows. Section 1 focuses on the economic situation in Hungary and the reaction of the Fidesz government. Section 2 focuses on how governments can influence the economic performance of a country. Section 3 focuses on how the implemented policies by the Fidesz government affected the FDI going into the Hungarian economy. Section 4 focuses on the regional disparity within Hungary. Section 5 focuses on why this thesis should use the synthetic control method. The last section focuses on studies which previously used the synthetic control method.

2.1 Economic situation of Hungary in the pre-Fidesz period

From 1995 till 2004 Hungary was performing relatively well in comparison to other Eastern European countries (including Czech Republic, Poland and Slovakia) as it was showing a relatively rapid growth measured by GDP per capita at PPP (Valentinyi, 2012). However, in 2005 the tables turned and instead of growing faster than the peer countries, Hungary was now experiencing a slower economic growth. This was largely caused by a slow growth in total factor productivity since 1995 in Hungary. Until 2004 Hungary was able to compensate this slow growth by a substantial large increase in capital and numbers of hours worked. Therefore, they were able to keep up with the economic growth of the Eastern European peers. According to Valentiny (2012), the convergence margins through capital accumulations and hours worked were slowly getting exhausted. As the capital accumulation and hours worked were not able to compensate for the low TFP due to that they were exhausted, the TFP had to increase to have long-term economic growth as otherwise Hungary would experience a slow-down such as experienced since 2005.

Furthermore, Hungary was severely affected by the economic crisis of 2008 due to its financially vulnerable position. According to the IMF (2008, 2008a), this vulnerable position was caused by several factors including a high external and public debt. Specifically, for Hungary the government debt in 2007 was 66 percent of GDP, while external debt was around 97 percent of GDP at the end of 2007 (IMF, 2007; IMF, 2008, 2008a). The high external debt in Hungary was mainly caused by Hungarian banks which were borrowing substantially internationally (Valentinyi, 2012). The banking system in Hungary was dependent on external funding and had large on-balance sheet currency mismatches (IMF, 2008a; IMF, 2011). Moreover, the Hungarian banks offered loans in foreign currency to households and corporations which exposed the economy to fluctuations in the exchange rate (IMF, 2008a; IMF, 2011).

To sum up, the economic situation in Hungary was in a crisis when Fidesz won the 2010 parliamentary election. Therefore, the main goal of the Fidesz government was to revitalize the economy. In other words, the economic policies implemented were in the beginning focussed on crisis management in Hungary. However, the Fidesz government was not only focussed on crisis management, but also on improving Hungary´s long-term economic fundamentals (Piasecki, 2015). The key pillars of the economic policies implemented by the Fidesz government to accomplish better economic fundamentals and to resolve the crisis included tax relief for households, enhanced family benefits (to increase low fertility rates), and targeted support to SMEs in sectors considered strategic (the "New Széchenyi Plan") (IMF, 2011).

2.2 The effect of governments on economic performance

According to Hibbs (1977), right and left-wing governments will pursue macroeconomic policies broadly in accordance with the objective economic interest and subjective preference of their class-defined core political constituencies. Therefore, the outcome of elections matter for the economic performance of a country as political parties will pursue policies which cater their core constituencies (Born et al., 2019). That right and left-wing governments pursue different policies is in line with the traditional partisan theory of policy outcomes. This theory predicts that right and left-wing government will propose and adopt very different budgets. The left-wing governments will in general pursue policies that increases government control on the economy, while right-wing governments will pursue policies that advocate reliance on the market (Tavits & Letki, 2009; Cameron, 1978). Thereby, for left-wing governments, the government spending is expected to increase, while for right-wing governments it is expected to decline.

From 2002 till 2010, the Hungarian Socialist party which can be classified as a social-democratic political party ruled together with the Alliance of Free Democrats which can be classified as a liberal political party. With the election of the political party named Fidesz in 2010, Hungary made a swing towards a nationalist, conservative, and right-wing populist political party. Thereby, the policies pursued by the government in the country changed. In an astonishing short period, a wide range of political, legal, economic and administrative changes were implemented by the Fidesz government. Specifically, in the period of May 2010 till December 2013, the parliament adopted 840 acts in total (Sadecki, 2014). In comparison, in the previous term in which the socialist and liberal political party were in power, the total acts adopted were only 583 (Sadecki, 2014). As mentioned earlier due to the bad financial situation of Hungary when the Fidesz government came into power, the economic policies which were implemented were not only focussed on improving Hungary's long-term economic fundamentals, but were also focused on crisis management (Piasecki, 2015).

Following the traditional partisan theory of policy outcomes, the expectations might be that the government spending declined in Hungary after the Fidesz political party came into power. However, the Fidesz political party is not only a right-wing political party as it also is a nationalist and populist political party which is shown through the pursued policies. Specifically, in the crisis management it became clear that the Fidesz government pursued policies which were based on its nationalistic ideas. An example of this is the type of policies

implemented by the Fidesz government aimed at decreasing the high level of debt. The IMF's recommendation for declining the level of debt for Hungary was cutting its public spending. However, the Fidesz government refused to follow the IMF's recommendations and instead chose to increase the income of the government by increasing the taxes. The marginal rate of the value-added tax and a bank levy were implemented in 2011 which both increased the revenue of the government (Djankov, 2015). However, most importantly is that additional taxes were levied on corporations in selected sectors of the Hungarian economy (Piasecki, 2015). These taxes are known as the sectoral taxes which were levied on a number of sectors which had a relatively large foreign ownership such as the financial, energy, telecommunication, and retail sector (IMF, 2014).

The purpose behind this "nationalistic" tax was that the burden of the economic crisis of 2008 would be divided more "fairly" in the economy (Piasecki, 2015). In reality, the more "fairly" dividing of the burden included that foreign owned companies were impacted the most by the new taxes, while smaller players which were mostly domestically owned SMEs were largely excluded from the taxes. In other words, the taxes predominantly hurt foreign economic interests and thereby likely improved the competitive position of domestically owned SMEs in these particular sectors (Bogaards, 2018; Piasecki, 2015). Moreover, several "nationalistic" economic reforms were implemented to improve the long-term economic fundamentals of Hungary. Four of the main (nationalistic) economic reforms that were implemented to improve the fundamentals include the nationalization of strategic assets, nationalization of the banking sector assets and restructuring the state-owned development bank and postal services to deliver credit, establishment of "national" monopolies in several sectors, and the subsidizing of a growth scheme for reducing the burden of corporate credits to smaller businesses (often domestically owned) (Djankov, 2015).

2.3 The effect of the implemented economic policies on FDI

At first glance, the economic policies implemented by the Fidesz government seem to have had a positive effect on the economic growth of Hungary. From figure 1 it is apparent that the real GDP growth of Hungary has been characterized by an upward trend from 2013 onwards. However, one cannot simply conclude that this suggests that the economic policies of the Fidesz government have had a positive effect on the economic growth of Hungary. As instead it could be that there was an increase in the real GDP growth of Hungary, however that this increase is lower than what it would have been without the Fidesz government. The economic policies implemented by the Fidesz government likely have had a negative impact on the economic growth of Hungary through creating a distorted market.
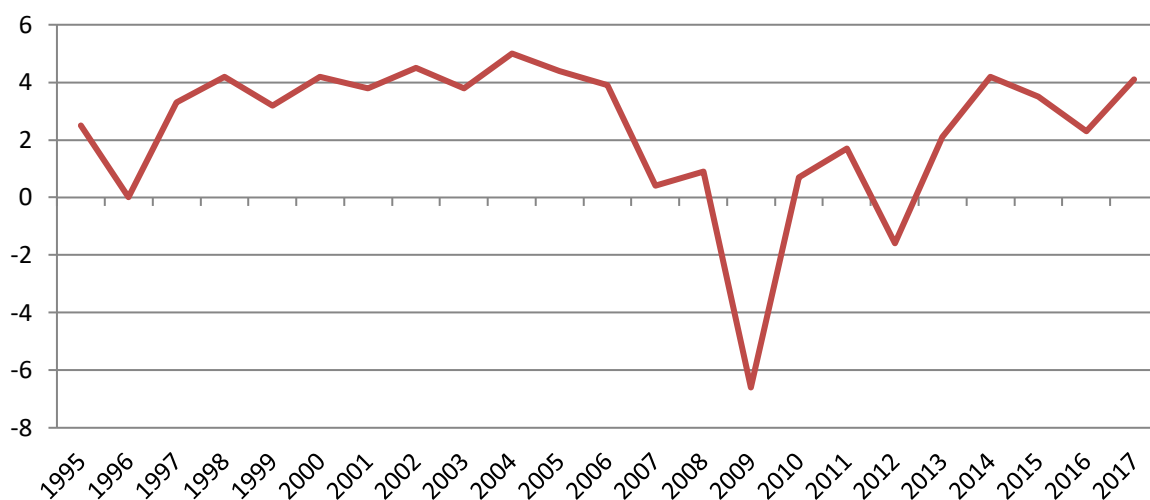
Figure 1 Real GDP growth of Hungary (annual percent change)
Source: IMF and World Economic outlook (2019)

As mentioned earlier the sectoral tax implemented by the Fidesz government was in favour of domestically owned companies. Thereby, the sectoral tax caused an increase in the competitive position of domestically owned companies in comparison to the foreign owned companies in Hungary. In other words, the sectoral tax created a distorted market as it impeded free and open competition. The distorted market in Hungary had a profound effect on the investments going into the economy. According to the IMF (2011), the distorted market discriminated between sectors, was in favour of domestically owned companies, and created policy uncertainty. All of these factors contributed to an upraise in the risk premia which was a warning to foreign companies thinking about investing in Hungary (IMF, 2011). Besides creating an upraise in the risk premia, the sectoral tax implemented by the Fidesz government had according to the IMF (2014) a negative effect on the business climate, foreign investment, bank lending, competition, and result into the inefficient allocation of resources.

The negative effect of the Fidesz government on investments going into the Hungarian economy was according to the IMF country report of 2013 the main reason why the growth prospects of the country had declined in recent years. According to the IMF country report of 2013, unconventional policies, high and uneven tax rates, and heavy regulatory burden had decreased the confidence of investors and contributed to a sharp decline in investments into the Hungarian economy. Moreover, according to the IMF country report of 2014, the growth prospects were expected to remain weak in the period 2013 till 2019 due to continued low investments. The sharp decline in investments going into the Hungarian economy is shown in figure 2. From figure 2 it is apparent that from 2012 onwards, the inward FDI stock as share of GDP saw a substantial decline from 82 percent in 2012 towards just 61 percent in 2018. This indicates that the FDI going into the Hungarian economy has seen a decline in the post-Fidesz election period.
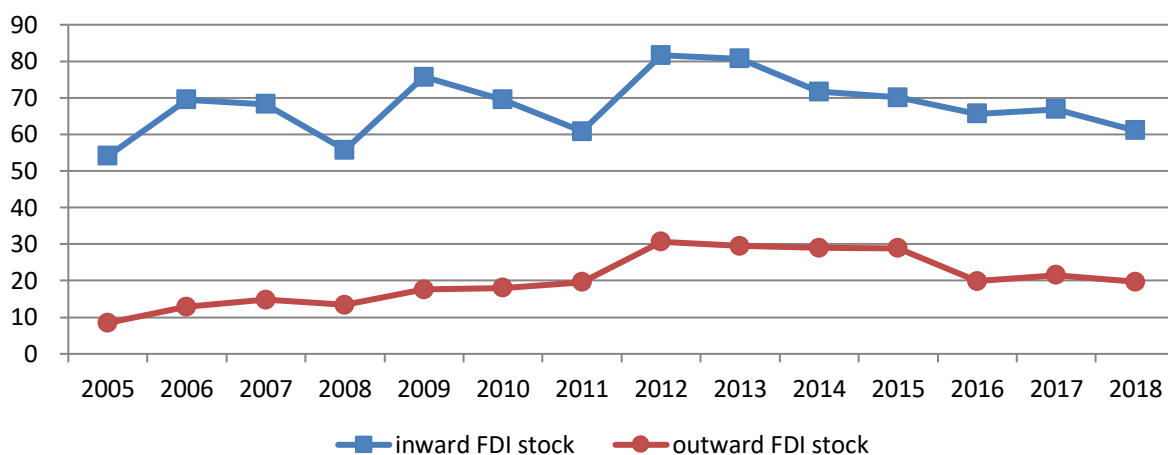
Figure 2 FDI stocks as a share of GDP total (%) in Hungary (2005-2018)
Source: Graph is based on data from OECD statistics.

As the level of FDI going into the Hungarian economy had declined, the effect of FDI on economic growth had likely also declined. According to several researchers, FDI has a positive effect on economic growth through several indirect factors (Borensztein et al, 1998; Balasubramanyam et al; De Mello, 1999; OECD, 2000; Dritsaki and Stiakakis, 2014). Specifically, according to the OECD (2002), the indirect factors of FDI include technological spillovers, assist human capital formation, contributed to international trade integration, and contributes to a more competitive business environment and enhances enterprise development. Moreover, according to Dritsaki and Stiakakis (2014), the indirect factors of FDI increase the provision of funds for domestic investment, encourages the creation of new jobs, and reinforce the technology transfer.

The indirect factors of FDI mentioned above have all a positive effect on economic growth. However, for the economic growth in a country to benefit from the indirect factors of FDI, there have to be appropriate policies and a basic level of development in the country (OECD, 2002). In addition, within the FDI literature, there is a discussion on whether FDI has a positive or negative effect on economic growth. This thesis follows the IMF hypothesis that FDI had positive effects on the economy in Hungary. According to the IMF country report of 2013, the main reason that the growth prospects of Hungary had declined in recent years was due to a decline of FDI into the Hungarian economy. Moreover, according to the IMF country report of 2014 the growth prospects of Hungary were expected to remain weak in the period 2013 till 2019 due to low investments.

Overall, it is expected that the decline of FDI going into the Hungarian economy will have reduced the positive effect of FDI on the economic growth of Hungary. In other words, the economic growth has likely experienced a slowdown caused by the decline in the positive effect of FDI on economic growth. This is in line with the negative real GDP growth experienced by Hungary in 2012 as shown in figure 1. However, from 2013 onwards, the real GDP growth as shown in figure 1 has been positive for Hungary which could indicate that the decline in inward FDI did not affect the economy. However, as the inward FDI has declined, the economy may have seen an increase in real GDP growth, but it is still likely that the economy has experienced

a slow-down. Therefore, the first hypothesis in this thesis is: *The Hungarian economy has experienced a slow-down after the 2010 parliamentary election.*

2.4 Regional level

The focus of the literature review has so far been on the Hungarian economy. However, some Hungarian regions will have attracted a larger share of the FDI going into the Hungarian economy than others. The regions which attracted a larger share of the FDI going into Hungary in the pre-Fidesz period, will be the regions that likely experienced the largest decline in economic growth due to the Fidesz government.

With Hungary entering into the European Union in 2004, the region of Közép-Magyarország (Central Hungary) which later on was divided into Budapest and Pest became part of the European capital-city networks and competed for advanced business functions internationally (Hunya, 2014). However, this region was thereby the exception as the other Hungarian regions were unable to compete with other European cities. According to Hunya (2014), this was caused by the fact that the size of the largest provincial towns of Hungary were only around one tenth of the Budapest agglomeration. This indicates that these provincial towns and therefore their regions provided lower opportunities for businesses than cities such as Budapest. This reduces their ability to attract sophisticated business functions in sectors (including manufacturing and the service sector) as they cannot compete with other regions. In other words, Közép-Magyarország was a region that was able to give higher opportunities to businesses which therefore invested more largely in this region. This is in line with the results shown in figure 3 in which the share of the FDI of foreign direct investment enterprises per region is shown. Foreign direct investment enterprises can be defined as enterprises in which the investor is not located in the same economy as the enterprise and owns directly or indirectly 10 percent or more of the voting power if it is incorporated or the equivalent for an unincorporated enterprise (OECD, 2008).

From figure 3 it becomes apparent that in 2008, 59 percent of the FDI of foreign direct investment enterprises into Hungary went towards the Budapest region, while 12.7 percent went to Pest. So in total 71.8 percent of the FDI of foreign direct investment enterprises in Hungary went to the region Közép-Magyarország (Central Hungary) in 2008. The regions including Dél-Dunántúl (Southern Transdanubia) and Dél-Alföld (Southern Great plain) were at the bottom with respectively attracting 1.4 percent and 2.7 percent of the FDI of foreign direct investment enterprises into Hungary in 2008.

Furthermore, in figure 3 it is shown that the richest region (Budapest) attracted a larger share of the FDI in the pre-Fidesz government period than the poorer regions. In other words, Budapest had the highest share of FDI and therefore likely experienced the highest positive effect of FDI on economic growth in the pre-Fidesz period. That the richest region, experienced the highest benefits of FDI resulted in an increase in the economic inequality within Hungary in this period. According to Lukovics (2014), in the period 1996 till 2005, there has been a divergence in real GDP per capita for the Hungarian regions on NUTS-2 and NUTS-3 level.

Moreover, according to the OECD (2018), the GDP per capita gap between Hungarian regions on NUTS-2 increased significantly in the period 2000 till 2007.
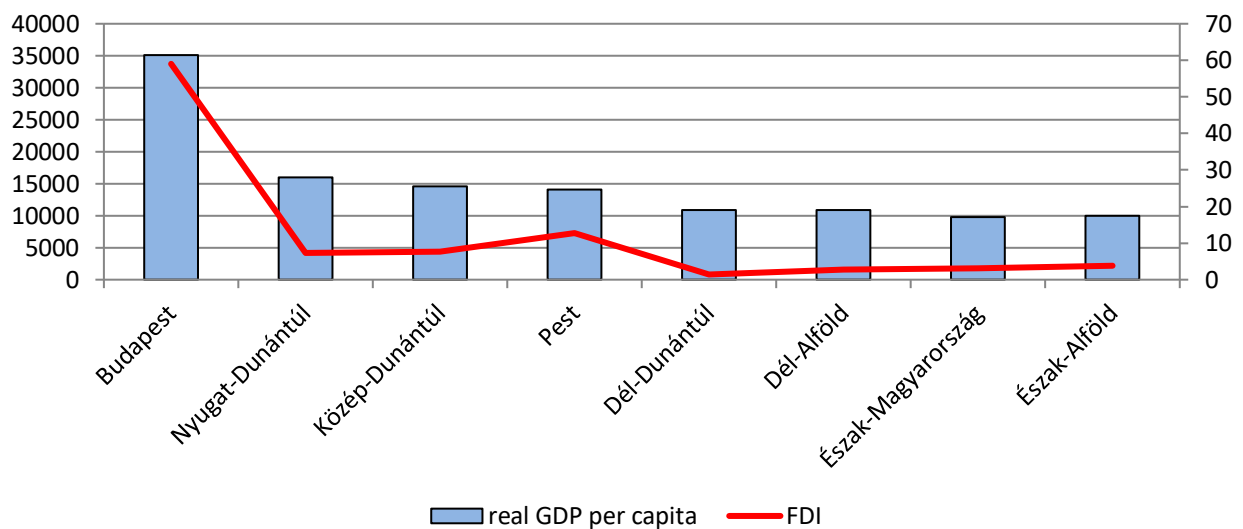
Figure 3 The share of FDI of foreign direct investment enterprises (%) and the real GDP per capita (PPS, EU27 from 2020) for Hungary on NUTS-2 level for 2008
Source: own calculations based on data from Hungarian Central Statistical Office (HSCO) and Eurostat Regional Database

In general, the regions with the highest real GDP per capita were also the regions with the highest share of FDI as apparent from figure 3. Therefore, the decline in FDI going into the Hungarian economy in the post-Fidesz election period has likely affected the richest regions more intensively than the rest of the regions. This is in line with the results shown in figure 4 in which a comparison is made between the annual average real GDP per capita growth in the pre-Fidesz period and the post-Fidesz election period. From figure 4 it is apparent that the growth rates which have seen the largest decline in the post-Fidesz election period were from the regions with the highest economic output including Budapest and Pest. Moreover, two of the poorest regions in Hungary: Dél-Alföld and Észak-Magyarország experienced an increase in the annual average real GDP per capita growth in the post-Fidesz election period in comparison to the pre-Fidesz period.

Overall, the four richest Hungarian regions (including Budapest, Nyugat-Dunántúl, Közép-Dunántúl, and Pest) experienced a decline in the annual average real GDP per capita growth in the post-Fidesz election period of 8 percent. Moreover, 86.7 percent of the FDI of foreign direct investment enterprises into Hungary went to these regions. That the richest regions (in terms of economic output) which had a higher share of FDI experienced a decline in annual average real GDP per capita growth in the post-Fidesz election period indicates that these regions were most negatively affected by the policies implemented by the Fidesz government. On the other hand, the four poorest Hungarian regions (Dél-Dunántúl, Dél-Alföld, Észak-Magyarország, and Észak-Alföld) experienced an increase in the annual average real GDP per capita growth of 1.5 percent in the post-Fidesz election period. It thus seems that the poorer regions have profited from the policies implemented by the Fidesz government. In other words, as the richest regions

are likely to be the most negatively affected by the economic policies implemented, there likely has been economic convergence between regions in Hungary. Therefore, the second hypothesis of this thesis is: *The economic inequality between regions in Hungary has declined due to the economic policies pursued by the Fidesz government.*
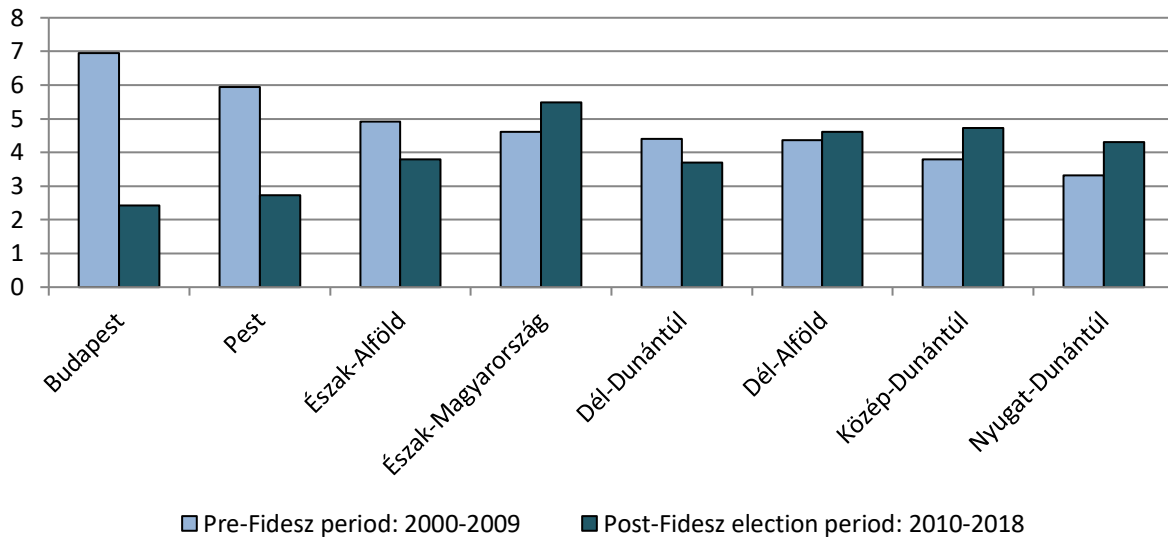
Figure 4 Annual average real GDP per capita growth for pre- and post-Fidesz election period on NUTS-2 level for Hungary (percentage %)
Source: own calculations based on data from Eurostat Regional Database

2.5 Why this thesis uses the synthetic control method

As mentioned earlier this thesis aims to calculate the causal effect of the 2010 parliamentary election in which the national-conservative, right-wing political party Fidesz came into power by winning the elections in Hungary. To calculate the causal effect, the thesis can either use "the synthetic control method or comparative case studies". In comparative case studies, a comparison is made between one or more units exposed to an event such as the election of the Fidesz political party to one or more unexposed units (Abadie et al, 2010). In this thesis there are two types of comparative case studies that can be used to calculate the economic consequences of the Fidesz government in Hungary.

First, a comparative case study on national level can e.g. include a comparison between the economic output of Hungary and Germany. Moreover, on regional level this comparative case study would include a comparison between e.g. the economic output of Budapest and Warsaw. Second, a comparative case study on national level can be made between the economic output in the pre-Fidesz period and the post-Fidesz election period of Hungary. Moreover, on regional level this type of comparative case study would include a comparison between e.g. the economic output in the pre-Fidesz period and the post-Fidesz election period of Budapest. However, these comparative case studies have severe limitations in comparison to the synthetic control method. Therefore, in this thesis instead of the comparative case studies, the synthetic control method will be used to calculate the causal effects of the Fidesz government. The next part of this paragraph will explain the limitations of the comparative case studies and how these

are solved by the synthetic control method by using the example of the comparison on national level between Hungary and Germany.

First, there is a limitation of the comparative case study in which a comparison is made between the economic output of a country exposed to an event (e.g. Fidesz government) with an unexposed country. In this case the country exposed to the event is Hungary which can be compared with e.g. Germany. This thesis wants to calculate the causal effect of the Fidesz government and therefore it is important that the country's economic output determinants of the comparison unit (e.g. Germany) are similar and ideally identical to that of the unit affected by the event (Hungary) in the pre-Fidesz period. When the economic output determinants are similar or identical between the two units, the likelihood is higher that the differences calculated in the economic output between Germany and Hungary in the post-Fidesz election period are the causal effect of the Fidesz government.

However, the likelihood that there is a comparison unit which has similar or even identical economic output determinants as the unit affected (Hungary) is small (Abadie & Gardeazabal, 2003). Therefore, there is a high possibility that with this kind of comparative case study, there would be a difference in the economic output determinants in the pre-Fidesz period between the comparison and affected unit. The differences in the economic output determinants in the pre-Fidesz period in turn can have an effect on subsequent economic output. Therefore, the causal effect calculated by this approach may not just show the causal effect of the Fidesz government as it could also show the effect of differences in economic output determinants between the comparison and affected unit (Hungary) in the pre-Fidesz period and the impact it may have on subsequent economic output.

Moreover, even if the economic output determinants of Hungary and its comparison unit (Germany) were similar with this approach, the synthetic control method likely could improve the fit between the economic output determinants of the comparison and affected unit in the pre-Fidesz period. With the synthetic control method a comparison is made between the economic outputs of Hungary in the post-Fidesz election period with that of a weighted combination of other countries which best resemble the economic output determinants of Hungary in the pre-Fidesz period. The weighted combination of countries which best resembles the economic output determinants of Hungary in the pre-Fidesz period is defined as the "synthetic" Hungary. In the result section it is shown which weighted combination of countries is included into the synthetic Hungary.

Second, there is a limitation of the comparative case study in which a comparison is made between the economic output of one country in two different periods. The first period includes the period in which the country is exposed to a certain event (Fidesz government). Moreover, the second period includes the period in which the country was not exposed to the event. In our case, a comparison could be made between the economic output of the pre-Fidesz and the post-Fidesz election period for Hungary. With this type of comparative case study, the calculations are likely not showing the causal effects of the Fidesz government. The calculations instead will show the differences between periods in Hungary. For example, just before the election of

the Fidesz government, the financial crisis occurred in 2008. This had a severe negative effect on the economic growth in Hungary as it was financially vulnerable. If the financial crisis years are included in the pre-Fidesz period of this thesis, the comparison between the pre- and post-Fidesz election period will likely show a higher economic output in the post-Fidesz election period.

However, this does not indicate that the results of this type of comparative case study shows a positive causal effect of the Fidesz government. The economic growth may have been even higher in the post-Fidesz election period without the Fidesz government. In other words, this type of comparative case study does not take into account that there can be a negative effect of the Fidesz government even when there is a higher economic output in the post-Fidesz election period in comparison to the pre-Fidesz period. This problem is solved with the synthetic control method as with this method a comparison is made between the synthetic Hungary and the actual Hungary in the same period: the post-Fidesz election period. The results based on the calculations made will show the causal effect of the Fidesz government instead of the differences between periods in Hungary as would be the case with using the comparative case study.

2.6 previous studies which used the synthetic control method

The synthetic control method has been developed by Abadie and Gardeazabal (2003) to solve the limitations of the comparative case studies. It does so by providing a transparent, data driven, systematic procedure to construct comparison units which will overcome the limitation of these comparative case studies (Born et al, 2017). In the study of Abadie and Gardeazabal (2003), the synthetic control method is used to calculate the economic cost of a conflict. Specifically, the study looks at the economic costs of the terrorist conflict in the Basque country in the 1970s till 1990s. To calculate these economic costs a comparison is made between the Basque country and the synthetic Basque country. The synthetic Basque country consist of a weighted combination of other regions within Spain that best resemble the characteristics (including real per capita GDP, investment ratio, population density, sectoral shares, and human capital) of the Basque country in the pre-terrorism period.

This synthetic control method was later formalized in Abadie et al (2010). In Abadie et al (2010), the synthetic method is used to calculate the causal effects of Proposition 99 which is a large-scale tobacco control program that was implemented in 1988 in California (Abadie et al, 2010). Moreover, since the introduction of the synthetic control method in 2003, the method has been used in several studies for a range of issues including the economic impact of the German reunification of West Germany and the impact of trade agreements on exports in Latin America (Born et al, 2017; Bluszcz, 2019; Abadie et al, 2015; Hannan, 2017). Moreover, a study which used the synthetic control method is Born et al (2019). Born et al (2019) use the synthetic control method to calculate the macroeconomic impact in the US of the election of Donald Trump in 2016. It thereby asks a similar question as this thesis for a different country: What is the macroeconomic impact of a new political power?

In Born et al (2019) a comparison is made between the actual US and a synthetic US which consist of a weighted average of OECD countries which best resemble the characteristics of the US in the pre-Trump period. The results of the study in Born et al (2019) show no evidence of a "Trump effect". After the election, the growth in the US has not seen a divergence from the synthetic US in terms of real GDP. Moreover, the study did not find any divergence between the economic indicators of the US and the synthetic US.

That there is no "Trump effect" can be seen as an unexpected outcome especially looking at specific policies. For example the Tax Cuts and Job acts which were implemented in December 2017 induced a large reduction of tax rates for individuals and business thereby providing a boost to output growth in the short and long run (Born et al, 2019; Barro and Furman, 2018; Mertens, 2018; Sedláček and Sterk, 2019). However, there were also changes in trade policy. Specifically, there was a 'cold trade war' in the first year of the Trump administration which has likely caused a decline in economic activity (Born et al, 2019). Therefore, an important note which has to be made for this type of study is that the synthetic control method looks at the overall effect of all policy measures implemented by a government. In other word, the causal effects calculated by the synthetic control method for the US do not distinguish between effects of specific policy measures. This also applies to this thesis as we look at the causal effects of all policy measures implemented by the Fidesz government.

In this thesis the synthetic control method is used to calculate the causal effects of the Fidesz government. With the election of the Fidesz political party in 2010, Hungary made a swing from socialist and liberal political parties towards a nationalist, conservative and right-wing populist political party. This shift in turn might have had an effect on the policies implemented as right- and left-wing governments have a tendency to pursue macroeconomic policies which are in line with their objective economic interest and subjective preference of their class-defined core political constituencies (Hibbs, 1977). To my knowledge there has been no study yet which has calculated the causal effects of the Fidesz government on national or regional level. In other words, there is no study yet which aims to calculate the causal effects of this change in political power in Hungary. Therefore, the aim of this study is to be the first study to calculate the causal effects of the Fidesz government for Hungary and the Hungarian regions. The causal effects will be calculated by using the synthetic control method.

3. Methodology

3.1 Synthetic control method

This thesis aims to calculate the causal effects of the Fidesz government on the economic output of Hungary and the Hungarian regions. As mentioned earlier, comparative case studies have severe limitations in comparison to the synthetic control method. This thesis therefore uses the synthetic control method as developed by Abadie and Gardeazabal (2003) which was later refined by Abadie et al (2010). With the synthetic control method, the economic output of the actual Hungary will be compared with the synthetic Hungary in the post-Fidesz election period. Moreover, on regional level the economic output for the seven regions (NUTS-2) of Hungary will be compared with their seven synthetic regions in the post-Fidesz election period. For example, the economic output of the actual Közép-Dunántúl will be compared with the economic output of the synthetic Közép-Dunántúl in the post-Fidesz election period. Moreover, the economic output of the actual Nyugat-Dunántúl will be compared with the economic output of the synthetic Nyugat-Dunántúl in the post-Fidesz election period. The same comparisons are made for the other five Hungarian regions on NUTS-2 level.

The synthetic Hungary/Közép-Dunántúl/Nyugat-Dunántúl consist of a weighted combination of countries/regions which best resemble the economic output determinants of Hungary/Közép-Dunántúl/Nyugat-Dunántúl in the pre-Fidesz period and are not affected by the intervention of interest (the election of the Fidesz political party in 2010). In this section the synthetic control method is explained on national level. In other words, the example used to explain the synthetic control method is Hungary instead of e.g. Közép-Dunántúl. A note is that on regional level, the potential controls for Hungarian regions consist of regions instead of countries.

Following the study of Abadie et al (2003, 2010), suppose that $J + 1$ units (countries) are observed over $T > 1$ periods (national: 1995-2018, regional: 2000-2018). Moreover, suppose that only the first country (Hungary) is exposed to the intervention of interest (the election of the Fidesz political party) at a period $T_0 < T$. T_0 can be denoted as the number of pre-intervention periods (national: 1995-2009, regional: 2000-2009) with $1 \leq T_o \leq T$. As only Hungary is exposed to the election of the Fidesz political party this indicates that the remaining J are all potential controls. The set of potential controls J is in the statistical matching literature referred to as the "donor pool" (Abadie et al, 2010). In other words, the "donor pool" consists of countries that can be included in the synthetic Hungary. In this thesis the "donor pool' of countries consist of all the 27 European countries (besides Hungary). Moreover, on regional level, all the EU regions (besides the Hungarian regions) for which the data was available are included into the "donor pool". At the end of this paragraph it is explained why only the EU countries and regions are included.

Let Y_{jt}^N denote the outcome of the variable of interest (real GDP per capita) that would be observed if country j is not affected by the intervention (election of Fidesz political party) for units $j = 1, \ldots, J + 1$ and time periods $t = 1, \ldots, T$. The time period t in this thesis is on

national level from 1995 till 2018 and on regional level from 2000 till 2018. On the other hand, Y_{jt}^A denotes the outcome of the variable of interest (real GDP per capita) that would be observed if country j is affected by the intervention (election of Fidesz political party) for units $j = 1, \ldots, J+1$ and time periods $t = 1, \ldots, T$. With the synthetic control method an assumption is made that the election of the Fidesz political party has no effect on the outcome variable before 2010 such that for the period 1995 till 2009 ($t < T_0$) there is $Y_{jt}^N = Y_{jt}^A$ for all $j = 1, \ldots, J+1$.

Let $\alpha_{jt} = Y_{jt}^A - Y_{jt}^N$ denote as the causal effect of the election of the Fidesz political party for unit j at time t. Therefore, the outcome of the variable of interest (real GDP per capita) that would be observed if country j is affected by the election of the Fidesz political party for all countries $j = 1, \ldots, J+1$ and time periods $t = 1, \ldots, T$ can be calculated by:

$$Y_{jt}^A = Y_{jt}^N + \alpha_{jt} \tag{1}$$

Let D_{jt} denote as an indicator in which $D_{jt} = 1$ indicates that unit j is exposed to the election of the Fidesz political party at time t, while $D_{jt} = 0$ indicates that unit j is not exposed at time t. The observed outcome variable (real GDP per capita) for unit j at time t is therefore:

$$Y_{jt} = Y_{jt}^N + \alpha_{jt} D_{jt} \tag{2}$$

As mentioned earlier, we suppose that only the first country which is Hungary in this thesis is exposed by the election of the Fidesz political party after period T_0 with $1 \leq T_0 < T$. In this thesis after period T_0 indicates the post-Fidesz election period which is from 2010 till 2018. Therefore, this thesis has:

$$D_{jt} = \begin{cases} 1 & \text{if } j = 1 \text{ and } t > T_0 \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

The aim of this thesis is to calculate the causal effect of the election of the Fidesz political party on the outcome of the variable of interest (real GDP per capita) for Hungary for the time period $t = T_0, \ldots, T$. This is given by equation 4:

$$\alpha_{1t} = Y_{1t}^A - Y_{1t}^N = Y_{1t} - Y_{1t}^N \tag{4}$$

Equation 4 indicates that the causal effect of the Fidesz government on the real GDP per capita (outcome variable) could be identified if we observe the real GDP per capita in the absence of the Fidesz government: Y_{1t}^N. A study can accomplish this by constructing a proper synthetic control with the synthetic control method.

Let X_1 denote as a ($k \times 1$) vector of the economic output determinants which are known as predictor variables in the affected country (Hungary) in the pre-Fidesz period. Let X_0 denote as

($k \times J$) vector of the same economic output determinants known as predictor variables for the J possible controls which compose the "donor pool" in the pre-Fidesz period. In this thesis the economic output determinants thus predictor variables on national level include: real GDP per capita, inflation rate, industry share of gross value added, investment ratio, schooling, and a measure of trade openness. Moreover, on regional level the economic output determinants thus predictor variables of this thesis include real GDP per capita, investment ratio, schooling (3-4), schooling (5-8), industry share of gross value added, and population density. Why these variables are included on national and regional level is further explained in the data section. The aim of the synthetic control method is to weight the element of X_0 such that the results most closely resemble X_1 (Born et al, 2017)

Let $W = (w_1, \ldots \ldots, w_j)$ denote as a ($J \times 1$) vector of nonnegative weights which add up to one. The scalar of $w_j (j = 1, \ldots \ldots, J)$ represents the weight of country j in the synthetic Hungary. Each different value of W will lead to a different synthetic Hungary. This is because each W represents a different weighted average of the available control countries thus synthetic control. The weights within W are composed such that the synthetic Hungary will most closely resemble the actual Hungary in the pre-Fidesz period in terms of economic output determinants. In other words, that aim is to minimize the difference in economic output determinants between Hungary and its synthetic control in the pre-Fidesz government period which is given by $X_1 - X_o W$.

Let V denote as a ($k \times k$) nonnegative diagonal matrix which represent the importance of the different economic output determinants. In this thesis these values are data-driven through the algorithm of Abadie et al (2003, 2010). Let W^* denote as a vector which defines the combination of control countries not affected by Fidesz government which best resemble Hungary in terms of economic output determinants in the pre-Fidesz period. In other words, W^* is chosen such that it will minimize the weighted mean square error $(X_1 - X_0 W)'V(X_1 - X_0 W)$ with $w_j \geq 0$ for $j = 1, \ldots, J$ and $w_1 + \cdots.. + w_j = 1$ (Abadie et al, 2003).

The synthetic control method has a few assumptions which have to be explained. The first assumption is that only Hungary is affected by the intervention of interest (election of the Fidesz government). This indicates that the economic output of Hungary and its regions experience a causal effect, while there is no causal effect of the Fidesz government on the economic output of the comparison countries. The main effect of the Fidesz government is through the economic policies implemented. These economic policies resulted in a decline in the FDI going into the Hungarian economy. The FDI that without the Fidesz government likely would have gone into the Hungarian economy could now have switched towards other countries. If there is indeed a switch of FDI towards other countries than there are not only causal effects of the Fidesz government for Hungary. The causal effects calculated for Hungary can then be slightly biased due to the "positive" spillovers of the switch in FDI for other European countries. However, to my knowledge, there is no data available to where the FDI of Hungary has transferred to. In other words, due to limited data it is not possible to further analyse the causal effects of the Fidesz government on other European countries.

The second assumption made by the synthetic control method is that there is no difference in economic shocks (e.g. shocks induced by new policies) in the post-Fidesz election period between Hungary and the synthetic Hungary. The same applies on the regional level. Hungary and its regions are like the comparison countries/regions part of the European Union. Therefore, it can be assumed that the economic shocks (e.g. shocks induced by new policies of the EU) that did happen in this period, will have a relatively similar effect in the post-Fidesz election period for Hungary and the EU countries included into the synthetic Hungary. In other words, the assumption that the effect of the economic shocks occurring were relatively similar among the EU countries in the post-Fidesz election period seems like a valid assumption for the synthetic control method used in this thesis. The third assumption made by the synthetic control method is that the event (the election of the Fidesz political party) is generating causal effects from the moment the election happened and not before. This indicates that in the case of this thesis the causal effect of the Fidesz government started from 2010 onwards and not before. This again seems like a valid assumption as the Fidesz government started to implement its nationalistic policies after their election and not before.

3.2 Placebo studies

In this thesis placebo studies will be used to see how high the validity and credibility are of the results found with the synthetic control method. According to Abadie et al (2015), placebo studies for the synthetic control method can be defined as a wide range of falsification exercises. One of the placebo studies which can be used for the synthetic control method is called an in-space placebos (Abadie et al, 2015). With this type of placebo the intervention of interest (the election of the Fidesz political party) is reassigned to members of the donor pool. In other words, in the post-Fidesz election period e.g. the actual Poland and the synthetic Poland are compared instead of the actual Hungary and the synthetic Hungary. Moreover, on regional level instead of a comparison in the post-Fidesz election period between e.g. the actual Közép-Magyarország and the synthetic Közép-Magyarország, the comparison can now consist of e.g. the actual Latvija and the synthetic Latvija.

With the synthetic control method it is assumed that the Fidesz government has no spillover effect on the countries/regions in the donor pool. If this is a correct assumption, the effects found in the post-Fidesz election period for the placebo studies should be considerably smaller than for Hungary and its regions. Moreover, the results of the placebo studies can be compared to the results from Hungary and its regions. It thereby can give an indication of whether the estimated effect of the Fidesz government in Hungary/Hungarian regions is larger than the placebo effects found from the placebo studies. If there is an effect of the Fidesz government in Hungary, the effects found for Hungary and its regions should be substantially larger than the effects found for the other countries/regions.

To compare whether the effects for Hungary and its regions are larger than for the placebo studies, the ratio is calculated between the post-Fidesz election period root mean square prediction error (RMSPE) and the pre-Fidesz period root mean square prediction error (RMSPE). The RMSPE calculates the magnitude of the gap in the outcome variable (real GDP per capita) between the actual countries/regions and their synthetic counterfactuals (Abadie et

al, 2015). This has relevance as when the pre-RMSPE and the post-RMSPE are both large, the large post-RMSPE does not indicate a large effect. Since then the causal effects which are calculated in the post-Fidesz election period are then likely caused by the large pre-RMSPE instead of the Fidesz government. Moreover, if there is a clear effect of the Fidesz government on Hungary and its regions, the ratio for Hungary and the Hungarian regions should be substantially larger than for the other countries/regions.

4. Data

In this thesis the focus is on calculating the causal effect of the election of the Fidesz political party in 2010 on the economic output of Hungary and its regions within. To calculate these effects, the synthetic control method is used. As apparent from the methodology section, this indicates that this thesis constructs a synthetic Hungary out of countries that have not experienced the intervention of interest (the election of the Fidesz political party). Moreover, on regional level this indicates that this thesis constructs synthetic versions of the Hungarian regions out of regions that have not experienced the intervention of interest (the election of the Fidesz political party). To subdivide the economic territory of Hungary into regions, the Nomenclature of territorial units for statistics (NUTS) is used. The NUTS is based on a hierarchical breakdown which indicates that the countries can be broken down in three hierarchical levels. The first level is the NUTS-1, the second level is NUTS-2 and the third level is NUTS-3.

Ideally, this thesis would have divided the regions in Hungary according to the NUTS-3 level. However, due to the unavailability of the data on NUTS-3 level, this thesis instead focuses on the NUTS-2 level. For Hungary, the NUTS-2 level included until 2013 seven regions: Közép-Magyarország, Közép-Dunántúl, Nyugat-Dunántúl, Dél-Dunántúl, Észak-Magyarország, Észak-Alföld, and Dél-Alföld. However, after 2013 the region Közép-Magyarország was divided into Budapest and Pest. The preference would have been to use the new NUTS-2 level, however the data of Budapest and Pest is not available for all economic output determinants. Therefore, the NUTS-2 level before 2013 is used as NUTS classification instead of the NUTS-2 level after 2013.

Furthermore, the period in this thesis is different on national and regional level. On national level the period consist of 1995 till 2018, while on regional level the period consist of 2000 till 2018. The difference in starting year is because the regional data is only available from 2000 onwards, while the national data is available from 1995 onwards. Moreover, the period on national and regional level ends in 2018 as this is the most recent year with available data. It has to be emphasized that the period included in this thesis is divided into two specific periods. The first period in this thesis is the pre-Fidesz period which is on national level from 1995 till 2009, while on regional level the period is from 2000 till 2009. This period is used to find a weighted average of countries/regions which best resemble the economic output determinants of Hungary and the Hungarian regions in this period. Moreover, the second period in this thesis is the post-Fidesz election period which is from 2010 till 2018. This period is used to calculate the causal effects of the Fidesz government for Hungary and the Hungarian regions by comparing the outcome variable (real GDP per capita) of the actual Hungary/Hungarian regions with their synthetic counterparts.

The synthetic Hungary and Hungarian regions are constructed based on two different datasets. On national level, the dataset consists of Hungary and the other 27 European countries. These 27 other European countries could potentially be included into the synthetic Hungary. Moreover, on regional level the dataset consist of the Hungarian regions on NUTS-2 and all the regions of the European Union for which data was available for all variables in the period researched. For most non-Hungarian regions the data was available on NUTS-2 level, however

for some regions the data was unavailable at this level. Therefore, when possible these regions are divided based on the NUTS-1 classification. If the data was also unavailable at the NUTS-1 level, the regions have been left out of the dataset. Leaving some regions out and including several regions on NUTS-1 level gives 231 European regions which could potentially be included into the synthetic Hungarian regions.

4.1 Outcome variable

This thesis wants to calculate the economic consequences of the Fidesz government for Hungary and its regions. The outcome variable on both national and regional level is the real GDP per capita. The outcome variable on national level has been obtained from the Eurostat database with the indicator gross domestic product at market prices with current prices, purchasing power standard (PPS, EU27 from 2020) per capita as the unit of measure[1]. Moreover, the outcome variable on regional level has been obtained from the Eurostat regional database and OECD regional database. For the outcome variable obtained from the Eurostat regional database the indicator is Gross domestic product (GDP) at current market prices by NUTS 2 regions with the unit of measure purchasing power standard (PPS, EU27 from 2020), per inhabitant. Moreover, as not all the data on regional level for the outcome variable was available at the Eurostat regional database, the data for several regions has been obtained from the OECD regional database. For the outcome variable obtained from the OECD regional database, the indicator is Regional GDP with the unit national currency per head, current prices. To align the outcome variables obtained from the OECD and Eurostat, the GDP obtained from OECD was divided by the purchasing power parities (EU27_2020=1) for GDP per capita from Eurostat regional database which gives real GDP per capita with the unit purchasing power standards (PPS, EU27 from 2020).

4.2 predictor variables

As mentioned in the methodology section, the synthetic Hungary and the synthetic Hungarian regions are constructed such that the weighted average of countries/regions included best resemble the economic output determinants of Hungary/the Hungarian regions in the pre-Fidesz period. The economic output determinants are the predictor variables in this thesis as the economic output is the outcome variable. Which variables represent economic output determinants is based on the papers of Abadie & Gardeazabal (2003, 2015) and Born et al (2017, 2019). On national level, this thesis follows the standard set of economic output determinants set by Abadie et al (2015) and Born et al (2017, 2019). The standard set of economic output determinants consist of real GDP per capita, inflation rate, consumption, industry share of gross value added, investment ratio, schooling, and a measure of trade openness. In table 1 the headings and the units of these predictor variables in the Eurostat database are shown. As predictor variables are averages of the pre-intervention period in this case the pre-Fidesz period, the averages of the economic output determinants in the pre-Fidesz period have been calculated from the data obtained through Eurostat database.

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[1] For Romania the period 1995 till 2001 was missing from this database. Therefore, for this country, the data on real GDP at market prices with the unit current prices, million purchasing power standards (PPS, EU27 from 2020) and total population on 1 January by age and sex has been obtained. The data of the real GDP has been divided by the population to get the real GDP per capita for Romania for these years. Specifically, an example is that for the real GDP per capita of 1995 has been calculated by dividing the real GDP by population 1995 and 1996.

However, before the averages of the predictor variables including industry share of gross value added and trade openness can be calculated a few extra steps are needed. First, for the industry share, the gross value added of industry (except construction) has to be divided by the gross value added of all NACE activities. Thereby, the unit of this predictor variable is presented in percentages. Second, for trade openness, the exports and imports of goods and services have to be summed up. After the sum is made, the total exports and imports of goods and services in national currency are divided by the GDP in national currency. Thereby, the unit of this predictor variable also is presented in percentages.

Table 1 Heading, type used in this thesis, and unit for all predictor variables on national level obtained from Eurostat regional database

Predictor variable	Heading	Specific type used in this thesis	Unit
Real GDP per capita	Main GDP aggregates per capita	Gross Domestic Product at market prices	Current prices, purchasing power standard (PPS, EU27 from 2020) per capita
Investment ratio	Gross fixed capital formation by AN_F6 asset type	Asset type: total fixed assets (gross)	Percentage of gross domestic product (GDP)
Schooling	Population by educational attainment level, sex, age (%)	age: 25-64, sex: total, educational attainment: level 3-8	Percentages
Inflation	HICP (2015=100) – annual data (average index and rate of change)	All-items HICP	Annual average rate of change
Household+ non-profit consumption	GDP and main components (output, expenditure and income)	Household and NPISH final consumption expenditure	Current prices, million purchasing power standards (PPS, EU27 from 2020)
Industry share	National accounts aggregates by industry	Total – all NACE activities (gross value added)	Current prices, million units of national currency
	National accounts aggregates by industry	Industry (except construction) (gross value added)	Current prices, million units of national currency
	GDP and main components (output, expenditure and income)	Gross domestic product at market prices	Current prices, million units of national currency
Trade openness	Exports and Imports by Member States of the EU/third countries	Exports of goods and services	Current prices, million units of national currency
	Exports and Imports by Member States of the EU/third countries	Imports of goods and services	Current prices, million units of national currency

On regional level, the economic output determinants are based on the study of Abadie & Gardeazabal (2003) and Abadie et al (2015). The economic output determinants include real GDP per capita, investment ratio, schooling (3-4), schooling (5-8), industry share of gross value added, and population density. Most of the data is obtained from Eurostat regional database except for the data from Polish regions. The data from Polish regions was unavailable at the Eurostat regional database. Therefore, they have instead been obtained from OECD regional database. In table 2 the headings, which types is used, and what the units of the variables are in

the Eurostat and OECD regional databases are shown. As mentioned earlier, of the predictor variables the averages are taken of the pre-Fidesz period. However, for several predictor variables a few steps have to be taken before the averages can be calculated.

First, for the predictor variable real GDP per capita the data is obtained from two different databases. To align the two measures and get the real GDP per capita an extra step had to be undertaken for the GDP per capita data obtained from the OECD regional database. Specifically, the GDP per capita obtained from the OECD database is divided by the PPPs (EU27_2020=1) which gives the real GDP per capita. Second, for the investment ratio, the gross fixed capital formation in national currency has to be divided by the gross domestic product in national currency. Thereby, the unit of this predictor variable is presented in percentages. Third, for the industry share of gross value added, the gross value added of the industry has to be divided by the gross value added of all NACE/total activities. This gives that the unit of this predictor variable is presented in percentages.

Table 2 Database, heading, type used in this thesis, and unit for all predictor variables on regional level

| Predictor variable	Database	Heading	Specific type used in this thesis	Unit
Real GDP per capita	Eurostat	Gross Domestic Product (GDP) at current market prices by NUTS-2 regions		Purchasing power standard (PPS, EU27 from 2020), per inhabitant
	OECD	Gross Domestic Product, Large regions TL2		National currency per head, current prices
	Eurostat	Purchasing power parities (PPPs), price level indices and real expenditures for ESA 2010_aggregates	Gross domestic Product	Purchasing power parities (EU27_2020=1)
Investment ratio	Eurostat	Gross fixed capital formation by NUTS-2 regions	Total – all NACE activities	Million units of national currency
	Eurostat	Gross Domestic Product (GDP) at current market prices by NUTS-2 regions		Million units of national currency
Schooling (3-4)	Eurostat	Population aged 25-64 by educational attainment level, sex and NUTS-2 regions (%)	Sex: total, age: 25 till 64, educational attainment: upper secondary and post-secondary non-tertiary education (3-4)	percentage
Schooling (5-8)	Eurostat	Population aged 25-64 by educational attainment level, sex and NUTS-2 regions (%)	Sex: total, age: 25 till 64, educational attainment: tertiary education (5-8)	percentage
Industry share	Eurostat	Gross value added at basic prices by NUTS-3 regions	Total – all NACE activities	Million units of national currency
	Eurostat	Gross value added at basic prices by NUTS-3 regions	Industry (except construction)	Million units of national currency
	OECD	GVA by industry, large TL2 and small TL3 regions	GVA_IND_TOTAL: Regional Gross Value Added, total activities	Million national currency, current prices
	OECD	GVA by industry, large TL2 and small TL3 regions	GVA_IND_10_vB_E: GVA in industry, including energy	Million national currency, current prices
Population density	Eurostat	Population density by NUTS 3 region		Persons per square kilometre
	OECD	Population density and area, large TL2 and small TL3 regions	Population density (pop. per km^2)	Ratio

5. Results

5.1 National level

Using the synthetic control method as described in the methodology section, a synthetic Hungary is constructed as a counterfactual of the actual Hungary. The synthetic Hungary is constructed such that the weighted average of countries included best resemble the economic output determinants in the pre-Fidesz period of Hungary. The weights of the countries included into the synthetic Hungary are: Portugal (0.296), Poland (0.258), Latvia (0.219), Romania (0.162), and Slovenia (0.064). These weights indicate that 29.6 percent of the synthetic Hungary consists of Portugal, while 25.8 percent consist of Poland and so on. In table 3, the means of the economic output determinants (predictor variables) in the pre-Fidesz period are shown for the actual Hungary and its synthetic counterpart. From table 3 it is apparent that most of the economic output determinants between the synthetic- and actual Hungary are relatively similar with the exception of consumption and trade openness. The difference between these two variables for the actual Hungary and synthetic Hungary is respectively 18061 PPS for consumption and for trade openness it is 23.4 percent.

Table 3 The means of the predictor variables in the pre-Fidesz period for the actual and synthetic Hungary

Predictor variables	Actual Hungary	Synthetic Hungary
Real GDP per capita	11692	11712
Investment ratio	23.81	23.81
Schooling	73.65	63.00
inflation	9.1	9.1
consumption	29718	47779
Industry share	25.93	23.08
Trade openness	51.89	75.32

Source: predictor variables of the actual Hungary are obtained from Eurostat database

The synthetic Hungary has been constructed so the next step of this thesis is calculating the causal effects of the Fidesz government. As mentioned in the methodology section, the causal effects are calculated by comparing the outcome variable (real GDP per capita) of the actual Hungary with the synthetic Hungary in the post-Fidesz election period. However, to calculate these causal effects, the real GDP per capita of the synthetic Hungary has to be similar to the actual Hungary in the pre-Fidesz period. The results for the real GDP per capita of the actual Hungary and the synthetic Hungary are shown in figure 5. From figure 5 it becomes apparent that in the pre-Fidesz period, the real GDP per capita of the synthetic Hungary follows largely a similar path as the real GDP per capita of the actual Hungary. However, ideally the match would have been exact. When the match is exact, it is more likely that the differences calculated in the outcome variable in the post-Fidesz election period would be only caused by the causal effects of the Fidesz government and not by pre-Fidesz differences in the outcome variable.
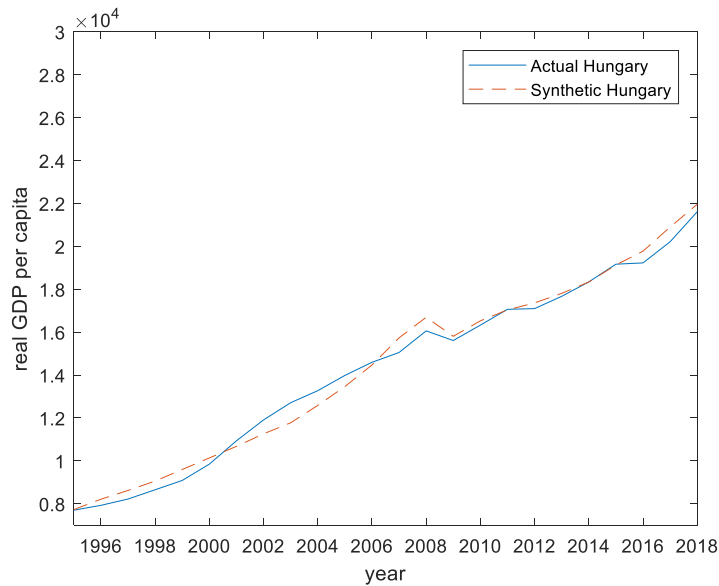
Figure 5 The real GDP per capita for Hungary and the synthetic Hungary
Source: real GDP per capita of the actual Hungary is obtained from Eurostat database

The first hypothesis of this thesis is that *the Hungarian economy has experienced a slow-down after the 2010 parliamentary election.* In the post-Fidesz election period, the path of the real GDP per capita has been relatively similar between Hungary and the synthetic Hungary. However, looking more closely, the actual Hungary always is a bit behind the real GDP per capita of its synthetic counterpart. This is confirmed by the results shown in figure 6 in which the difference in real GDP per capita for the actual Hungary and the synthetic Hungary is shown. The largest decline in economic output in Hungary was in 2016 and 2017 of respectively 2.84 percent and 3.40 percent. On the other hand, in 2011, 2014, and 2015, the economic output of Hungary is a bit higher than that of the synthetic Hungary with respectively 0.16 percent, 0.04 percent, and 0.19 percent.

Overall, over the period 2010 until 2018, the Hungarian economy experienced an average annual decline in the real GDP per capita of 1.23 percent in comparison to its synthetic counterpart. In other words, the results are supporting my first hypothesis that the Hungarian economy indeed experienced a slow-down after the parliamentary elections of 2010. Thereby, the results are in line with the expectations in this thesis. According to the IMF country report of 2013, the growth prospects of Hungary had declined in recent years. Moreover, according to the IMF country report of 2014, the growth prospects were expected to remain weak in the period 2013 till 2019. That the growth prospects had declined in recent years and were expected to remain weak in the period 2013 till 2019 was caused by the decline in investments going into the economy. The decline in FDI (which is caused by the policies implemented by the Fidesz government) causes lower growth prospects as it likely resulted into a decline in the positive effect of FDI on economic growth. In other words, the expectation was that the decline in FDI had resulted in a slowdown of the Hungarian economy.
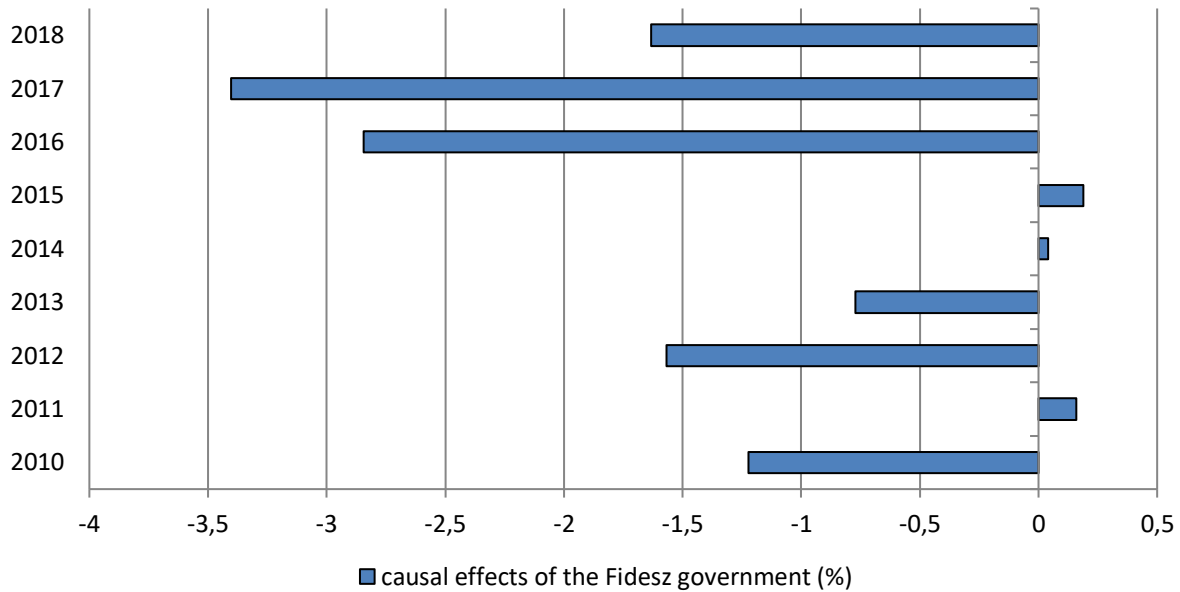
Figure 6 The difference in real GDP per capita for the actual Hungary and the synthetic Hungary (%)

Source: real GDP per capita is obtained from Eurostat database

5.2 Regional level

Using the synthetic control method as described in the methodology section seven synthetic Hungarian regions which are counterfactuals of the actual seven Hungarian regions are constructed. The synthetic Hungarian regions are constructed such that the weighted average of regions included best resemble the economic output determinants of the Hungarian regions in the pre-Fidesz period. This thesis includes an analysis on regional level as there are regions within Hungary that had a larger share of the FDI going into the Hungarian economy than other regions in the pre-Fidesz period. The regions which had a larger share of FDI are likely the regions that are most affected by the policies implemented by the Fidesz government. To sum up, the causal effects calculated for the Hungarian economy are likely not representative for the regional economies in Hungary.

Before the causal effects can be calculated for the Hungarian regions, the synthetic Hungarian regions have to be constructed for the actual Hungarian regions. In table 3 the three largest weights of regions included in the synthetic Hungarian regions are shown. The countries from which most of the regions are included into the synthetic Hungarian regions are Latvia, East Germany, Poland, Bulgaria, and Romania. In table 4 the means of the predictor variables in the pre-Fidesz period for the actual and synthetic Közép-Magyarország and the actual and synthetic Dél-Alföld are shown. It is shown that the economic output determinants are exactly the same for the actual Közép-Magyarország and Dél-Alföld and their synthetic counterparts. For the other Hungarian regions, the means of the predictor variables in the pre-Fidesz period for the actual Hungarian regions and their synthetic counterparts are shown in the Appendix. As shown in the appendix, there is not always an exact match between the mean of the predictor variables of the Hungarian regions and their synthetic counterpart in the pre-Fidesz period.

Table 4 The three largest weights of regions included into the synthetic Hungarian regions

Hungarian Regions	Largest region	Second largest region	Third largest region
Közép-Magyarország	Bratislavský Kraj (0.198)	Lubelskie (0.165)	Brandenburg (0.093)
Közép-Dunántúl	Dytiki Makedonia (0.343)	Yugoiztochen (0.230)	Sud – Muntenia (0.226)
Nyugat-Dunántúl	Sud - Muntenia (0.160)	Alentejo (0.126)	Yugoiztochen (0.050)
Dél-Dunántúl	Východné Slovensko (0.416)	Severoiztochen (0.281)	Região Autónoma da Madeira (PT) (0.117)
Észak-Magyarország	Severoiztochen (0.563)	Východné Slovensko (0.405)	Região Autónoma da Madeira (PT) (0.026)
Észak-Alföld	Sud - Muntenia (0.411)	Severoiztochen (0.220)	Latvija (0.172)
Dél-Alföld	Latvija (0.249)	Nord-Est (0.238)	Sud-Est (0.135)

Table 5 The means of the predictor variables in the pre-Fidesz period for the actual and synthetic Közép-Magyarország and Dél-Alföld

Predictor variables	Actual Közép-Magyarország	Synthetic Közép-Magyarország	Actual Dél-Alföld	Synthetic Dél-Alföld
Real GDP per capita	21650	21650	9340	9340
Investment ratio	21.12	21.12	23.19	23.19
Schooling (3-4)	57.36	57.36	59.26	59.26
Schooling (5-8)	25.32	25.32	13.27	13.27
Industry share	18.69	18.69	22.80	22.80
Population density	413.49	413.49	73.83	73.83

Source: predictor variables of the actual Közép-Magyarország and Dél-Alföld are obtained from Eurostat regional database

The synthetic Hungarian regions have been constructed so the next step of this thesis is calculating the causal effects of the Fidesz government for the Hungarian regions. As mentioned in the methodology section, the causal effects are calculated by comparing the outcome variable (real GDP per capita) of the actual Hungarian regions with the synthetic Hungarian regions in the post-Fidesz election period. The results of the real GDP per capita of the actual Közép-Magyarország and its synthetic Közép-Magyarország are shown in figure 7. Moreover, the results of the real GDP per capita of the actual Dél-Alföld and the synthetic Dél-Alföld are shown in figure 8. In addition, the results of the real GDP per capita of the other actual

Hungarian regions and their synthetic counterparts are shown in the Appendix. From figure 7 it is apparent that this thesis constructed a suitable synthetic Közép-Magyarország for the actual Közép-Magyarország. It is shown that the actual Közép-Magyarország and the synthetic Közép-Magyarország largely follow the same economic output path in the pre-Fidesz period. Moreover, from figure 8 it is apparent that the synthetic counterpart of the actual Dél-Alföld is not as similar as the synthetic counterpart of Közép-Magyarország. It is shown that in the pre-Fidesz period, the magnitude of the gap in the real GDP per capita is larger for Dél-Alföld than it was for Közép-Magyarország. Therefore, the credibility of the causal effects found for the actual Közép-Magyarország is higher than that for the actual Dél-Alföld.
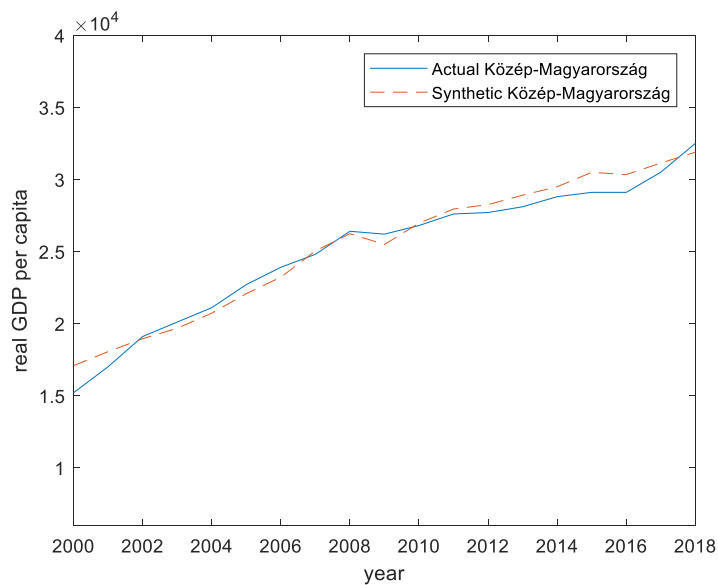
Figure 7 The real GDP per capita for Közép-Magyarország and the synthetic Közép-Magyarország

Source: real GDP per capita of the actual Közép-Magyarország is obtained from Eurostat regional database
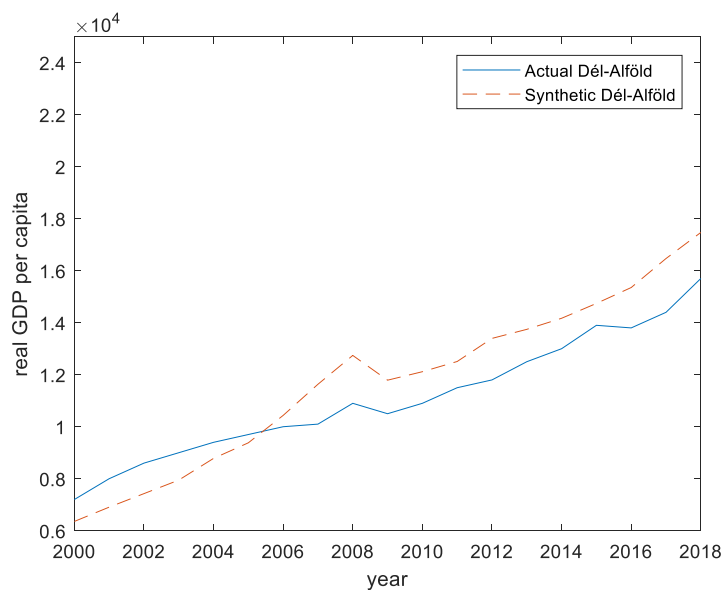
Figure 8 The real GDP per capita for Dél-Alföld and the synthetic Dél-Alföld

Source: real GDP per capita of the actual Dél-Alföld is obtained from Eurostat regional database

This thesis expected that the region of Közép-Magyarország would have experienced the largest decline in real GDP per capita in the post-Fidesz election period as it was the region which had the largest share of FDI in the pre-Fidesz period. It is expected that the regions with the highest level of FDI are also the regions which have experienced the highest positive effect of FDI on economic growth. However, the causal effects calculated with the synthetic control method for the Hungarian regions indicates that other Hungarian regions have experienced a larger decline. In figure 9, the differences in the annual real GDP per capita of the actual Hungarian regions and the synthetic Hungarian regions are shown as a percentage of the real GDP per capita of the Hungarian regions.

From figure 9 it is apparent that the regions including Észak-Alföld and Dél-Alföld are the regions which have experienced the largest decline in their real GDP per capita in comparison to their synthetic counterparts in the post-Fidesz election period. Észak-Alföld experienced an average annual decline of 15 percent in their real GDP per capita. Moreover, Dél-Alföld experienced an average annual decline of 11 percent in their real GDP per capita. However, not all Hungarian regions have experienced a decline in their real GDP per capita in comparison to their synthetic counterparts. Specifically, the regions Közép-Dunántúl and Nyugat-Dunántúl have experienced both on average an annual increase of 8 percent. The exact numbers of the average annual decline/increase in real GDP per capita for the Hungarian regions can be found in the appendix.
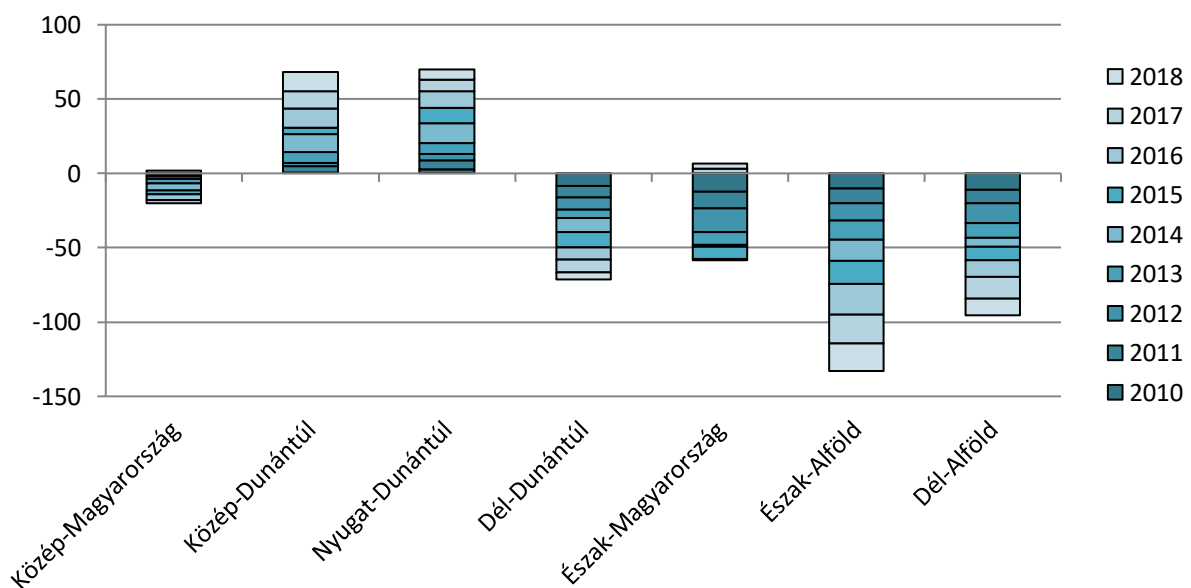
Figure 9 The difference between the real GDP per capita for the actual Hungarian regions and the synthetic Hungarian regions (%)
Source: real GDP per capita is obtained from Eurostat regional database

The second hypothesis of this thesis is that *the economic inequality between regions in Hungary has declined due to the economic policies pursued by the Fidesz government.* To see whether the inequality has been reduced by the Fidesz government a correlation is made between the reported causal effect of the Hungarian regions in this thesis and the real GDP per capita of the

Hungarian regions in the year before the election (2009). In figure 10 it is shown that there is no correlation between the economic output of the Hungarian regions in 2009 and the causal effects experienced by the Hungarian regions in the post-Fidesz election period. In other words, this indicates that the economic policies implemented by the Fidesz government have not resulted into more economic equality among the Hungarian regions.

Moreover, it instead seems that without the Fidesz government the regional economic equality would have been higher. It is shown in figure 10 that the richest Hungarian region experienced a smaller decline in economic output in the post-Fidesz election period than the four poorest Hungarian regions. Moreover, the second and third richest region in Hungary experienced a positive effect of the Fidesz government. Therefore, it is likely that the Fidesz government instead of increasing the economic equality has increased the economic inequality between the Hungarian regions. In other words, there is no support for the second hypothesis of this thesis. Moreover, the results of this thesis are contradicting the prediction of the second hypothesis.

That the results of the synthetic control method are contradicting the second hypothesis can be seen as a surprise. The four richest Hungarian regions in terms of economic output had a share of 86.7 percent of the FDI of foreign direct investments that went into Hungary. Therefore, the decline in FDI caused by the Fidesz government was expected to affect these regions the most. As the decline in FDI will most likely result in a decline in the positive effect of FDI on the economic growth of the Hungarian regions. The surprising results of this thesis speak to the discussion on whether FDI has a positive effect on economic growth. If the FDI had a positive effect on economic growth in Hungary, the regions with the largest share of FDI should be the regions that were most negatively affected by the policies implemented by the Fidesz government.

However, the synthetic control method does not distinguish between effects of specific policy measures. In other words, the synthetic control method does not look at the effect of a single policy measure. Therefore, there is the possibility that the policies implemented had (besides a negative effect on FDI) positive effects (through other factors) on economic growth. The positive effects (through other factors) on economic growth could be the highest for the Hungarian regions which also had the highest share of FDI. In other words, the decline in the positive effect of FDI on economic growth could be compensated by a positive effect of another factor caused by the implemented policies of the Fidesz government.
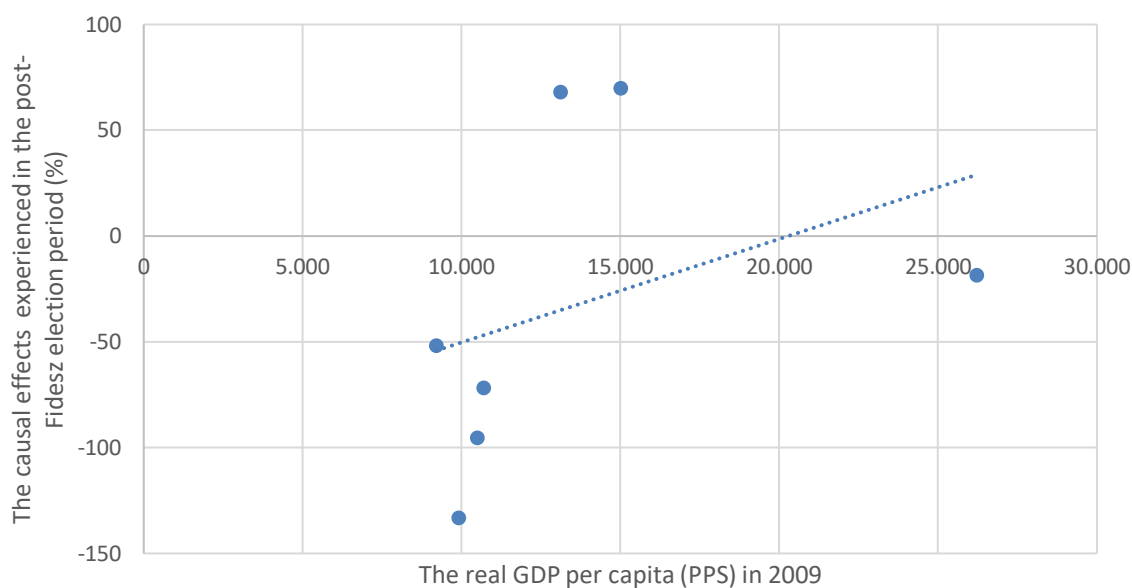
Figure 10 A correlation between the real GDP per capita of the Hungarian regions in 2009 and the causal effects (%) experienced by the Hungarian regions in the post-Fidesz election period

Source: real GDP per capita is obtained from Eurostat regional database

5.3 Placebo studies

5.3.1 National level

To evaluate the validity and credibility of the causal effects calculated in this thesis for the Hungarian economy in-space placebos are done. With the in-space placebos the intervention of interest (the election of the Fidesz political party) is reassigned to members of the donor pool. In addition, to compare whether the causal effects for Hungary are larger than for the countries included into the placebo studies, the ratio is calculated between the post-Fidesz election period root mean square prediction error (RMSPE) and the pre-Fidesz period root mean square prediction error (RMSPE). As mentioned in the methodology section, the RMSPE calculates the magnitude of the gap in the outcome variable (real GDP per capita) between the actual countries/regions and their synthetic counterparts (Abadie et al, 2015). The results of the ratio of post-RMSPE to pre-RMSPE on national level are shown in figure 11.

From figure 11 it is apparent that Hungary has the lowest ratio in comparison to the other countries. Specifically, the ratio is smaller than 1 which indicates that the gap in the post-Fidesz election period is smaller than the gap in the pre-Fidesz period between the actual- and synthetic Hungary. The low RMSPE ratio indicates that the causal effects calculated for the Hungarian economy in the post-Fidesz election period are likely caused by differences in the outcome variable in the pre-Fidesz period. In other words, the calculated causal effect for the Hungarian economy with the synthetic control method, do not directly indicate that there is indeed an effect of the Fidesz government on the Hungarian economy. In the discussion paragraph this issue is discussed further.
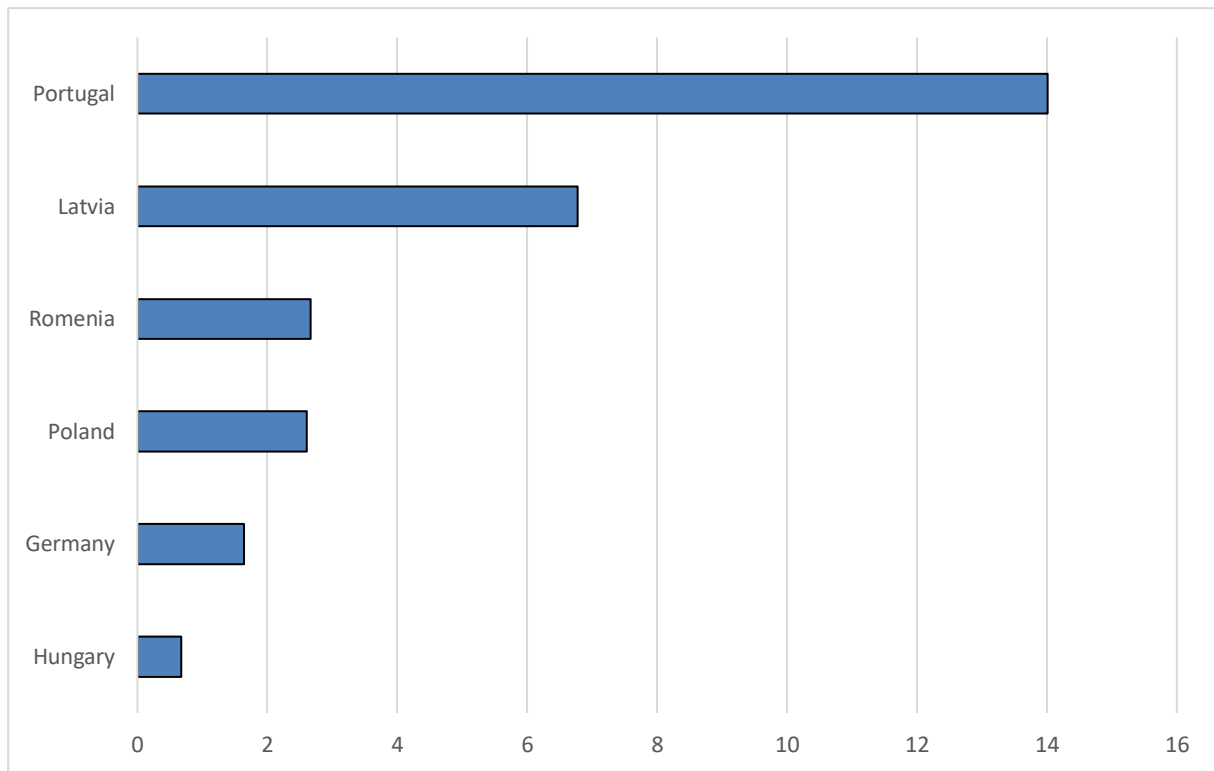
Figure 11 Ratio of Post-RMSPE to pre-RMSPE: Hungary and its control countries

5.3.2 Regional level

For the regional level, the same in-space placebos are done as on national level. The purpose of these placebos are again to see what the validity and the credibility of the calculated causal effects for the Hungarian regions. As mentioned earlier in the national paragraph, the ratio of post-Fidesz election period root mean square prediction error (RMSPE) and the pre-Fidesz period root mean square prediction error (RMSPE) is calculated. This ratio is calculated so that this thesis can compare whether the causal effects calculated for the Hungarian regions are larger than that for the regions included into the placebo studies. The results are shown in figure 12. It is shown in figure 12 that there is a large difference between the ratios of the Hungarian regions.

On the one hand, Közép-Dunántúl and Nyugat-Dunántúl have a high ratio which indicates that the gap in the real GDP per capita between them and their synthetic counterpart in the post-Fidesz election period is significantly larger than in the pre-Fidesz period. Therefore, as the ratio is high, the causal effect calculated for these two Hungarian regions is likely indeed the causal effect of the Fidesz government. The high ratio suggests it is unlikely that the gap found in the post-Fidesz election period is merely the result of the same gap in the pre-Fidesz period. In other words, this indicates that the gap found in the post-Fidesz election period is likely the result of the Fidesz government.

However, the other five Hungarian regions including Közép-Magyarország, Dél-Dunántúl, Észak-Magyarország, Észak-Alföld, and Dél-Alföld are showing a substantial lower ratio.

Specifically, Közép-Magyarország has a ratio of 1 which indicates that the gap in the post-Fidesz election period is almost the same as in the pre-Fidesz period. Therefore, as the ratio is 1, the causal effects calculated in the post-Fidesz election period are likely caused by the same gap in real GDP per capita in the pre-Fidesz period. In other words, it seems that Közép-Magyarország has experienced no causal effect of the Fidesz government. Furthermore, the low ratio of the other four Hungarian regions likely indicates that the calculated causal effects in the post-Fidesz election period are caused by differences in the real GDP per capita between the actual Hungarian regions and their synthetic counterparts in the pre-Fidesz period.
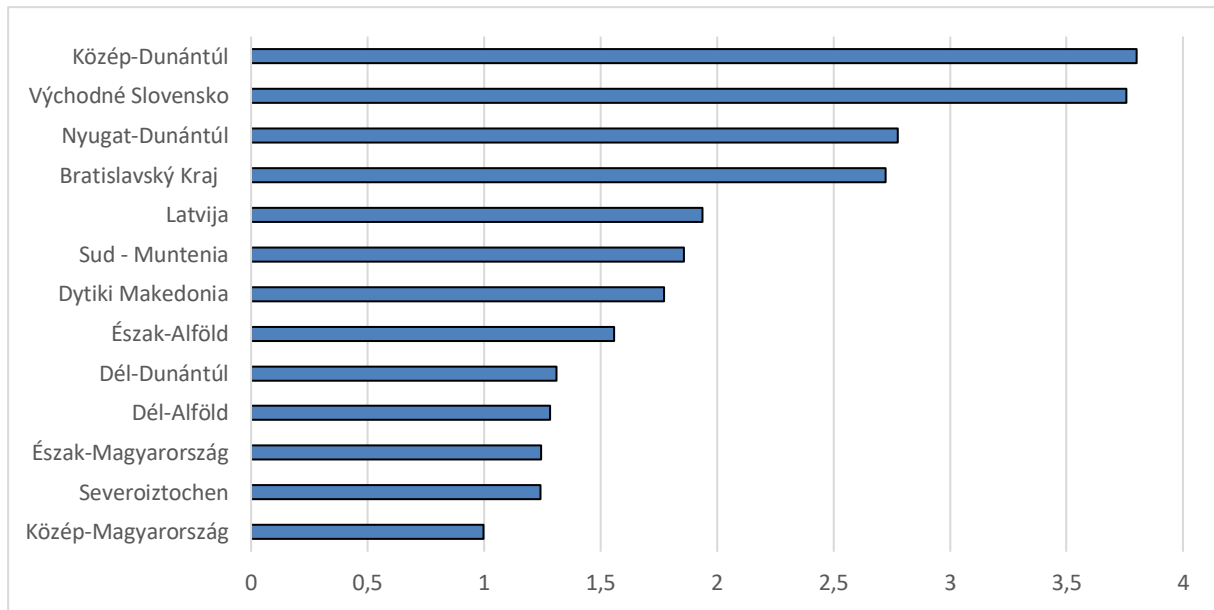

Figure 12 Ratio of Post-RMSPE to pre-RMSPE: Hungarian regions and its control regions

5.4 Discussion

5.4.1 National level

With the synthetic control method, the outcome (real GDP per capita) and predictor variables (real GDP per capita, investment ratio, schooling, inflation, household and non-profit consumption, industry share, and trade openness) of Hungary have to be similar to that of its synthetic counterpart in the pre-Fidesz period. As otherwise the calculated causal effects in terms of economic output in the post-Fidesz election period could just merely be showing the differences in economic output (determinants) in the pre-Fidesz period between Hungary and its synthetic counterpart. In other words, the higher the similarity is between the economic output (determinants) in the pre-Fidesz period of Hungary and the synthetic Hungary, the more credible and valid the causal effects calculated are in the post-Fidesz election period.

The outcome and predictor variables in the pre-Fidesz period between Hungary and the constructed synthetic Hungary of this thesis show large similarities. However, the outcome and predictor variables of the synthetic Hungary are not an exact match for Hungary in the pre-

Fidesz period. Therefore, the causal effects calculated in terms of economic output could be slightly biased by the differences in economic output (determinants) in the pre-Fidesz period. This indicates that the causal effects calculated in this thesis could merely show the differences in the economic output (determinants) in the pre-Fidesz period instead of the causal effects of the Fidesz government.

That the causal effects calculated for Hungary may show the differences in economic output (determinants) in the pre-Fidesz period is strengthened by the placebo studies done on national level. With the placebo studies it is shown that the ratio of post-RMSPE to pre-RMSPE for Hungary was the lowest in comparison to the countries included in the donor pool. Specifically, the ratio for Hungary is smaller than 1. This indicates that the magnitude of the gap in real GDP per capita in the post-Fidesz election period is smaller than in the pre-Fidesz period. From comparing the actual- and synthetic Hungary, it seemed apparent that there was a slowdown experienced by the Hungarian economy.

However, one has to take into account the ratio and that there were differences in the economic output (determinants) in the pre-Fidesz period between Hungary and its synthetic counterpart. Therefore, it is likely that the gap calculated in economic output between Hungary and the synthetic Hungary in the post-Fidesz election period was caused by the differences in the economic output in the pre-Fidesz period. In other words, the slight slowdown which seemed evident from the results is likely not from the causal effects of the Fidesz government. One thus has to be careful with making firm conclusions based on the causal effects calculated on national level in this thesis as the credibility and validity of these causal effects are relatively low.

5.4.2 Regional level

With the synthetic control method, the outcome (real GDP per capita) and predictor variables (real GDP per capita, investment ratio, schooling (3-4), schooling (5-8), industry share, population density) of the Hungarian regions have to be similar to their synthetic counterparts in the pre-Fidesz period. For the Hungarian regions including Közép-Magyarország and Dél-Alföld the predictor variables are an exact match with the synthetic Közép-Magyarország and Dél-Alföld in the pre-Fidesz period. However, the exact match between Dél-Alföld and its synthetic counterpart in terms of economic output determinants seems to not have resulted into the same level of similarity in the economic output in the pre-Fidesz period. Moreover, for the rest of the Hungarian regions there are some dissimilarities in the economic output determinants between the Hungarian regions and their synthetic counterpart. For the Hungarian regions including Észak-Magyarország, Észak-Alföld, and Dél-Dunántúl, the dissimilarity of the economic output determinants have resulted into a large gap in the pre-Fidesz period for the economic output.

This indicates that there is a high chance that the differences calculated in the economic output between the Hungarian regions and their synthetic counterparts in the post-Fidesz election period are caused by differences in economic output (determinants) in the pre-Fidesz period. Furthermore, for the other two Hungarian regions including Közép-Dunántúl, and Nyugat-

Dunántúl the economic output (determinants) are relatively similar in comparison to their synthetic counterparts in the pre-Fidesz period. However, there are still differences in the pre-Fidesz period, which can bias the results. The causal effects calculated can be biased as they potentially could be showing the pre-Fidesz period differences in the economic output (determinants) instead of the causal effects of the Fidesz government.

Analysing the ratio of post-RMSPE to pre-RMSPE for all the Hungarian regions the following conclusions are likely. First, it is likely that the causal effects calculated for Közép-Dunántúl, and Nyugat-Dunántúl are indeed caused by the Fidesz government. These regions have the highest ratio found in comparison to the other regions included into the placebo studies. The high post-RMSPE to pre-RMSPE ratio indicates that the magnitude of the gap in the real GDP per capita in the post-Fidesz election period is much larger than the gap in the pre-Fidesz period. The higher magnitude of the gap in the real GDP per capita in the post-Fidesz election period indicates that a certain event (election of the Fidesz political party) must have happened in the post-Fidesz election period which has resulted into causal effect for these Hungarian region. In other words, it is unlikely that the differences in the economic output (determinants) in the pre-Fidesz period are responsible for the significantly larger gap in real GDP per capita in the post-Fidesz period.

Second, the region of Közép-Magyarország shows a ratio of almost exactly 1. This indicates that the differences in real GDP per capita in the pre-Fidesz period between the actual Közép-Magyarország and its synthetic counterpart are almost the same as the differences in the post-Fidesz election period. Therefore, the causal effects calculated in the post-Fidesz election period are likely due to the differences in economic output (determinants) in the pre-Fidesz period. In other words, for Közép-Magyarország, the Fidesz government likely did not cause any effect. If the Fidesz government would have caused effects for this Hungarian region, the ratio would have been much larger than 1.

Third, the other four Hungarian regions including Dél-Alföld, Észak-Magyarország, Észak-Alföld, and Dél-Dunántúl have a ratio between 1.25 till 1.56. This indicates that the gap between these Hungarian regions and their synthetic counterparts in the real GDP per capita in the post-Fidesz election period is only a fraction larger than the gap in the pre-Fidesz period. Moreover, non-Hungarian regions which should not have experienced any causal effects experienced a larger gap in the real GDP per capita between the pre-Fidesz and the post-Fidesz election period. Therefore, it is likely that the differences calculated between the Hungarian regions and their synthetic counterparts in the post-Fidesz election period are caused by the differences in the real GDP per capita in the pre-Fidesz period. If there would have been causal effects of the Fidesz government for these regions, the ratio would have been larger for these Hungarian regions than for the non-Hungarian regions included in the placebo studies.

6. Conclusion

This study aimed to calculate the economic consequences of the Fidesz government on both national and regional level. With the parliamentary elections of 2010, Hungary made a swing towards a nationalist, conservative, and right-wing populist government. This swing had implications for the type of policies that were implemented by the Hungarian government. The aim of this thesis was to see whether this swing has resulted in a slowdown of the Hungarian economy in terms of economic output. With the synthetic control method, it was found that there was a small slowdown of the Hungarian economy. Specifically, in the period 2010 till 2018 Hungary experienced on average an annual decline in the real GDP per capita of 1.23 percent.

The slowdown found with the synthetic control method for the Hungarian economy is in line with the expectations of this thesis. The expectations were based on the country reports of the IMF. According to the IMF country report of 2013, the growth prospects of Hungary had declined in recent years due to a decline in investments going into the Hungarian economy. Moreover, according to the IMF country report of 2014, the growth prospects were expected to remain weak in the period 2013 till 2019 due to continued low investments. It was therefore expected that the decline in investments going in the economy resulted into a slowdown for the Hungarian economy.

However, the validity and credibility of the slowdown calculated is questionable. The results of the placebo studies on national level shows that the post-RMSPE to pre-RMSPE ratio for Hungary is the smallest of all the countries included in the placebos. Moreover, the gap in the outcome variable between the actual and synthetic Hungary in the pre-Fidesz period is larger than the gap found in the post-Fidesz election period. This indicates that the gap found in the real GDP per capita in the post-Fidesz election period is very likely the result of the gap in the real GDP per capita in the pre-Fidesz period. In other words, including the placebo studies in my conclusion, it is likely that the Fidesz government did not cause effects for the Hungarian economy. This can be seen as surprising as from the literature review the expectation was to find a slowdown caused by a decline in investments into the Hungarian economy.

As no slowdown has been found, the positive role of FDI on the economic growth of Hungary can be questioned. Within the FDI literature there is a discussion about whether FDI has a negative or positive effect on the economic growth of a country. This thesis supported the literature arguing that FDI generally has a positive effect on economic growth. According to the IMF (2013, 2014), the main reason why the growth prospects of Hungary have declined in recent years and will remain low in the period 2013 till 2019 is a decline in investments into the Hungarian economy. However, with the results found for the Hungarian economy one can question whether FDI had such a positive effect on the Hungarian economy in the pre-Fidesz period. If this was the case, surely a negative effect of the Fidesz government should have been found on national level due to a decline in FDI.

However, another possibility for why no slowdown was calculated for the Hungarian economy can be that the synthetic control method does not distinguish between the effects of specific policy measures. Therefore, there is the possibility that the policies implemented had (besides

a negative effect on FDI) positive effects (through other factors) on the economic growth of Hungary. In other words, the decline in the positive effect of FDI on economic growth is then compensated by a positive effect of another factor caused by the implemented policies of the Fidesz government. Further research is needed to examine why the results in this thesis show no slowdown caused by the Fidesz government for the Hungarian economy.

The region in Hungary which had the largest share of the FDI going into the Hungarian economy in the pre-Fidesz period was Közép-Magyarország. For Közép-Magyarország, a slight slowdown in economic output was experienced during the Fidesz government. However, from the placebo studies done on regional level it became apparent that this calculated slowdown was not caused by the Fidesz government. The result of the gap in the real GDP per capita between Közép-Magyarország and its synthetic counterpart in the post-Fidesz election period instead was likely caused by the gap in the real GDP per capita between Közép-Magyarország and its synthetic counterpart in the pre-Fidesz period. In other words, it seems that the region with the largest share of the FDI going into Hungary did not experience a decline in its economic output. This again questions whether FDI had a positive effect on the economic growth in Hungary in the pre-Fidesz period as then this thesis should have found a negative effect for this region in the post-Fidesz election period. However, the other possibility is again that the policies implemented had (besides a negative effect on FDI) positive effects (through other factors) on the economic growth of Közép-Magyarország.

The aim of this thesis on regional level was to see whether the economic policies implemented by the Fidesz government resulted into a more economically equal Hungary. The expectation was that the richest region would be most negatively affected by the economic policies implemented by the Fidesz government as these policies result into a decline in FDI going into the region. As mentioned earlier, the decline in investment going into the Hungarian regions was expected to decrease the positive effects of FDI on the economic growth of the Hungarian regions. From the results section it is evident that there was no correlation found between the real GDP per capita in the pre-Fidesz period and the causal effects of the Fidesz government calculated in this thesis.

This indicates that there was no decrease in inequality as the richest regions were not necessarily the regions that were affected most by the Fidesz government. In other words, no support was found for the second hypothesis of this thesis that the inequality between regions declined due to the economic policies pursued by the Fidesz government. Moreover, the results are even contradicting this hypothesis. It seems that the richest region experienced only a small decline in economic output in the post-Fidesz election period in comparison to the four poorest Hungarian regions. Moreover, the second and third richest region in Hungary experienced a positive effect of the Fidesz government.

In other words, the poorer regions were most negatively affected by the Fidesz government, while the richest regions had either a positive effect or a small negative effect. Therefore, it is likely that the Fidesz government has resulted into more economic inequality between the Hungarian regions. A possibility for this surprising outcome can be that the policies implemented had a more positive effect (through other factors than FDI) on the richest regions

and thereby compensated for the negative effect of the policies on FDI. Moreover, the policies implemented by the Fidesz government could have had a negative effect on the poorer regions through other factors than FDI. Another possibility could be that there was no positive effect of FDI on the economic growth of the Hungarian regions. However, this possibility does not explain why the poorest regions experienced a large negative effect of the Fidesz government. Further research is needed to examine why the results show an increase in economic inequality between the Hungarian regions.

However, the causal effects calculated for some Hungarian regions in the post-Fidesz election period have low credibility. This is caused by dissimilarities in the economic output (determinants) in the pre-Fidesz period between these Hungarian regions and their synthetic counterpart. From the post-RMSPE to pre-RMSPE ratio it is apparent that for Dél-Alföld, Észak-Magyarország, Észak-Alföld, and Dél-Dunántúl the results were likely caused by differences in the economic output (determinants) in the pre-Fidesz period. In other words, the causal effects calculated for these regions are likely not caused by the Fidesz government. This is due to that the differences in the economic output (determinants) in the post-Fidesz period were likely caused by the same differences in the economic output (determinants) in the pre-Fidesz period.

Therefore, it has to be pointed out that from the results of this thesis it seems evident that the results are contradicting the second hypothesis. However, when other studies examine the causal effect of the Fidesz government and the similarity in the economic output (determinants) in the pre-Fidesz period between the Hungarian regions and their synthetic counterpart is higher. There is a chance that the results will differ from the results in this thesis. Moreover, also on national level the fit in the pre-Fidesz period between Hungary and the synthetic Hungary was not exact. This could have slightly biased the results found for the Fidesz government.

Overall, even though the results found in this thesis have their limitations, there are several contributions of this paper. First, this is the first paper to research the consequences of all the policies implemented by the Fidesz government on both national and regional level. Moreover, the economic consequences are researched by using a unique method: the synthetic control method. The results of this paper are a starting point for further research on specific policies. As it is shown from the results in this thesis that it is likely that as all policies implemented by the Fidesz government are researched in this paper, the policies compensate one another. In other words, the negative effect of the policies on FDI may be compensated by a positive effect on another factor which in turn has a positive effect on economic growth.

Second, this paper examined how the economic consequences of the Fidesz government had affected the regional economic inequality in Hungary. The results found in this paper have low credibility and validity for several Hungarian regions. Therefore, I would suggest researchers to try to improve the fit in the economic output (determinants) in the pre-Fidesz period between the Hungarian regions and their synthetic counterparts. Moreover, also on national level the fit in the economic output (determinants) in the pre-Fidesz period between Hungary and the synthetic Hungary was not exact. This also could have slightly biased the casual effects

calculated of the Fidesz government. Improving the fit between Hungary/the Hungarian regions and their synthetic counterparts can e.g. be done by using different economic output determinants. This study follows the economic output determinants of the study of Abadie et al (2003, 2015) and Born et al (2017, 2019). When the fit of the economic output (determinants) between Hungary/ the Hungarian regions and their synthetic counterparts is improved in the pre-Fidesz period more firm conclusions can be made. As from this thesis no firm conclusions can be made due to the low credibility and validity of the results found.

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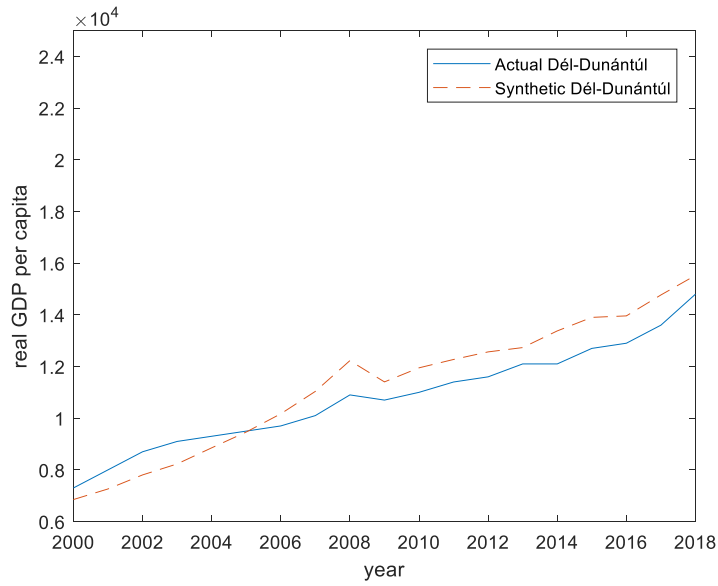
Appendix
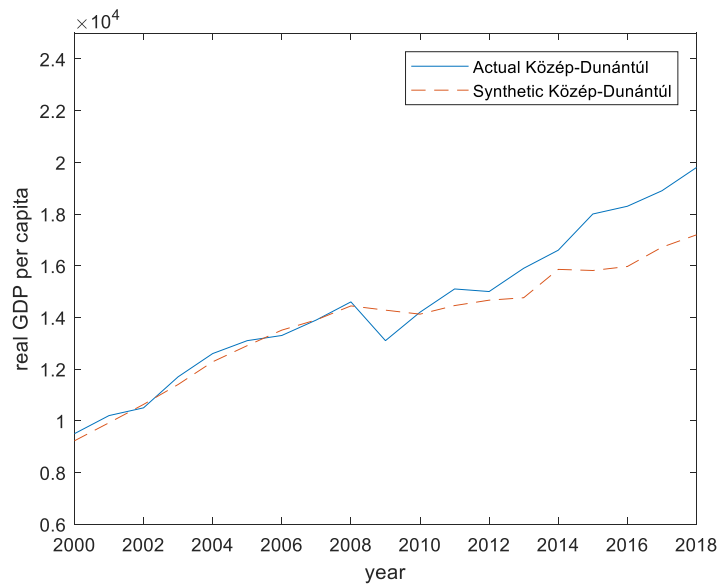
Figure A1 The real GDP per capita for Közép-Dunántúl and the synthetic Közép-Dunántúl
Source: real GDP per capita of the actual Közép-Dunántúl is obtained from Eurostat regional database
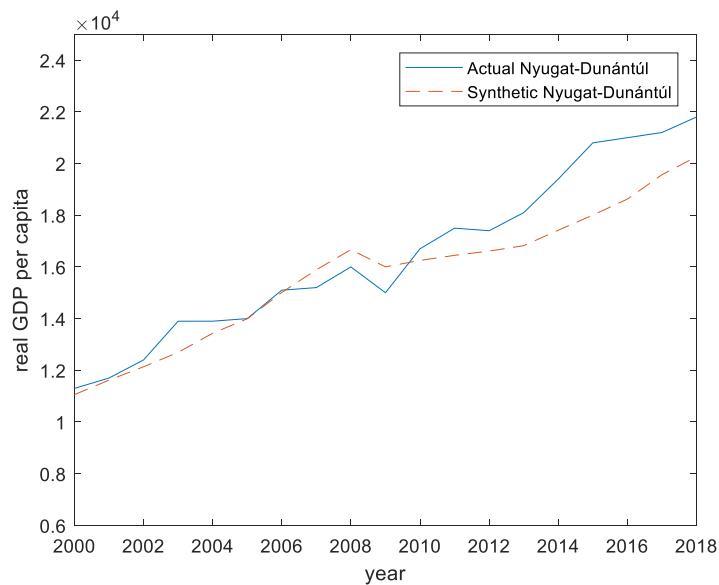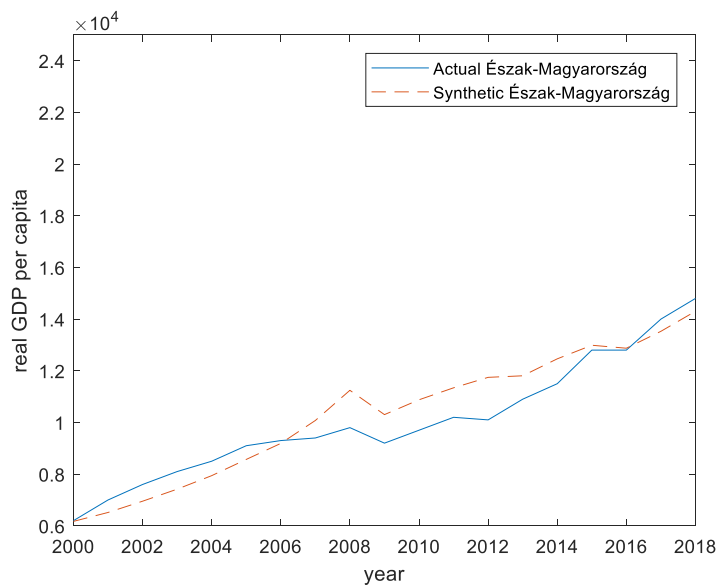

Figure A2 The real GDP per capita for Nyugat-Dunántúl and the synthetic Nyugat-Dunántúl
Source: real GDP per capita of the actual Nyugat-Dunántúl is obtained from Eurostat regional database
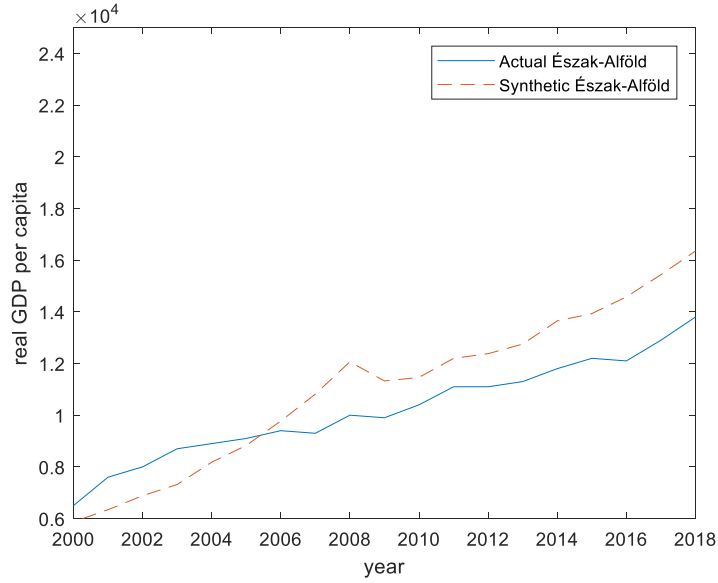
Figure A3 The real GDP per capita for Dél-Dunántúl and the synthetic Dél-Dunántúl
Source: real GDP per capita of the actual Dél-Dunántúl is obtained from Eurostat regional database

Figure A4 The real GDP per capita for Észak-Magyarország and the synthetic Észak-Magyarország
Source: real GDP per capita of the actual Észak-Magyarország is obtained from Eurostat regional database

Figure A5 The real GDP per capita for Észak-Alföld and the synthetic Észak-Alföld
Source: real GDP per capita of the actual Észak-Alföld is obtained from Eurostat regional database

Table A1 The means of the predictor variables in the pre-Fidesz period for the actual and synthetic Közép-Dunántúl

Predictor variables	Actual Közép-Dunántúl	Synthetic Közép-Dunántúl
Real GDP per capita	12250	12250
Investment ratio	28.84	28.84
Schooling (3-4)	61.01	52.30
Schooling (5-8)	13.31	13.31
Industry share	41.83	35.75
Population density	99.59	85.12

Source: variables of the actual Közép-Dunántúl are obtained from Eurostat regional database

Table A2 The means of the predictor variables in the pre-Fidesz period for the actual and synthetic Nyugat-Dunántúl

Predictor variables	Actual Nyugat-Dunántúl	Synthetic Nyugat-Dunántúl
Real GDP per capita	13850	13850
Investment ratio	25.40	25.40
Schooling (3-4)	62.81	46.97
Schooling (5-8)	13.82	13.82
Industry share	39.12	26.39
Population density	88.66	88.66

Source: variables of the actual Nyugat-Dunántúl are obtained from Eurostat regional database

Table A3 The means of the predictor variables in the pre-Fidesz period for the actual and synthetic Dél-Dunántúl

Predictor variables	Actual Dél-Dunántúl	Synthetic Dél-Dunántúl
Real GDP per capita	9330	9330
Investment ratio	27.30	27.30
Schooling (3-4)	58.20	58.20
Schooling (5-8)	12.74	12.74
Industry share	22.61	22.61
Population density	68.93	117.79

Source: variables of the actual Dél-Dunántúl are obtained from Eurostat regional database

Table A4 The means of the predictor variables in the pre-Fidesz period for the actual and synthetic Észak-Magyarország

Predictor variables	Actual Észak-Magyarország	Synthetic Észak-Magyarország
Real GDP per capita	8420	8439
Investment ratio	27.44	26.71
Schooling (3-4)	59.39	59.39
Schooling (5-8)	12.47	15.87
Industry share	33.92	21.51
Population density	94.35	94.39

Source: variables of the actual Észak-Magyarország are obtained from Eurostat regional database

Table A5 The means of the predictor variables in the pre-Fidesz period for the actual and synthetic Észak-Alföld

Predictor variables	Actual Észak-Alföld	Synthetic Észak-Alföld
Real GDP per capita	8740	8740
Investment ratio	26.88	26.88
Schooling (3-4)	56.4	56.40
Schooling (5-8)	13.03	13.03
Industry share	25.11	25.11
Population density	86.69	97.06

Source: variables of the actual Észak-Alföld are obtained from Eurostat regional database

Table A6 The annual loss in real GPD per capita (%) for the Hungarian regions

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Közép-Magyarország	-0.61	-1.25	-1.97	-2.86	-2.39	-4.78	-4.22	-2.08	1.89
Közép-Dunántúl	0.53	4.26	2.23	7.17	4.47	12.14	12.74	11.56	13.16
Nyugat-Dunántúl	2.69	6.01	4.53	7.06	10.21	13.44	11.31	7.71	7.04
Dél-Dunántúl	-8.62	-7.65	-8.32	-5.22	-10.55	-9.45	-8.20	-8.59	-4.90
Észak-Magyarország	-12.14	-11.19	-16.30	-8.31	-8.37	-1.47	-0.57	3.37	3.35
Észak-Alföld	-10.22	-9.89	-11.54	-12.84	-15.66	-14.18	-20.49	-19.66	-18.50
Dél-Alföld	-11.15	-8.77	-13.53	-9.96	-9.00	-6.05	-11.25	-14.36	-11.28