CenEA Working Paper Series

WP01/19

Implications of the Polish 1999 administrative reform for regional socio-economic development

Michał Myck
Mateusz Najsztub

Abstract:

On 1 January 1999, four major reforms took effect in Poland in the areas of health, education, pensions and local administration. After 20 years, only in the last case does the original structural design remain essentially unchanged. In this paper, we examine the implications of this reform from the perspective of the distance of municipalities from their regional administrative capital. We show that despite fears of negative consequences for peripheral regions, the reform did not result in slower socio-economic development for those municipalities that found themselves further from the new administrative centres. We use a number of socio-economic indicators at municipal level and apply differences-in-differences methods comparing the outcomes before and after the reform between the municipalities for which the distance increased and those for which it did not. Municipalities are matched on pre-reform indicators using entropy balancing. Apart from small effects on net migration, we do not identify any significant negative effects of the 1999 administrative reform for the peripheral municipalities. In fact, results are positive in the case of municipal revenues and, while they are not precisely estimated in our preferred specification, they remain statistically significant in a number of robustness checks.

Key words: regional development, administrative reform, distance to capitals, differences in differences

JEL classification: P30, R11, R50

Implications of the Polish 1999 administrative reform for regional socio-economic development[1]

Michał Myck
Mateusz Najsztub

Abstract

On 1 January 1999, four major reforms took effect in Poland in the areas of health, education, pensions and local administration. After 20 years, only in the last case does the original structural design remain essentially unchanged. In this paper, we examine the implications of this reform from the perspective of the distance of municipalities from their regional administrative capital. We show that despite fears of negative consequences for peripheral regions, the reform did not result in slower socio-economic development for those municipalities that found themselves further from the new administrative centres. We use a number of socio-economic indicators at municipal level and apply differences-in-differences methods comparing the outcomes before and after the reform between the municipalities for which the distance increased and those for which it did not. Municipalities are matched on pre-reform indicators using entropy balancing. Apart from small effects on net migration, we do not identify any significant negative effects of the 1999 administrative reform for the peripheral municipalities. In fact, results are positive in the case of municipal revenues and, while they are not precisely estimated in our preferred specification, they remain statistically significant in a number of robustness checks.

Keywords: regional development, administrative reform, distance to capitals, differences in differences

JEL classification: P30, R11, R50

---

1. Introduction

Four major reforms took effect on 1 January 1999 in Poland, substantially changing the structure of healthcare, education, the pension system and local government administration.[2] The extent of the changes and the fact that all four reforms were implemented on the same day could in fact be considered as representing a symbolic end of the socio-economic transition which had started with the Round Table talks and the partly democratic elections of June 1989. However, in 2019, 20 years later, the originally introduced structural design remains unchanged in only one of the four areas – Polish local government.

The first to be substantially overturned was the healthcare reform and the new decentralised design of healthcare financing, which came under central management as early as 2003. The stepwise dismantling of the new defined-contribution pension system followed. Although so far there has been no return to the original defined-benefit formula, exceptions from the general rules were made for specific groups of the population in 2003 and 2005, while the share of pension contributions invested in private funds relative to the pay-as-you-go system was cut substantially in 2014. The clearest, and arguably most abrupt, U-turn, however, affected the education system. In 2016, the government of the Law and Justice party basically reintroduced the pre-1999 '8+4' education structure (primary + secondary) in place of the post-1999 '6+3+3' design (primary + middle + secondary). Naturally, each of the three modified or overturned reforms deserve a separate and detailed account with regard to the advantages and disadvantages of the original structure and reasons for departures from the initial design. What is of interest for us here, though, is merely the somewhat surprising fact that, despite returning claims of the need to change Polish administrative design and repeated promises to do this in subsequent parliamentary elections, the implications of the fourth reform have remained essentially intact.

In this paper, we provide an evaluation of the implications of the Polish 1999 administrative reform with a particular focus on the dynamics of socio-economic conditions in municipalities that found themselves on the periphery of the newly created enlarged top-tier regions. Examining an extensive set of indicators, we find that, despite fears to the contrary voiced at

---

[2] For discussion of the details of the 1999 reforms, see: healthcare – McMenamin and Timonen (2002) and Rincker and Battle (2011); education – Organisation for Economic Co-operation and Development (2011); pensions – Chłoń-Domińczak (2002) and Lachowska and Myck (2018); and local administration – Regulski (2003) and Swianiewicz (2010).

the time the reform was implemented, there is no evidence that these peripheral regions suffered as a result of the reform.

Our analysis is set in the theoretical context of agglomeration and regional development, which have been the central reference for the analysis of spatial development for a long time and which have featured prominently in economic geography literature for many decades (Hoover, 1948; Jacobs, 1969; Scott, 2001). Uneven spatial distribution of capital and labour forms the cornerstone of Krugman's seminal paper (Krugman, 1991), which lay the foundation for the dynamic development of studies aiming to explain the observed trajectories of development at the regional level with reference to economic incentives (Rodríguez-Pose, 1998; Gallup et al., 1999; Clark et al., 2003; Fingleton and López-Bazo, 2006; Gennaioli et al., 2014). Over the years, though, the principles of the new economic geography (NEG) models have come under increasing criticism, in particular for placing too much emphasis on the role of pure economic forces and underestimating the role of physical landscape, climate and natural resources (Ottaviano and Thisse, 2004) as well as the interaction of these first-nature causes with those of the second nature, i.e. factors related to human activity and economic incentives (Fujita and Mori, 2005).[3]

Man-made administrative boundaries, which are the focus of this paper, add yet another layer of complexity disturbing the homogeneity of location space, which is not captured in the NEG approach. These boundaries have a potentially strong influence on regional economic activity both between and within countries. In the latter case, since such borders usually do not delineate trade barriers and major institutional differences, their role for regional growth is likely to depend on specific regulations and local conditions. However, the importance often given to administrative reforms in the public discourse as well as many studies on regional inequality suggests that they may play a significant role in differentiating regional economic activity (Démurger, 2001; Bolthoa et al., 2018). Administrative boundaries mark specific responsibilities and obligations of local governments, delineate regions with stronger and weaker administrative capitals, and determine the proximity of localities to their respective administrative centres of power. There is clearly a high degree of interregional variation in economic development both between and within countries (Corrado et al., 2005; Ezcurra and Rapún, 2006; Gennaioli et al., 2013; Charron, 2016; Beugelsdijk et al., 2018). Thus, at a time of growing interest in a regional focus on spatial development and new attempts to

---

[3] For a review of NEG models and an empirical application, see Organisation for Economic Co-operation and Development (2009).

conceptualise the role of the region (Clark et al., 2003; Soja, 2015; Keating, 2017), it seems important to gather evidence on the different levels of interaction between regional centres and peripheral localities.

In this paper, we focus on the importance of geographic proximity to administrative regional capitals and ask whether the role of distance to regional centres goes beyond their purely economic potential. Our empirical analysis takes advantage of the exogenous variation in this distance resulting from the Polish administrative reform which, along with the three others, took effect on 1 January 1999.

The Polish case is particularly interesting given both the scale of the reform and the developments that followed, including Poland's entry into the European Union on 1 May 2004. One of the aims behind the changes in administrative design was in fact to strengthen the top tier of local government to make it more effective in absorbing EU funds, and through this channel limit economic disparities at the regional level. In the reform's final form, 16 top-tier regions (*województwa*, voivodeships) were created in place of the former 49. This concentrated a significant degree of administrative power in a smaller number of regional centres, and at the same time increased the physical distance to such centres for hundreds of municipalities (*gminy*). The ongoing debate about the benefits and costs of the reform, as well as continued discussions regarding potential modifications to the Polish administrative map, reflects a high degree of importance given to the arrangement of local government. In this debate, the implications of the reform for regional development in the peripheral regions are of central importance.

In this paper, we use a number of indicators reflecting socio-economic developments at the municipal level to show that there is little evidence of negative implications of the 1999 reform for the regional development of peripheral municipalities. On a more general level, our analysis also shows that while distance to regional centres of growth is likely to matter, this mechanism does not necessarily apply to the distance to administrative capitals. In Section 2, we present the key features of the Polish 1999 administrative reform and discuss the spatial set-up of our empirical exercise. Data used for the analysis and the analytical approach are discussed in Section 3. This is followed by the presentation of results in Section 4 and conclusions in Section 5. Our analysis certainly does not constitute proof of a link between the lack of negative effects for peripheral municipalities and the longevity of the administrative design of 1999. However, it is likely that inclusive growth at regional level after its implementation contributed to the stability of the structure of Poland's local government.

2. The Polish administrative reform of 1999

2.1 Local administration under communism

Major administrative reforms are relatively infrequent, which makes the scope and scale of the one implemented in Poland on 1 January 1999 a rather unique point of reference for analysis of potential implications of administrative restructuring for spatial economic development. The reform went far beyond the administrative rearrangement of local government, as it was the culmination of a process that reintroduced local autonomy to the Polish political system. Communist rule after the Second World War essentially abolished autonomous government at the local level, and this centralised system remained in place until the fall of communism in 1989. The administrative structure of Poland immediately after the end of the war was subject to frequent and substantial changes, partly due to significant shifts of state borders and the administrative role of the Soviet military. After a series of reforms, by 1957 the administrative structure consisted of 17 districts (*województwa*, voivodeships), 5 separated towns, 314 counties (*powiaty*) and 4315 communities (*gromady*), which in 1954 replaced the larger municipalities (*gminy*) as the lowest-tier level of administration. In line with a hierarchical system of communist governance, local administrative units were left with very limited space for independent decision-making. Several minor reforms were implemented in subsequent years, until the early 1970s which saw a series of important changes implemented largely to curb the increasing power of local party authorities. The reform of 1972 re-established municipalities as the lowest tier of local administration in place of communities, while in June 1975 the government abolished the powiats and replaced the three-tier system with a two-tier arrangement made of 49 voivodeships and 2394 municipalities (247 cities, 26 urban districts, 1546 rural and 575 mixed urban–rural municipalities).[4]

2.2 The road to the 1999 reform

The shift to democracy in Poland, with its symbolic beginning in the parliamentary elections of June 1989, brought about significant modifications in the role of local government. Initially, this was exemplified in constitutional changes that granted municipalities the status of autonomous legal entities with executive power and newly acquired property rights. The principal goal was to restore autonomous local government at the lowest administrative level.

---

[4] The legal act defining the administrative arrangement after June 1975 is *Ustawa z dnia 28 maja 1975 r. o dwustopniowym podziale administracyjnym Państwa oraz o zmianie ustawy o radach narodowych*.

Municipalities were granted authority over land use, planning, environmental protection, maintenance of public infrastructure, ownership and maintenance of public educational and cultural facilities, public administration of buildings and community housing. They also gained financial independence with unlimited property rights, and were granted protection against legal intervention from higher levels of government. The first democratic local elections were held in May 1990.

Further legislative work on the nature of local government in Poland was initiated in 1993, with the aim of restoring the three-tier administrative arrangement and reducing the number of voivodeships. After the 1997 parliamentary elections, the ruling centre-right coalition went ahead with the implementation of four major reforms in the areas of education, healthcare, pensions and administration. The goal of the administrative reform was to further decentralise political power and increase public finance transparency. The middle tier of local government – the powiats – was reintroduced as a body responsible for the administration of institutions beyond the scope of a single municipality, such as hospitals, secondary schools, public roads, unemployment prevention, judiciary and overseeing capacities. The number of voivodeships was reduced and their responsibilities were focused on overall regional development, higher education, regional infrastructure and the prospective management of EU funds. The structure of voivodeships, as one of the more contentious issues of the reform, was decided at the very end of the legislative process.[5] In the end, the reform resulted in the formation of 16 voivodeships, 308 counties, 66 towns with county status and 2478 municipalities. The new administrative division of Poland has been in place, with minor modifications, since 1 January 1999 (for details and comments, see Blazyca et al. (2002), Regulski (2003) and Swianiewicz (2010)).[6]

The reform implied the loss of regional administrative capital status for 31 cities (administration in two voivodeships, Lubuskie and Kujawsko-Pomorskie, is split between two capitals), and for nearly 60% of municipalities it resulted in an increase in the distance to their regional administrative centre compared with the pre-reform arrangement. These features of the reform are illustrated in Figure 1. Cities marked in blue used to be administrative capitals before 1999, while those marked in red maintained their status after the reform. The blue rays show the

---

[5] The government originally proposed to reduce the number of voivodeships to 12, which met with strong opposition in parliament and in many regions. Parliamentary opposition demanded the restoration of 17 voivodeships, as prior to the 1975 reform.

[6] The legal act defining the post-1999 administrative arrangement is *Ustawa z dnia 24 lipca 1998 r. o wprowadzeniu zasadniczego trójstopniowego podziału terytorialnego państwa*.

distance of municipalities from their respective administrative capitals before 1999, with the post-1999 distances marked in red. In the case of the two new voivodeships where two cities received capital status, we measure the distance to the city that became the site of the regional government (*sejmik wojewódzki*), which is the key institution responsible for regional development.[7]

3. Methods and data

3.1 The model

The principal aim of this paper is to examine the role of distance to administrative capitals for regional variation in economic development. The fact that − from the municipal point of view − this distance changed exogenously as a result of the reform in 1999 provides us with a clear identification strategy. The change of administrative capitals affected nearly 60% of municipalities, which leaves the rest − the ones that had their administrative centre in the same city before and after the reform − as potential controls in the comparison. To examine the role of being further from the administrative regional capital, we apply the diff-in-diff approach with the following specification:

$$y_{it} = \alpha_0 + \beta_1 change_i + \beta_2 after_{it} + \beta_3 change_i * after_{it} + M_i + T_t + \varepsilon_{it} \qquad (1)$$

where y_{it} is the analysed outcome variable for municipality *i* at time *t*, *change_i* is the binary distance increase indicator, *after_{it}* is a dummy indicator of time after the implementation of the 1999 reform and *change_i***after_{it}* is the interaction between the two. M_i and T_t denote municipality and time fixed effects, while ε_{it} is the residual.[8] The key coefficient of interest is β_3, which is our diff-in-diff estimator of the effect of the reform on y_{it}.

---

[7] In the case of Lubuskie voivodeship, the government is based in Zielona Góra (Gorzów Wielkopolski being the second capital city in the voivodeship), while the site of the government for the Kujawsko-Pomorskie voivodeship is Toruń (rather than Bydgoszcz). As we show below, our results are robust to the exclusion of these two voivodeships from the sample.

[8] Since we estimate the model with year and municipality fixed effects, the *change_i* and *after_{it}* controls could be omitted, but we leave them for clarity of the diff-in-diff presentation.

Figure 1a. Administrative arrangements in Poland before the 1999 administrative reform: voivodeships, capitals and distance from municipalities to regional administrative centres

Distance: pre-reform
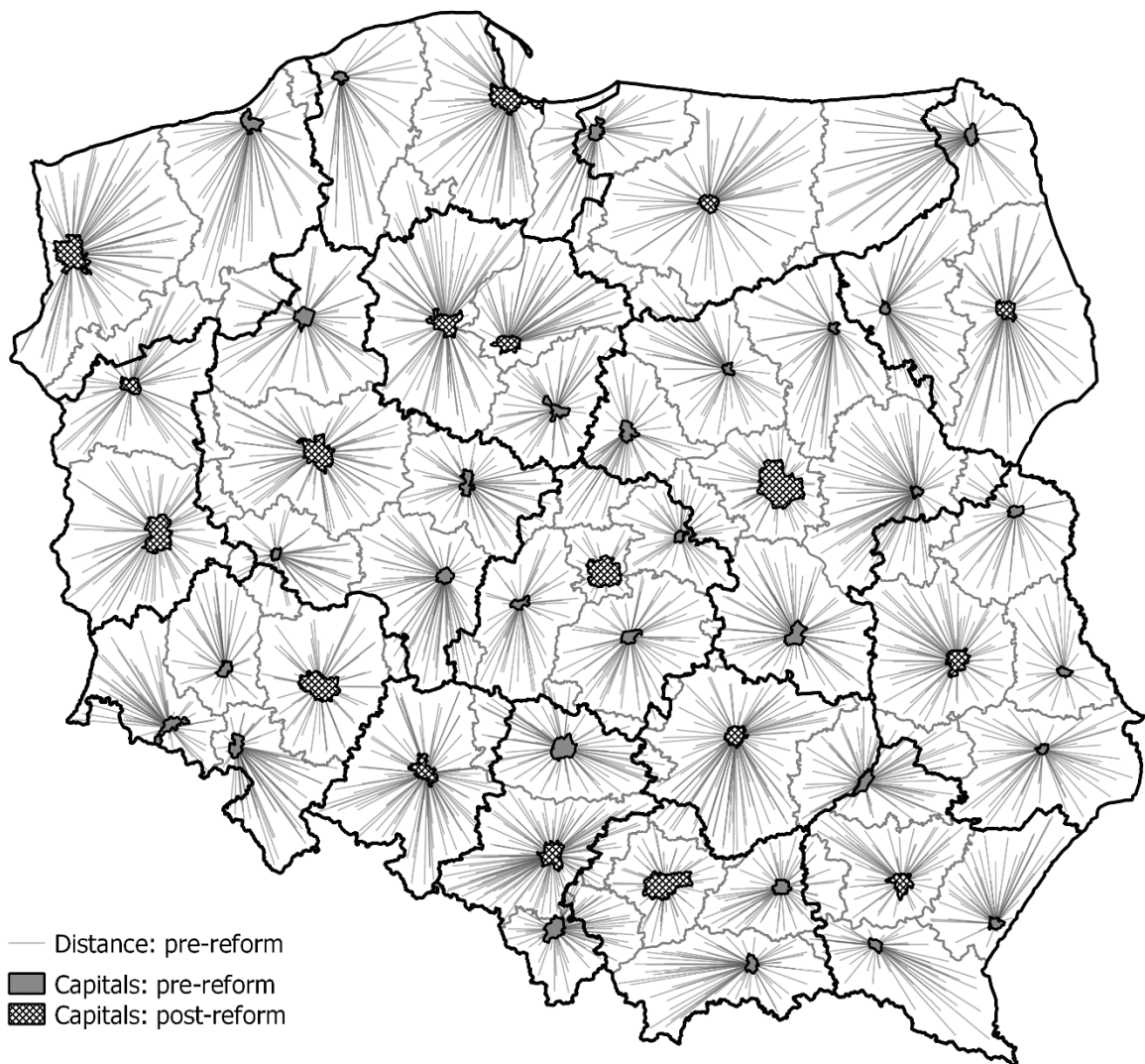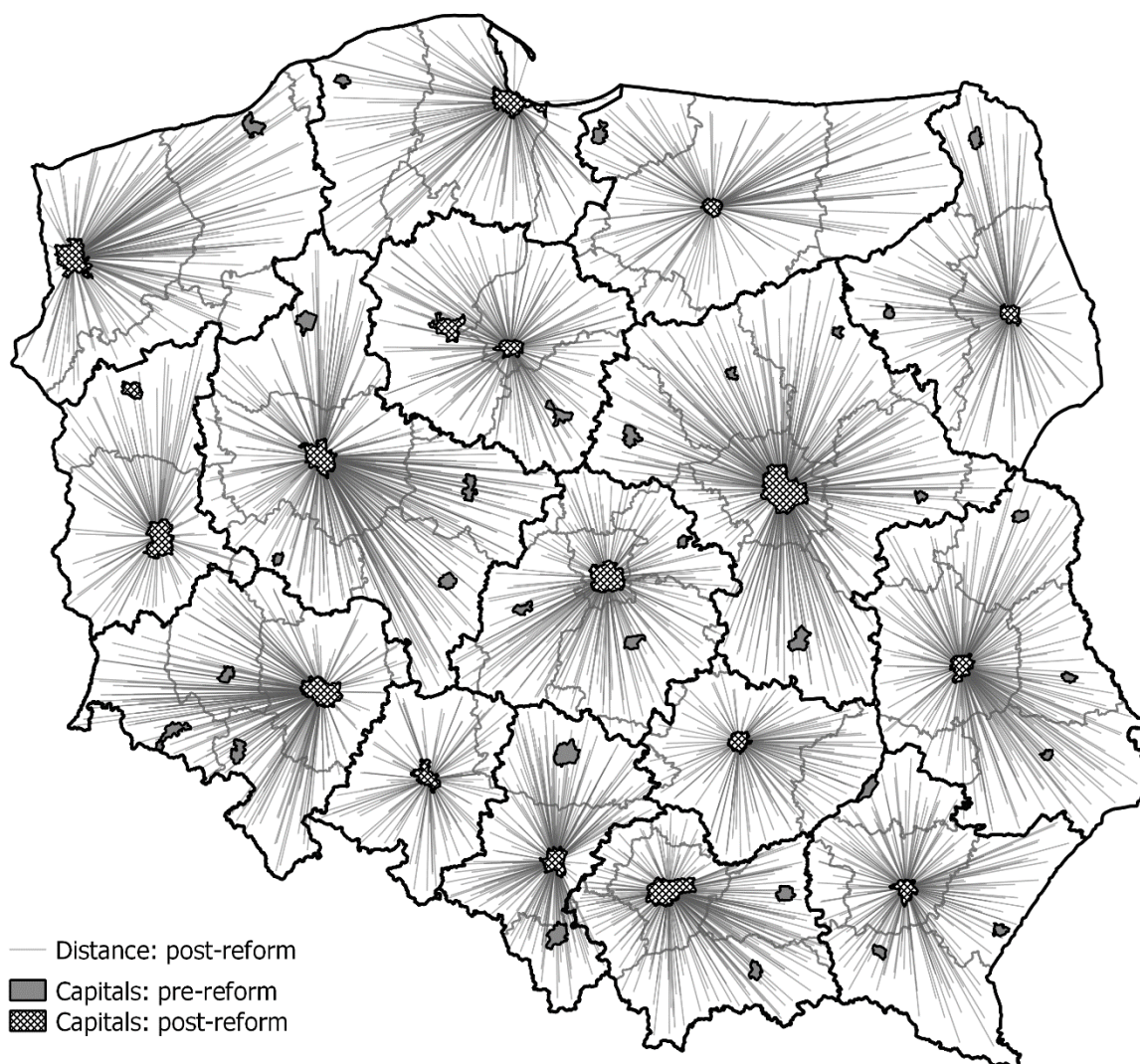Capitals: pre-reform
Capitals: post-reform

Figure 1b Administrative arrangements in Poland after the 1999 administrative reform: voivodeships, capitals and distance from municipalities to regional administrative centres

Note: Straight lines represent distances between centroids of municipalities and their respective capitals: Figure 1a: the pre-1999, Figure 1b: the post-1999 administrative arrangement.
Source: Authors' calculations and illustration using PRG data.

3.2 Entropy balancing

In the analysis of potential differences in the development of post-reform outcomes, we aim to identify the effect of the physical distance of municipalities from administrative capitals. This is done by examining the regional-level outcomes for two groups of municipalities – those that got further away and those for which the distance did not change or decreased – and over two periods of time – before and after the reform. However, since developments in the two groups of municipalities might differ for reasons independent of the reform, we perform a matching exercise to minimise the risk of bias in our diff-in-diff estimates (Kahn-Lang and Lang, 2018;

Lima and Silveira Neto, 2018) due to differences in the conditioning variables between the treatment and control groups of municipalities. Since the number of observations in our sample is relatively low, our chosen matching approach follows Hainmueller (2012) and is based on entropy balancing (Hainmueller, 2012; Marcus, 2013; Adda et al., 2014; Baskaran, 2017). Entropy balancing allows for the matching of treatment and control groups in such a way as to ensure identical properties of the distributions in terms of the first and second moments. To account both for pre-treatment levels and pre-treatment trends, matching is performed on data from 1995 up to 1998. The balancing is conducted on municipality-level data concerning population composition, land area, municipal budgetary variables and infrastructure characteristics. The obtained weights are included in the diff-in-diff regressions. To account for potential serial correlation, we cluster standard errors at the municipality level (Bertrand et al., 2004).

3.3 Data

For our analysis, we use a number of municipality-level proxies for regional economic development as well as population statistics, which originate from two sources. The first is the Local Data Bank (*Bank Danych Lokalnych*, BDL) provided by the Polish Central Statistical Office (*Główny Urząd Statystyczny*, GUS), with data available since 1995 and including information on population, local government finances and the number of private companies. This information is supplemented by night-time lights data provided by the National Oceanic and Atmospheric Administration (NOAA). These data come from the Defence Meteorological Satellite Program Operational Linescan System (DMSP-OLS) and are available for years 1992–2012 (Elvidge et al., 2009; National Geophysical Data Center (NGDC), 2010). Night-time lights data have been used recently as a proxy for economic development in a number of contexts both at national and regional level (Henderson et al., 2012; Pinkovskiy and Sala-i-Martin, 2016). Administrative boundaries have been taken from the National Register of Boundaries (*Państwowy Rejestr Granic*, PRG), which provides detailed information on boundaries as far back as 2008. The lights data have been matched with specific municipalities according to the respective boundaries.[9] Given the time coverage of the two data sources, for

---

[9] Municipalities are identified through so-called TERYT codes. The format of these has changed over time but the changes are documented online (GUS, 2018) and have been processed into a recoding database (Żółtak, 2018). The codes were substantially different before the 1999 reform and these have been matched using information obtained from GUS. Due to unavailability of historical spatial data, we cannot document detailed border changes between the municipalities, which may introduce a degree of measurement error in the estimates. The reform in 1999 did not result in municipality mergers or significant boundary changes. We had to exclude 5 municipalities that underwent mergers or splits during the analyzed period and could not be recovered in the GIS data.

consistency of our analysis we limit it to the period 1995–2012, which gives us four years prior to the reform and fourteen years after its implementation.

While the BDL provides a substantial amount of information at the municipal level, the number of indicators that could serve as proxies for economic growth and are available both before and after the reform is limited. In several cases, while data series exist, they have been subject to definitional and reporting changes. This affects even such basic statistics as local population numbers or employment. Since the administrative information on the population stock is dependent on the national censuses, population data tend to be strongly discontinuous at census years. We address this by backdating the population information from 2014 using year-by-year population flow information provided in the BDL. In the case of employment, municipality-level information is available only with regard to employment by large enterprises, which limits the use of employment data as a proxy for growth. In addition, the definition of a large company changed (from 5+ to 9+ employees) precisely at the time the administrative reform was implemented, which invalidates the use of this municipality-level information in the evaluation.[10]

3.4 Outcomes and matching variables

Of the municipality-level variables available for analysis, we use three categories of outcomes (in most cases, we take logarithms of the values to account for the distributional features of the data):

Population:
- total population (log);
- births (log);
- deaths (log);
- net migration (number of individuals).

Local government finances:
- total own revenues (per capita, log);
- own non-capital revenues (per capita, log);
- central government subventions (per capita, log);
- central government subsidies (per capita, log);

---

[10] Another definitional change refers to housing, which since 2003 also includes uninhabited dwellings. It is notable though that in the case of both employment and housing, the results of diff-in-diff regressions are consistent with other results reported in Table 3. Since the definitions were consistent prior to 1999, and since they seem to be good proxies for economic development, we use both employment and housing information in the matching procedures even though we do not analyse them as outcomes in the final analysis.

- total expenditure (per capita, log).

Economic variables:

- total lights (per capita, log);

- number of private companies (per 1000 persons, log).

Table 1. Pooled logit regression results for the probability of treatment

|	Marginal effect	z-statistic	Significance
Outcome variables			
Population density	-0.001	(-0.299)	
Births, log	-0.083	(-2.124)	*
Deaths, log	-0.113	(-3.058)	**
Net migration, p.c.	-0.008	(-5.983)	***
Own revenues, p.c. log	0.008	(0.146)	
Own non-capital revenues, p.c. log	-0.540	(-8.079)	***
Subventions, p.c. log	-0.007	(-1.308)	
Subsidies, p.c. log	-0.014	(-0.808)	
Total lights, p.c. log	-0.032	(-2.404)	*
Private companies, per 1000 pers., log	0.182	(6.124)	***
Additional variables			
Share of 0–14 in population	2.102	(3.257)	**
Share of 60+ in population	1.478	(2.682)	**
Employment (5+ companies), log	0.114	(4.404)	***
Housing, p.c. log	-0.072	(-0.677)	
Area, ha	0.025	(1.525)	
Water pipes length, p.c.	2.488	(1.387)	
Share of employed in agriculture	0.166	(2.578)	**
Share of employed in services	-0.035	(-0.522)	
Observations		9653	

Note: z-statistics in parentheses; standard errors clustered at the municipality level; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Matching variables do not include population and expenditures due to collinearity with other variables during matching. Monetary values in real 2005 PLN terms.
Source: Authors' calculations using BDL and NOAA data pooled for years 1995–1998. Pre- and post-reform capitals excluded from the analysis.

In the process of matching, through entropy balancing, we use pre-reform information for the years 1995–1998 and combine the above outcome variables with additional pre-reform data relevant from the point of view of municipality-level economic development. Table 1 presents pooled logit regression results for the reform treatment dummy, regressed on all variables used in the matching algorithm. As we can see, a number of variables differ significantly between the municipalities that became further away from the new administrative capitals and those that did not, which justifies the application of matching before the diff-in-diff estimation. Since the matching algorithm includes information from several pre-reform years, the balancing should account for potential differences both in the levels and in the pre-reform trends. The variables that are significantly different for treatment and control groups include both births and deaths,

as well as net migration, non-capital municipal revenues, total lights, the number of private companies, the demographic structure of the local population, employment in large companies (with 5+ employees) and the share of the employed in agriculture. This shows that – as one could expect – the treatment and control municipalities differ, and while there is no intuitive consistency in these differences, it is likely that they might influence the identification of the effect of the reform.

Figure 2. Changes in distance to administrative capitals
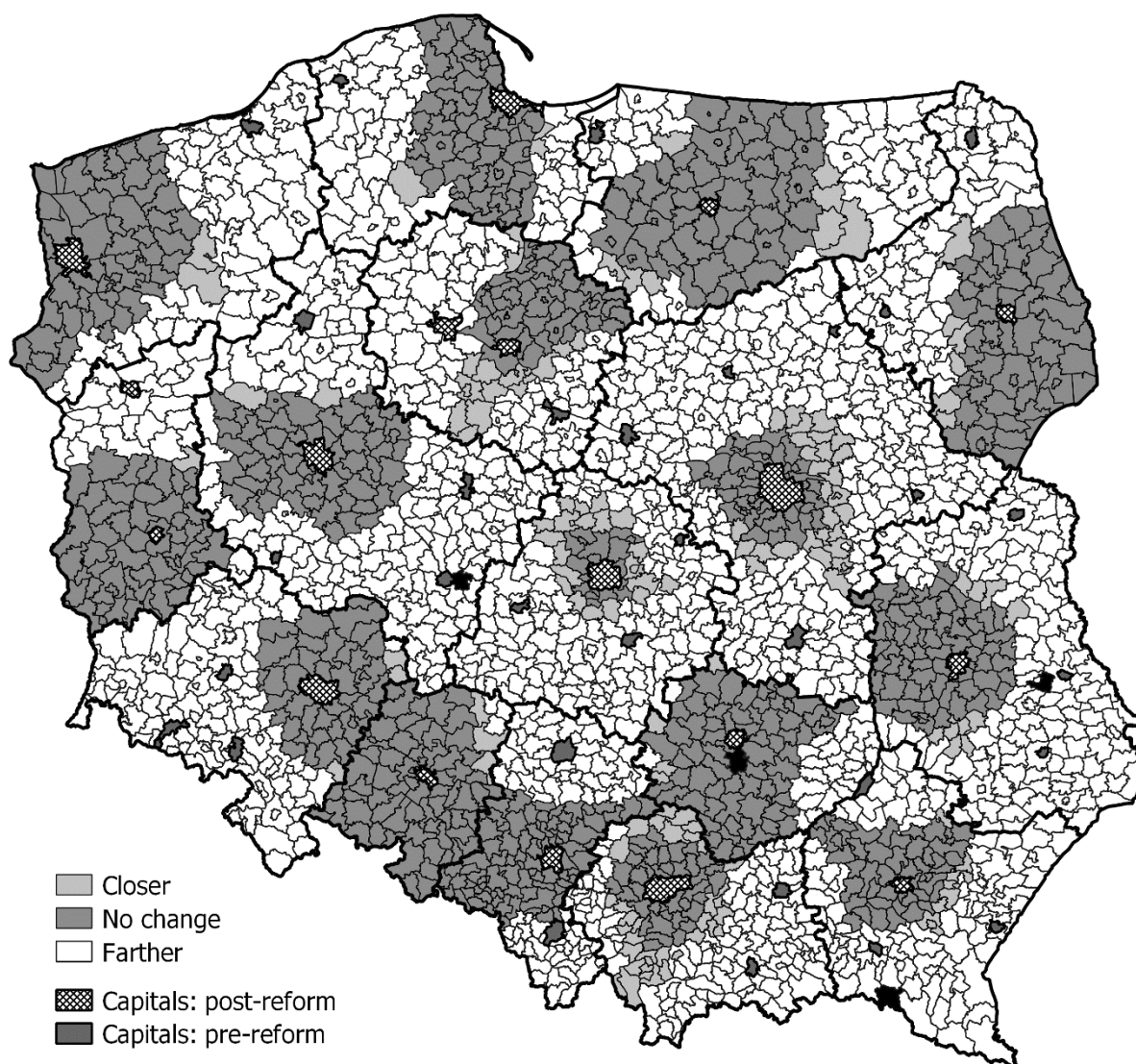
Note: Municipalities marked in black excluded from analysis due to specific municipal-level changes which make comparison over time impossible.
Source: Authors' illustration using PRG data.

13

4. Results

The first step of our analysis is entropy balancing to assign appropriate weights for the diff-in-diff analysis. Balancing is conducted using the variables shown in the treatment regression in Table 1 and is done to ensure consistency in first and second moments of the treatment and control groups. Treatment is defined with respect to the *increased distance* to the regional administrative capital resulting from the reform. All regional capitals – pre- and post-reform – are excluded from the analysis. The spatial distribution of changes in distance is shown in Figure 2. As we can see the municipalities for which the distance to their administrative capitals increased are generally peripheral with respect to the new capitals. The distance increased in the case of 1412 (58.3%) municipalities and fell in the case of 155 (6.4%), while it remained unchanged for 875 (35.4%) municipalities. For those municipalities for which the distance increased, it changed on average by 44.8 km (see Table 2).[11]

Table 2. Distribution of changes in distance to administrative capitals

Distance to administrative capitals	Number of municipalities	Proportion	Average change, km
Closer	155	0.064	-11.5
No change	857	0.354	0
Further	1412	0.583	44.8
Total	2423	1.000	25.4

Note: Pre- and post-reform regional capitals excluded from analysis.
Source: Authors' calculations using ArcGIS and PRG data. Distances (in straight lines) between centroids of municipalities.

4.1 The reform and its aftermath in the 49 regional capitals

Prior to the 1999 reform, there were 49 voivodeships in Poland, each with its own local capital. The reform reduced the number of voivodeships to 16, with 18 cities maintaining capital status. In the case of double capitals, only one city became the site of the local government and we consider these as local administrative centres. Naturally, the new voivodeships were created around the largest regional cities, and because of significant differences between the pre-1999 capitals it is impossible to judge the implications of the reform on city development just by comparing one group and the other. However, for descriptive purposes and as a reference point for analysis of the effect of the reform on non-capital municipalities, in Table 3 we present

---

[11] Distances are measured in straight lines between the centroids of the municipalities.

regression results of a comparison of developments between the two groups of capitals. From the point of view of the development of municipalities around them, it can still be informative to examine how differently the two groups of pre-1999 capitals developed after the implementation of the reform.

Table 3. Diff-in-diff estimates for loss of regional capital status

| Outcome	Coefficient	t-statistic	Significance	N
Population				
Number of people, log	0.005	(0.594)		882
Births, log	-0.139	(-5.718)	***	882
Deaths, log	0.020	(1.339)		882
Net migration, pers.	-1.902	(-2.906)	**	882
Finances				
Subventions, p.c. log	0.132	(1.465)		882
Subsidies, p.c. log	0.391	(3.419)	**	882
Own revenues, p.c. log	0.076	(1.872)	+	882
Own non-capital revenues, p.c. log	0.136	(2.307)	*	882
Expenditure, p.c. log	0.147	(3.141)	**	882
Economic indicators				
Total lights, p.c. log	-0.028	(-1.396)		882
Private companies, per 1000 pers., log	-0.057	(-1.734)	+	882

Note: $+ p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$; standard errors clustered at the municipality level. Monetary values in real 2005 PLN terms.
Source: Authors' calculations using BDL and NOAA data.

Table 3 presents results of diff-in-diff estimations using output variables from our main estimation and comparing cities that lost their capital status with those that maintained it before and after the reform. As we can see, the former capitals fare worse in terms of population trends – both in terms of the number of births and in terms of net migration. Details of these trends are presented in Figure 3 and suggest more favourable dynamics in these large cities, due both to different levels of births and to net migration. These are particularly evident after around 2005. At the same time though, municipal own local revenues look stronger in per-capita terms and the cities that lost capital status also fare better in terms of total local government expenditure. The latter is most probably related to central government subsidies, which are substantially stronger in the cities that lost their capital status and seem to be much more strongly supported from the central budget. While higher own revenues suggest higher economic dynamics, both the lights data (-2.8%) and developments in the number of private companies (-5.7%) point towards the opposite. Thus, despite a temptation to declare substantial socio-economic degradation of cities that lost the status of administrative capitals, and despite frequent references to the negative consequences of the 1999 reform in the public debate, our descriptive analysis suggests that there is no consistent evidence to support such conclusions. Several negative signals are counterbalanced with the performance of municipal budgets.

Figure 3. Averages of population indicators for former and current capitals
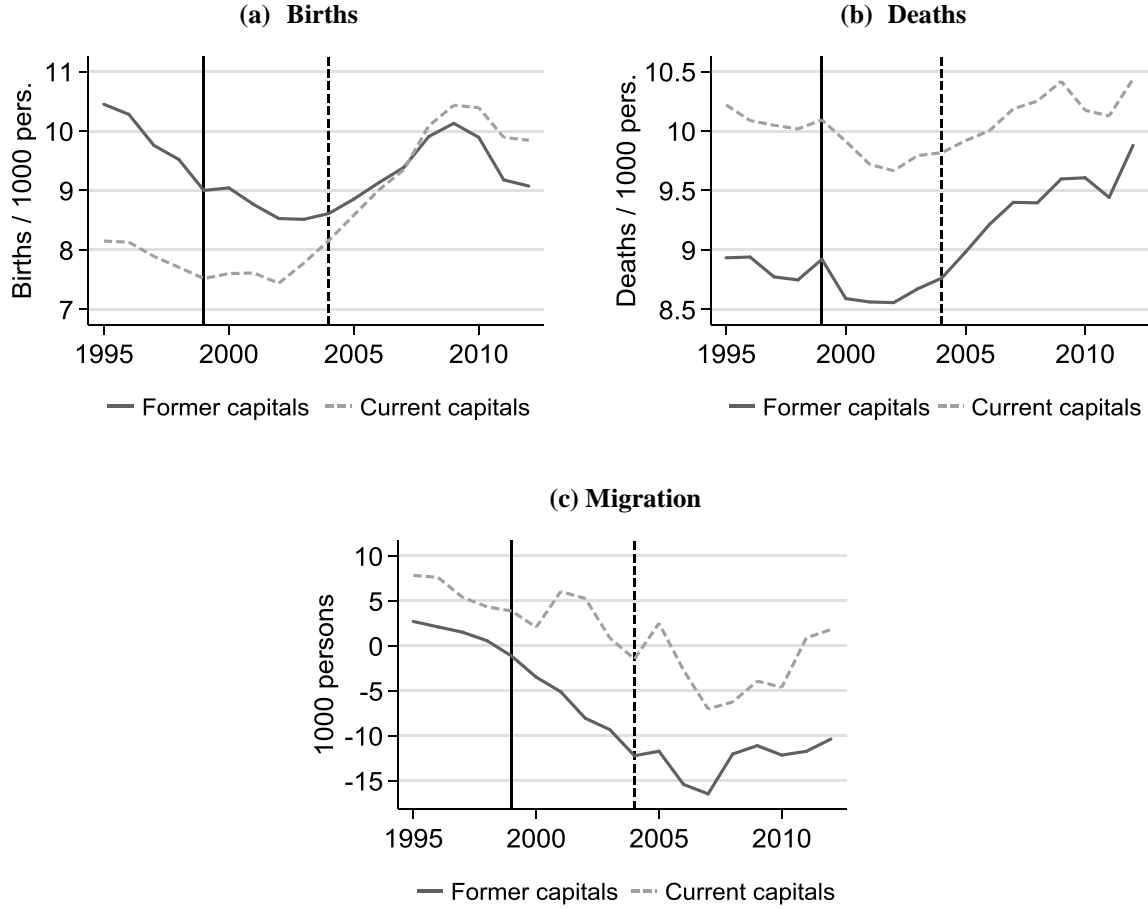
(a) Births

(b) Deaths

(c) Migration

Note: The black solid lines indicate the reform year (1999) and the dashed lines the year of EU accession (2004).
Source: Authors' calculations using BDL data.

4.2 Does distance matter? Effect of the 1999 reform on peripheral municipalities

The effect of the 1999 administrative reform on developments in non-capital municipalities is examined both without and with matching, with the latter conducted through entropy balancing. Matching is done using data for 1995–1998 to account for differences in pre-reform levels and trends (Autor, 2003; Lima and Silveira Neto, 2018), and we use all variables used in the probability of treatment regression in Table 1. Equation 1 is estimated for all of the considered outcomes and in each case we apply the same entropy balancing weights. The final estimates of the diff-in-diff coefficients $-\beta_3-$ are presented in Table 4, in two specifications, one without and one with matching.

16

Table 4. Diff-in-diff regression estimates without and with matching

Outcome	Without matching			With matching		
	Coeff.	*t*-stat.	Signif.	Coeff.	*t*-stat.	Signif.
Population						
Number of people, log	-0.017	(-6.610)	***	-0.005	(-0.900)	
Births, log	-0.055	(-9.521)	***	-0.000	(-0.027)	
Deaths, log	-0.014	(-3.511)	***	0.002	(0.160)	
Net migration, pers.	-12.313	(-3.851)	***	-12.579	(-2.372)	*
Finances						
Subventions, p.c. log	0.009	(0.673)		0.001	(0.038)	
Subsidies, p.c. log	0.109	(7.536)	***	-0.035	(-1.167)	
Own revenues, p.c. log	0.034	(3.930)	***	0.024	(1.028)	
Own non-capital revenues, p.c. log	0.040	(4.040)	***	0.033	(1.246)	
Expenditure, p.c. log	0.062	(9.580)	***	0.001	(0.062)	
Economic indicators						
Total lights, p.c. log	0.110	(8.900)	***	-0.002	(-0.049)	
Private companies, per 1000 pers., log	-0.036	(-4.914)	***	-0.029	(-1.022)	

Note: $+ p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$; standard errors clustered at the municipality level. Monetary values in real 2005 PLN terms.
*Source:* Authors' calculations using BDL and NOAA data.

The results show significant differences between the two specifications, which confirms important heterogeneity between the treatment and control municipalities and the need to apply matching. In the unmatched specification, we find negative and statistically significant values of β_3 for all population outcomes and the number of private companies. Similarly to the results for regional capitals, we find that becoming a peripheral municipality with a larger distance to the local administrative centre actually improves the position of local public finances. Additionally, the coefficient on total night-time lights is positive and significant. The differential values of central subsidies and total expenditures could be consistent with the falling number of private companies (down by 3.6%), as these could all reflect lower growth in the treated regions and the related higher gains from interregional redistribution. However, the other indicators suggest otherwise – the value of total lights is 11% higher in the treated regions after the reform, and their own local government revenues are also higher.

The statistical significance of most of these differences disappears after matching, which suggests that they relate more to the differences between the two groups of municipalities already established before the changes rather than to the reform itself. The only difference between the treated and control groups that remains statistically significant is migration. The additional average net loss among the treated municipalities is about 13 persons per year. After matching, the coefficients reflecting the implications of the reform for local public finances, total night-time lights and the number of private companies are all insignificant. This means that, once we account for the pre-reform differences between the two groups of municipalities,

we cannot identify any causal effect of the administrative reform on the pace of economic development, at least as reflected in the available indicators. Figure 4 illustrates the difference between the matched and non-matched results for specific years for four outcomes: total population, migration, total own municipal revenues and expenditures. As we can see there is evidence of significant depopulation in the peripheral municipalities, and the negative effects persist in the matched estimation, although once matching is applied they are not statistically significant. Effects on total own revenues and total expenditure are positive and significant without matching, but once we account for the pre-reform heterogeneity we find no significant effects of the reform on municipal public finances.

Figure 4. Distance to administrative capitals and outcomes: diff-in-diff regression results for selected variables before and after matching
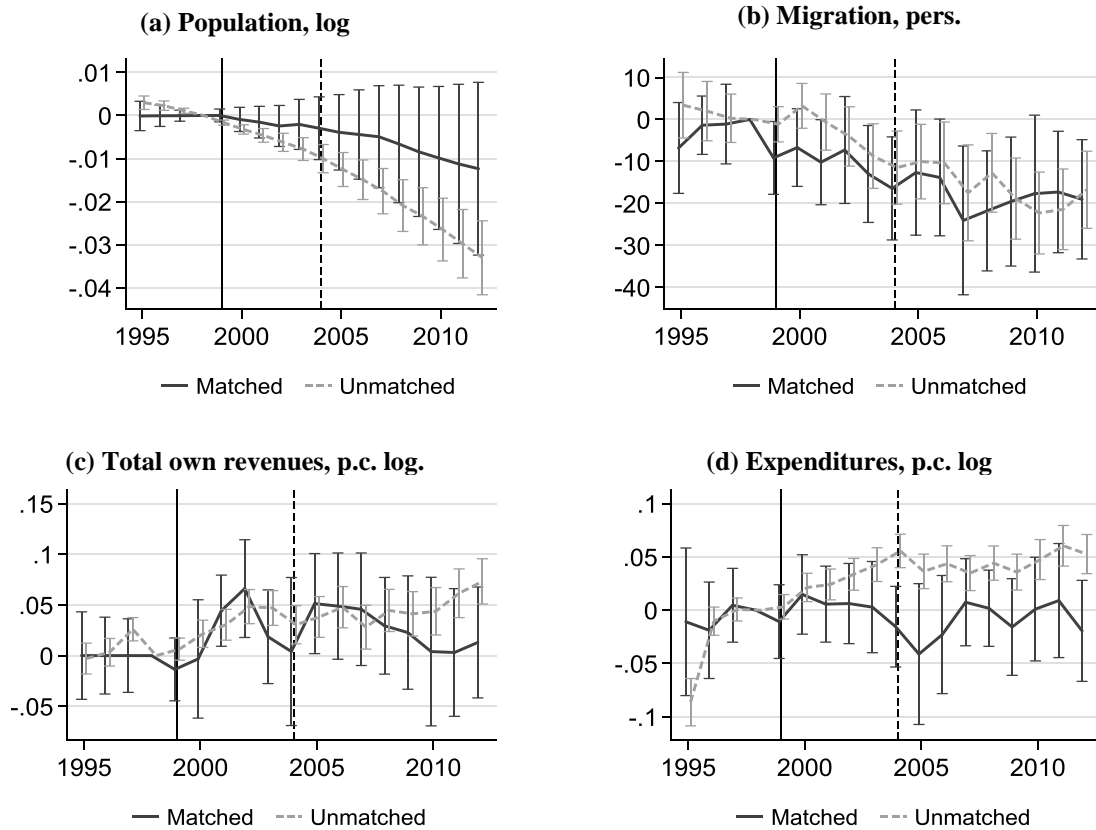
Note: The black solid lines indicate the reform year (1999) and the dashed lines the year of EU accession (2004). The vertical coloured lines show 95% confidence intervals; standard errors clustered at the municipality level.
Source: Authors' calculations using BDL data.

Table 5. Robustness checks

	Original, with adjusted matching			(a) No middle-distanced			(b) Without two capital regions			(c) Without municipalities with decreased distance		
	Coeff.	*t*-stat.	Signif.	Coeff.	*t*-stat.	Signif.	Coeff.	*t*-stat.	Signif.	Coeff.	*t*-stat.	Signif.
Population												
Number of people, log	-0.003	(-1.031)		-0.006	(-1.087)		-0.003	(-0.876)		-0.003	(-1.054)	
Births, log	-0.004	(-0.535)		-0.012	(-0.743)		-0.001	(-0.145)		-0.004	(-0.554)	
Deaths, log	0.006	(0.769)		-0.000	(-0.009)		0.010	(1.051)		0.007	(0.814)	
Net migration, pers.	-9.402	(-4.184)	***	-7.348	(-1.082)		-9.912	(-4.134)	***	-9.832	(-4.418)	***
Finances												
Subventions, p.c. log	-0.020	(-1.160)		0.021	(0.635)		-0.020	(-1.017)		-0.017	(-1.006)	
Subsidies, p.c. log	-0.007	(-0.355)		-0.041	(-1.210)		-0.002	(-0.067)		-0.007	(-0.345)	
Own revenues, p.c. log	0.047	(4.045)	***	0.051	(2.218)	*	0.040	(3.009)	**	0.049	(4.128)	***
Own non-capital revenues, p.c. log	0.061	(4.349)	***	0.063	(2.360)	*	0.047	(3.015)	**	0.062	(4.363)	***
Expenditure, p.c. log	0.012	(1.310)		0.022	(1.268)		0.018	(1.680)	+	0.013	(1.386)	
Economic indicators												
Total lights, p.c. log	-0.005	(-0.197)		0.004	(0.101)		0.003	(0.092)		-0.006	(-0.203)	
Private companies, per 1000 pers., log	-0.024	(-1.805)	+	-0.019	(-0.726)		-0.033	(-2.281)	*	-0.758	(-1.217)	

Note: $+ p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$; standard errors clustered at the municipality level. Monetary values in real 2005 PLN terms. Due to lower number of municipalities, matching conducted only for the first moments of distributions; thus we report the results of the original specification with the adjusted matching approach.
Source: Authors' calculations based on BDL and NOAA data.

Our results hold in a number of robustness checks with the exception of the positive implications of the reform for municipal revenues, which are significant in the alternative estimations. The robustness checks cover: (a) differentiating only between close and distant municipalities (comparing the 25% that are closest to the new capitals and the 25% that are furthest away); (b) excluding the two regions where there are two regional capitals (Lubuskie and Kujawsko-Pomorskie voivodeships); and (c) excluding municipalities that became closer to the administrative capitals after the reform. In all the robustness checks, we apply a simplified version of matching, with entropy balancing focused only on the first moments of the distributions. Results, including the original specification with the modified matching approach, are presented in Table 5. As we can see, the positive effects of the reform found for municipal revenues, while not significant in our preferred specification, turn out significant using a simplified method of matching and in all of the presented robustness tests, in the approximate range 4–6%. The significance levels in this robustness analysis ought to be treated with caution since we only match the data on the first moments, but the consistently positive signs in all specifications point towards surprising advantageous effects of the reform for the economic performance of the peripheral municipalities.

5. Conclusion

While spatial administrative arrangements are often associated with the geographic distribution of economic development, evaluating the role of the spatial relation between administrative centres and peripheral regions is difficult, since the distance to the centre can be determined by many factors which are simultaneously responsible for long-term growth. At the same time, large reforms that exogenously shift administrative power and which thus could facilitate the identification of its role for regional development are infrequent.

One such reform took effect in Poland on 1 January 1999, the day on which three other major reforms were simultaneously implemented in the areas of health, education and pensions. By 2019, of the four, only the structural design resulting from the administrative reform has remained essentially unchanged. In this paper, we take advantage of this reform and use it as a source of exogenous variation in the distance from municipalities to regional administrative capitals. The reform resulted in enlarged top-tier administrative regions, reducing their number from 49 to 16, and through this increased the distance from municipalities to their regional administrative centres for nearly 60% of Polish municipalities.

As the treatment group, we identify municipalities for which the geographic distance to the regional administrative capital increased, and compare long-term trends in a number of indicators for regional development with those in municipalities for which the distance remained unchanged or fell as a result of the reform. Due to significant differences between treatment and control municipalities, we apply entropy balancing methods to match their pre-reform characteristics and estimate the standard diff-in-diff regressions to compare the levels of outcomes before (1995–1998) and after (1999–2012) the reform across the two groups. We find that although the treatment and control municipalities differ in a number of dimensions that seem to be responsible for long-term socio-economic trends, there is little evidence to suggest that the administrative reform itself had any significant differential impact on the development of the two groups. This is despite the fact that the years over which we conduct the analysis fall in the period of intensive growth in public investments related to Poland's membership of the European Union as of 1 May 2004.[12] Although there is significant variation in how successful different Polish regions have been in absorbing EU funds (Dąbrowski, 2012, 2014), our results suggest that the differences do not seem to have their source in the variation in distance to the regional capitals where the key decisions concerning the allocation of these resources are made.

The only notable differential trend between the treatment and control groups of municipalities relates to net migration, which is more negative in the peripheral municipalities even in the matched specification (by about 13 people, or 0.081%, per municipality per year). If the tendencies continue, this might suggest potential long-term problems for the regions, but the scale of the difference is small and does not seem to represent an imminent policy challenge.

Some of our results are surprising and call for further research. This is especially true for the identified positive post-reform difference in the level of municipal revenues found between the pre- and post-reform regional capitals as well as between the treatment and control groups of municipalities. In both cases, the raw unmatched estimates suggest that revenues in the cities that ceased to be capitals and in municipalities further away from the new administrative centres were higher than in, respectively, the cities that maintained their regional capital status after the reform and the municipalities for which the distance to these capitals did not grow. In the latter case, the effects are no longer significant in our preferred specification after the application of

---

[12] As we document in Appendix Figure A1, the total amount of EU funds that was spent in the municipalities was initially (2007–2009) lower in those further away from the new administrative capitals, but in subsequent years (2010–2012) it was actually higher in these regions.

matching, but they remain positive. We also find that they are statistically significant using a simplified method of matching and in a number of robustness checks. If we take local government revenues as an indication of economic development, this would suggest counterintuitive results of faster growth in the smaller cities stripped of their capital status and in the peripheral municipalities.

Overall, a lack of consistent negative implications of the reform for the development of peripheral regions can be taken as a positive outcome of the reform. It suggests that despite the fears of growing regional disparity being further accelerated by the reform, these regions have fared at least as well as, and perhaps even better than, those that are close to the new administrative centres. This outcome may have contributed to the stability of Poland's administrative structure and the longevity of the system implemented on 1 January 1999.

References

Adda, Jérôme, McConnell, Brendon, Rasul, Imran, 2014. Crime and the depenalization of cannabis possession: evidence from a policing experiment. Journal of Political Economy 122, 1130-1202. doi:10.1086/676932

Autor, David H., 2003. Outsourcing at will: the contribution of unjust dismissal doctrine to the growth of employment outsourcing. Journal of Labor Economics 21, 1-42. doi:10.1086/344122

Baskaran, Thushyanthan, 2017. Local fiscal policy after a bailout: austerity or soft budget constraints? Economics of Governance 18, 209-238. doi:10.1007/s10101-017-0194-8

Bertrand, Marianne, Duflo, Esther, Mullainathan, Sendhil, 2004. How much should we trust differences-in-differences estimates? The Quarterly Journal of Economics 119, 249-275. doi:10.1162/003355304772839588

Beugelsdijk, Sjoerd, Klasing, Mariko J., Milionis, Petros, 2018. Regional economic development in Europe: the role of total factor productivity. Regional Studies 52, 461-476. doi:10.1080/00343404.2017.1334118

Blazyca, George, Heffner, Krystian, Helińska-Hughes, Ewa, 2002. Poland - can regional policy meet the challenge of regional problems? European Urban and Regional Studies 9, 263-276. doi:10.1177/096977640200900305

Bolthoa, Andrea, Carlin, Wendy, Scaramozzino, Pasquale, 2018. Why East Germany did not become a new *Mezzogiorno*. Journal of Comparative Economics 46, 308-325. doi:10.1016/j.jce.2017.11.004

Charron, Nicholas, 2016. Diverging cohesion? Globalisation, state capacity and regional inequalities within and across European countries. European Urban and Regional Studies 23, 355-373. doi:10.1177/0969776413512844

Chłoń-Domińczak, Agnieszka, 2002. The Polish pension reform of 1999. In: Fultz, Elaine (Ed.), Pension Reform in Central and Eastern Europe, Volume 1 – Restructuring with Privatization: Case Studies of Hungary and Poland. International Labour Office, Budapest, pp. 95-205.

Clark, Gordon L., Gertler, Meric S., Feldman, Maryann P., 2003. The Oxford Handbook of Economic Geography. Oxford University Press, Oxford.

Corrado, Luisa, Martin, Ron, Weeks, Melvyn, 2005. Identifying and interpreting regional convergence clusters across Europe. The Economic Journal 115, C133-C160. doi:10.1111/j.0013-0133.2005.00984.x

Dąbrowski, Marcin, 2012. Shallow or deep Europeanisation? The uneven impact of EU cohesion policy on the regional and local authorities in Poland. Environment and Planning C: Policy and Space, 30, 730-745. doi:10.1068/c1164r

Dąbrowski, Marcin, 2014. Towards place-based regional and local development strategies in Central and Eastern Europe? EU cohesion policy and strategic planning capacity at the sub-national level. Local Economy 29, 378-393. doi:10.1177/0269094214535715

Démurger, Sylvie, 2001. Infrastructure development and economic growth: an explanation for regional disparities in China? Journal of Comparative Economics 29, 95-117. doi:10.1006/jcec.2000.1693

Elvidge, Christopher D., Ziskin, Daniel, Baugh, Kimberley E., Tuttle, Benjamin T., Ghosh, Tilottama, Pack, Dee W., Erwin, Edward H., Zhizhin, Mikhail, 2009. A fifteen year record of global natural gas flaring derived from satellite data. Energies 2, 595-622. doi:10.3390/en20300595

Ezcurra, Roberto, Rapún, Manuel, 2006. Regional disparities and national development revisited: the case of Western Europe. European Urban and Regional Studies 13, 355-369. doi:10.1177/0969776406068590

Fingleton, Bernard, López-Bazo, Enrique, 2006. Empirical growth models with spatial effects. Papers in Regional Science 85, 177-198. doi:10.1111/j.1435-5957.2006.00074.x

Fujita, Masahisa, Mori, Tomoya, 2005. Frontiers of the new economic geography. Papers in Regional Science 84, 377-405. doi:10.1111/j.1435-5957.2005.00021.x

Gallup, John Luke, Sachs, Jeffrey D., Mellinger, Andrew D., 1999. Geography and economic development. International Regional Science Review 22, 179-232. doi:10.1177/016001799761012334

Gennaioli, Nicola, La Porta, Rafael, Lopez-de-Silanes, Florencio, Shleifer, Andrei, 2013. Human capital and regional development. The Quarterly Journal of Economics 128, 105-164. doi:10.1093/qje/qjs050

Gennaioli, Nicola, La Porta, Rafael, Lopez-de-Silanes, Florencio, Shleifer, Andrei, 2014. Growth in regions. Journal of Economic Growth 19, 259-309. doi:10.1007/s10887-014-9105-9

GUS, 2018. Baza TERYT. http://eteryt.stat.gov.pl/eTeryt/rejestr_teryt/udostepnianie_danych/baza_teryt/baza_teryt.aspx?contrast=default. Accessed 21 August 2018.

Hainmueller, Jens, 2012. Entropy balancing for causal effects: a multivariate reweighting method to produce balanced samples in observational studies. Political Analysis 20, 25-46. doi:10.1093/pan/mpr025

Henderson, J. Vernon, Storeygard, Adam, Weil, David N., 2012. Measuring economic growth from outer space. American Economic Review 102, 994-1028. doi:10.1257/aer.102.2.994

Hoover, Edgar M., 1948. The Location of Economic Activity. McGraw-Hill, New York, NY.

Jacobs, Jane, 1969. The Economy of Cities. Random House, New York, NY.

Kahn-Lang, Ariella, Lang, Kevin, 2018. The promise and pitfalls of differences-in-differences: reflections on '16 and pregnant' and other applications. Working Paper No. 24857. National Bureau of Economic Research, Cambridge, MA. doi:10.3386/w24857

Keating, Michael, 2017. Contesting European regions. Regional Studies 51, 9-18. doi:10.1080/00343404.2016.1227777

Krugman, Paul, 1991. Increasing returns and economic geography. Journal of Political Economy 99, 483-499. doi:10.1086/261763

Lachowska, Marta, Myck, Michał, 2018. The effect of public pension wealth on saving and expenditure. American Economic Journal: Economic Policy 10, 284-308. doi:10.1257/pol.20150154

Lima, Ricardo Carvalho de Andrade, Silveira Neto, Raul da Mota, 2018. Secession of municipalities and economies of scale: evidence from Brazil. Journal of Regional Science 58, 159-180. doi:10.1111/jors.12348

Marcus, Jan, 2013. The effect of unemployment on the mental health of spouses: evidence from plant closures in Germany. Journal of Health Economics 32, 546-558. doi:10.1016/j.jhealeco.2013.02.004

McMenamin, Iain, Timonen, Virpi, 2002. Poland's health reform: politics, markets and informal payments. Journal of Social Policy 31, 103-118. doi:10.1017/S0047279402006517

National Geophysical Data Center (NGDC), 2010. Version 4 DMSP-OLS night-time lights time series. https://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html. Accessed 15 June 2015.

Organisation for Economic Co-operation and Development (OECD), 2009. How Regions Grow: Trends and Analysis. OECD, Paris.

Organisation for Economic Co-operation and Development (OECD), 2011. The impact of the 1999 education reform in Poland. Education Working Paper No. 49. OECD, Paris. doi:10.1787/5kmbjgkm1m9x-en

Ottaviano, Gianmarco, Thisse, Jacques-François, 2004. Agglomeration and economic geography. In: Henderson, J. Vernon, Thisse, Jacques-François (Eds.), Handbook of Regional and Urban Economics, Vol. 4. North-Holland, Amsterdam, pp. 2563-2608. doi:10.1016/S1574-0080(04)80015-4

Pinkovskiy, Maxim, Sala-i-Martin, Xavier, 2016. Lights, camera ... income! Illuminating the national accounts–household surveys debate. The Quarterly Journal of Economics 131, 579-631. doi:10.1093/qje/qjw003

Regulski, Jerzy, 2003. Local Government Reform in Poland: An Insider's Story. Local Government and Public Service Reform Initiative, Budapest.

Rincker, Meg, Battle, Martin, 2011. Dissatisfied with decentralisation: explaining citizens' evaluations of Poland's 1999 health care reforms. Perspectives on European Politics and Society 12, 340-357. doi:10.1080/15705854.2011.596310

Rodríguez-Pose, Andrés, 1998. The Dynamics of Regional Growth in Europe: Social and Political Factors. Oxford University Press, New York, NY. http://cadmus.eui.eu//handle/1814/22579. Accessed 5 May 2017.

Scott, Allen J. (Ed.), 2001. Global City-Regions: Trends, Theory, Policy. Oxford University Press, New York, NY.

Soja, Edward, 2015. Accentuate the regional. International Journal of Urban and Regional Research 39, 372-381. doi:10.1111/1468-2427.12176

Swianiewicz, Paweł, 2010. If territorial fragmentation is a problem, is amalgamation a solution? An East European perspective. Local Government Studies 36, 183-203. doi:10.1080/03003930903560547

Ustawa z dnia 24 lipca 1998 r. o wprowadzeniu zasadniczego trójstopniowego podziału terytorialnego państwa. Dz.U. 1998 nr 96 poz. 603. http://prawo.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU19980960603. Accessed 6 February 2018.

Ustawa z dnia 28 maja 1975 r. o dwustopniowym podziale administracyjnym Państwa oraz o zmianie ustawy o radach narodowych. Dz.U. 1975 nr 16 poz. 91. http://prawo.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU19750160091. Accessed 6 February 2018.

Żółtak, Tomasz, 2018. Wykaz zmian w rejestrze TERC w latach 1999-2017. https://tomek.zozlak.org/inne/podz_teryt/zmiany_w_podz_teryt.zip. Accessed 21 August 2018.

Appendix: Distribution of EU funds by treatment and control groups

Figure A1. EU funds at municipality level
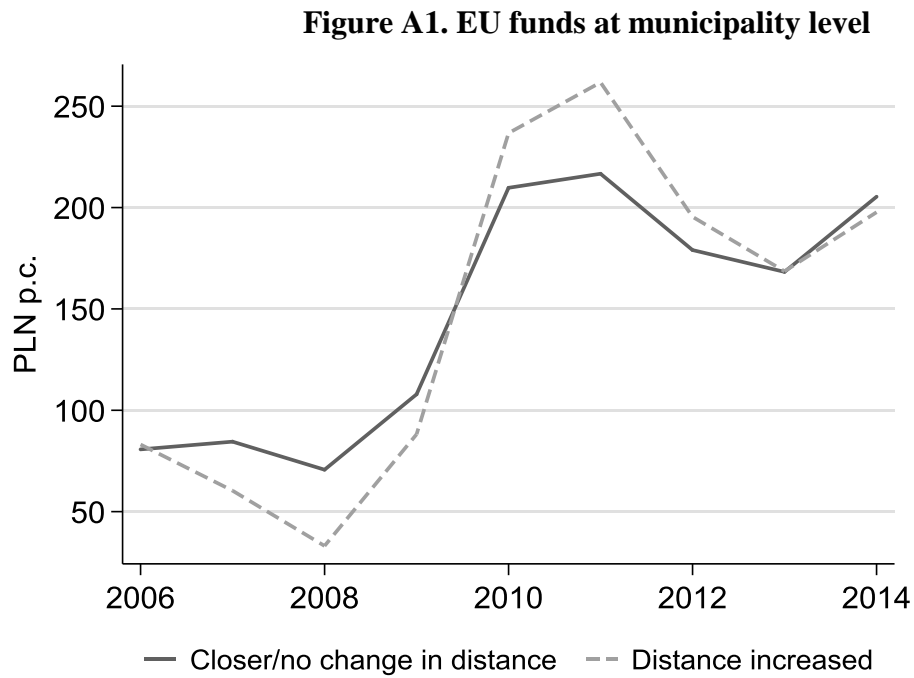
Source: Authors'calculations using BDL, unpublished statistics.