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Bøje-Kovács, Bence Jáanos; Mulalic, Ismir ; Schultz-Nielsen, Marie Louise

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Bence János Bøje-Kovács
Ismir Mulalic
Marie Louise Schultz-Nielsen

Department of Economics – Porcelænshaven 16A, 1. DK-2000 Frederiksberg

The Domino Effect: Exploring Residential Mobility in the Aftermath of Municipal Mergers*

Bence János Bøje-Kovács† Ismir Mulalic‡
Marie Louise Schultz-Nielsen§

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Abstract

In this paper, we investigate the impact of municipal mergers on residential mobility in a quasi-natural experiment setting by examining how local economic environment and neighborhood composition respond to the loss of local public administration. Utilizing comprehensive neighborhood-level data from Denmark spanning 1996 to 2015, we find that the loss of the town-hall triggers emigration, leading to a reduction in locally supplied public goods. This affects the local housing market and job availability, leading to lower housing prices, higher wages, and longer commutes. Ultimately, the loss of the town-hall bears major negative consequences for inhabitants.

Keywords: municipal amalgamation, regional migration, neighborhood characteristics, local labor markets.

JEL codes: H75, R23, R53, J23.

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†Aalborg University, Department of the Built Environment, DK, email: bjbk@build.auu.dk.

‡Copenhagen Business School, Department of Economics, Porcelænshaven 16A, DK-2000 Frederiksberg, Denmark, email: imu.eco@cbs.dk.

§ROCKWOOL Foundation Research, Ny Kongensgade 6, DK-1472 Copenhagen, email: mls@rff.dk.

1 Introduction

For the last couple of decades, several countries have implemented reforms aiming to increase the jurisdiction size by merging municipalities. The main rationale for municipal merger reforms is taking advantage of economies of scale in the municipal provision of local public goods and slowing down the urbanization process. While the existing literature mainly focuses on investigating the scale effects of municipal mergers as well as the effectiveness of the local public services, little attention has been paid to its consequences on residential mobility. This paper investigates the impact of municipal mergers on the dynamics of neighborhood mobility, specifically focusing on the reactions of the local economic environment to the loss of local public administration.

The larger administrative units are expected to have lower costs per inhabitant while having the same revenue. According to Allers and Geertsema (2016), increased jurisdiction size allows for a better match between tasks and workers' qualifications resulting in an improved division of labor as well as service levels as small municipalities might lack certain public services due to a lack of professionalization. Larger units may reduce the per-unit fixed cost as fixed costs are spread over more units of production. Duplication of certain services can also be avoided (Blesse and Baskaran, 2016). On the other hand, larger municipalities may induce higher costs of planning, monitoring, and reporting compared to their smaller counterparts (Allers and Geertsema, 2016). It might also be the case that reduced costs due to municipal mergers simply reflect the reduction in the level of services (Reingewertz, 2012).

A large body of studies have investigated the economies of scale due to municipal mergers with mixed results. While some studies find significant cost reductions (Reingewertz, 2012; Blom-Hansen et al., 2014; Blesse and Baskaran, 2016) others report increased costs (Moisio and Uusitalo, 2013). Some studies do not find any significant effects (Allers and Geertsema, 2016; Rouse and Putterill, 2005). Reingewertz (2012) found, using a large panel dataset combined with the difference-in-differences methodology, that municipal expenditures decreased following municipal mergers in Israel. They found no evidence for a lower level of service as measured by housing construction, school test results, and birth rates. Similarly, Blesse and Baskaran (2016) also found significant cost reductions in administrative expenditure when analyzing municipal mergers in Germany. They demonstrated that economies of scale are more pronounced in compulsory mergers, particularly when involving a larger number of residents and municipalities.[1] On the other hand, Moisio and Uusitalo (2013) found increased spending in merged municipalities in Finland

[1] Notsu (2024) shows that the implementation of the inter-municipal cooperation cloud, a pioneering digital framework that facilitates cooperation among municipalities in Japan, offers significant returns through cost sharing, consequently leading to significant reductions in tax administration expenses.

across several expenditure categories such as education and health care. They found that this increase remained even after ten years. Finally, Allers and Geertsema (2016) did not find any significant effect of municipal mergers on municipal spending or taxation in the Netherlands. They also investigated the degree to which municipal mergers impact the level of public services, using housing prices as a proxy. Consistent with the overall result, they did not find any empirical evidence of improved service levels. In Denmark, the country of our study, Blom-Hansen et al. (2014) found that administrative expenditures per capita in merged municipalities were substantially lower following the municipal mergers in 2007. Furthermore, Blom-Hansen et al. (2021) argued that this municipal merger reform did not result in a lower level of services, as suggested by their analysis of public school effectiveness. Lastly, Lassen and Serritzlew (2011) demonstrated that while municipal mergers in Denmark reduced internal political efficacy in the merged municipalities, it did not increase inequality between different social groups' sense of efficacy.

While researchers have mainly focused on investigating the scale effects of municipal mergers as well as the effectiveness of some local public services, little attention has been paid to its consequences on neighborhood composition and residential mobility. This is relevant as public goods such as school quality play an important role in households' residential location choice (Bayer et al., 2007). Rappaport (2008) suggests that local public goods are an important factor in the residential location choice of individuals while Glaeser et al. (2001) provide empirical evidence on the growing importance of consumer amenities.[2] Moreover, Etzo (2011) finds a positive correlation between amenities such as temperature and transport accessibility - i.e. the concentration of airports - and internal migration. Similarly, Biagi et al. (2011) find that natural amenities such as coasts are positively related to long distance (longer than 70 km) relocations. Finally, studies show that higher-income and better-educated households sort into neighborhoods with better amenities. For instance, Bayer et al. (2007) find a higher willingness to pay for neighborhoods with better school performance and the characteristics of the immediate neighbors. The same trend is observed in Denmark. For instance, Duijn et al. (2016) and Mulalic and Rouwendal (2020) show that the provision of local public goods and urban amenities such as densities of historical amenities and the concentration of public housing are important factors in household location choice and household sorting. Hybel and Mulalic (2022) show that areas in Denmark with a high level of amenities have experienced a more rapid population growth. Consequently, if changes in the quality

[2]Rappaport (2008) finds a strong positive correlation between urban amenities and population growth and shows that cross-sectional variation in amenities accounts for approximately one fifth of observed variation in density.

and/or quantity of the public goods and urban amenities occur, they might influence the household mobility and the residential location choice of households. The main objective of our study is to investigate the impact of the 2007 municipal mergers in Denmark on both the residential mobility of households and the availability of local public goods and amenities.

Our paper also contributes to the broader literature examining the effects of plant closures and mass layoffs. Municipal merger reform typically leads to changes in the number of public sector jobs, thereby affecting the local labor market. Municipal mergers can thus resemble plant closures and mass layoffs. This is importnat because existing literature shows that both plant openings and closures, as well as mass layoffs, have considerable impacts on local labor markets. Becker et al. (2021) assess the impact of shifts in public employment on private sector activity, exploiting the establishment of the new West German government in Bonn. Their findings suggest that an increase in local public employment leads only to a modest reduction in private sector employment. They estimate that each additional public sector job eliminates roughly 0.2 jobs in industry while creating just over one additional job elsewhere in the private sector. Jofre-Monseny et al. (2018) offer supporting evidence using Spanish data from 1980, 1990, and 2001, indicating that plant closures do not necessarily eliminate indirect jobs and may, in fact, stimulate job creation within local incumbent firms. Moreover, Faggio and Overman (2014) estimate the local labor market effects of public sector employment, revealing that each additional public sector job generates 0.5 jobs in the non-tradable sector while displacing 0.4 jobs in the tradable sector. Faggio (2019) employs a difference-in-differences approach on data spanning from 2003 to 2008 to evaluate relocations of public sector employment from London, yielding results consistent with Faggio and Overman (2014). Plant closures, along with mass layoffs, can also impact local wages. Moretti (2010) shows that plant closures lead to a reduction in local income, potentially reducing demand for local public goods. Additionally, studies by Jacobson et al. (1993) and Couch and Placzek (2010) indicate that workers affected by mass layoffs experience a significant short-term earnings decrease, which diminishes over time but does not entirely disappear. Our analysis also identifies the substantial impact of the loss of local public administration on the local labor market.

We exploit a quasi-experimental and extensive municipal merger reform in Denmark to explore the effects of municipal mergers. In addition to reducing the number of administrative units, the reform entailed an administrative annexation. Among the merged municipalities, only one retained its town hall, which is the primary administrative unit. Utilizing comprehensive neighborhood-level Danish data spanning from 1996 to 2015, we estimate the impacts of municipal mergers on the local economic environment and house-

hold mobility, attributing these changes to the loss of the town hall, i.e. the local public administration. This analysis is carried out using the difference-in-differences approach. We investigate the impact of the municipal merger reform on neighborhood residential composition and mobility by comparing neighborhoods in municipalities that forfeited their main administrative unit with those in municipalities that remained unaffected by the reform. Our findings reveal an immediate decline in the number of administrative staff in the affected neighborhoods post-reform, confirming the anticipated changes associated with administrative annexation. Similarly, we find that neighborhoods that lost their town hall following the municipal merger reform experienced a decrease in the population of working-age individuals and children under 16, negative net migration, and a significant reduction in the provision of public goods and job availability. These changes also resulted in lower housing prices. Lastly, we observe increased commuting distances and wages for workers residing in neighborhoods that lost their town halls. In summary, our results indicate that neighborhoods in municipalities that lost their town hall due to municipal mergeres underwent a decrease in public goods and a demographic and socioeconomic shift in residential composition.

The rest of the paper is organized as follows. In Section 2, we describe the institutional background of the municipal merger reform. Section 3 describes the data, while Section 4 presents our empirical strategy. Empirical findings are presented and discussed in Section 5. Section 6 concludes.

2 Institutional Background

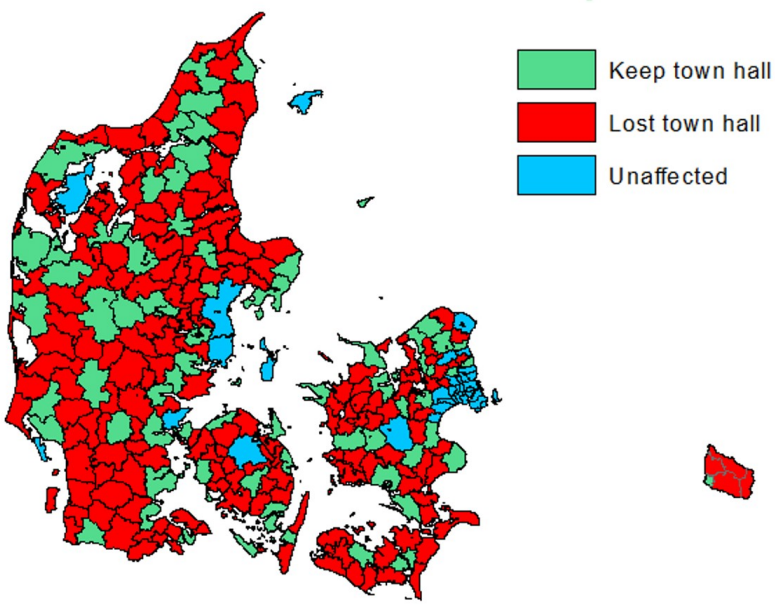
Denmark is partitioned into five regions and 98 municipalities. This administrative structure was instituted following a comprehensive reform of Denmark's public sector. In 2007, Denmark implemented the so-called *Structural Reform* which was a major reform of the Danish local government system. This reform effectively changed the administrative map of Denmark, reducing the number of municipalities from 271 to 98.[3] Specifically, 239 municipalities were merged into 66, while 32 remained unchanged (Blom-Hansen et al., 2014). Following the municipal merger process, only one municipality within each newly formed entity retained its town hall as the primary administrative unit, leading to the loss of town halls in the remaining municipalities. Figure 1 shows the three types of

[3]Between 1970 and 2007, the number of municipalities in Denmark remained relatively stable. In 1970, there were 277 municipalities, which decreased slightly to 275 in 1974, 271 in 2003, and 270 in 2006. Prior to 1970, Denmark was organized into 86 boroughs and approximately 1300 parishes across 25 county council districts. Notably, in 2003, five municipalities on the island of Bornholm merged, and in 2006, two municipalities on the island of Ærø followed suit. We estimated our main empirical models excluding these municipalities, and the results remained consistent.

municipalities.[4]

The structural reform involved also the consolidation of 14 counties into five regions. Moreover, there was a redistribution of responsibilities, with certain tasks transitioning from counties to the state and municipalities. Likewise, specific responsibilities moved from municipalities to the state. In this study, we particularly focus on one aspect of the structural reform - the loss of local public administration, specifically the town hall.

Figure 1. Municipal mergers in 2007



The structural reform was implemented rapidly (Mouritzen, 2006). Prior to 2002, the structural reform held no significance in the political debate. It was even rejected by the Minister of the Interior when it was brought up in a parliamentary committee debate. However, due to the escalating debate on the structure of the public sector, the government established in 2002 a Commission on Administrative Structure. The commission's primary task was to identify the advantages and disadvantages of alternative models for the public sector's structure. In 2004, the commission advocated for municipal mergers, arguing that the size of the municipalities was insufficient for the proper provision of public goods. In less than six months, a majority in the national parliament approved a semi-voluntary municipal merger reform (Ministry of Interior and Health, 2004). This implied that the reform was passed at the national level at one point in time meaning that municipalities were forced to enter into merges at the same time. The structural reform, specifically the municipal mergers, was implemented in January 2007.[5]

[4] Figure A.1 in Appendix A shows the new municipalities in Denmark.
[5] Table A.1 in Appendix A lists the chronological development of the municipal mergers process.

The reform specified that municipalities with a population of less than 20,000 should merge with adjacent municipalities. These mergers were intended to form new municipalities, each with a population of approximately 30,000 citizens. Municipalities with fewer than 20,000 inhabitants could only avoid mergers by entering a cooperative arrangement with a large neighboring municipality concerning service provision (Blom-Hansen et al., 2014). Moreover, it was decided that public employees should be assigned tasks (the provision of public goods), and these tasks were organized within the new authorities. This implied that employees who were primarily involved with a task that was transferred to another authority had to move to that authority. As a result of the reform, it was anticipated that approximately 170,000 full-time equivalents within the public sector would have a new employer (Ministry of Interior and Health, 2004).

This arrangement posed in practice significant challenges for municipalities with populations below 20,000 inhabitants. Consequently, only five out of a total of 200 small municipalities managed to avoid mergers by establishing such cooperative arrangements. Moreover, if a small municipality still opposed mergers, the municipal mergers would be carried out centrally by politicians. This was the case for only three municipalities. Overall, the implementation process of the reform indicates that while the mergers themselves were compulsory and centrally imposed, the selection of merger partners and the size of the resulting merged municipalities were determined locally (Blom-Hansen et al., 2014). These decisions were however constrained by geographical proximity.

3 Data

The data used in the empirical analysis are derived from annual administrative register data from Statistics Denmark. Utilizing the available register data, we have constructed an exhaustive dataset at the neighborhood level, encompassing the years 1996 to 2015. This dataset provides for the entirety of Denmark's population annual information on the residence location at the neighborhood level, along with socioeconomic and demographic characteristics such as age, gender, income, and education.[6] In addition, our dataset extends to the universe of firms observed within the same period. For each establishment, we have data on its location at the neighborhood level, the sector, and the number of full-time equivalents.

Neighborhoods are created by Damm and Schultz-Nielsen (2008) using a georeferenced clustering procedure that has been updated for this study to include recent years. Each of these neighborhoods comprises at least 150 households and their definitions remain

[6]In order to protect individual identities and ensure adequate confidentiality, Statistics Denmark does not disclose exact residential addresses. Instead, these are substituted with scrambled identifiers.

consistent over time. In total, there are 9,355 neighborhoods, each with an average size of 677 m^2. These neighborhoods are defined by existing physical barriers and exhibit homogeneity in terms of the number of residents. Figure 2 illustrates the centroids of the neighborhoods in Denmark.[7]

Figure 2. Centroids (red dots) for neighborhoods in Denmark

We first use data on individuals and households to compute demographic characteristics of neighborhoods. These include the number of residents aged 16-66 and the number of children under 16. We also calculate socioeconomic characteristics such as the total number of jobs, the number of jobs in the public sector, the average income, the average wage, and the average commuting distance.[8] Additionally, we calculate the average moving distance and the net migration for each neighborhood.[9] Net migration is calculated as the difference between the number of individuals aged 16-66 moving into the neighborhood and those of the same age group moving out.

Second, we use data on establishment to identify public goods such as primary schools and healthcare providers (doctors), along with their size measured in full-time job equivalents. Public schools include pre-primary, primary, and secondary levels, special schools

[7]The calculation of centroids is adjusted to the nearest populated address from the geographic centroid. This adjustment prevents the centroids from being located in unpopulated areas such as lakes.

[8]Statistics Denmark provides the distances for the shortest route between residence and workplace addresses. Commuting distance is calculated for each worker as the shortest route between the worker's residence and workplace location.

[9]The average reallocation distance is calculated based on the network distances between the centroids of the neighborhoods.

for disabled individuals, and youth and continuation schools.[10] Healthcare providers offer 13 different services, including general medical and specialist practice activities, psychological counseling, dental practice, and chiropractic services. We calculate the average number of full-time job equivalents for each type of public service within the neighborhood.

Finally, we use Danish administrative register data on real estate transactions to estimate a House Price Index (HPI) at the neighborhood level for the period 1996-2015. The data on real estate transactions includes structural attributes of dwellings such as the size of the housing unit, the number of rooms, the type of unit (e.g., multifamily house, single-family house), and the age of the building. Given the sparsity of the real estate transaction data, we use an algorithm developed by Ahlfeldt et al. (2023) to estimate a house price index for arbitrary spatial units using repeated cross-sections of geocoded microdata.

A challenge we face is that our neighborhoods, defined by existing physical barriers, do not necessarily follow administrative boundaries. As a result, 334 neighborhoods (about 3.6%) span multiple municipalities, each affected differently by the structural reform. As outlined in Section 2, the reform resulted in three types of municipalities. Among the merged municipalities, 2,403 neighborhoods are in municipalities that lost their town hall, while 3,235 are in municipalities that retained their town hall. A further 3,717 neighborhoods remain unaffected by the reform. We exclude the 334 neighborhoods that span multiple municipalities with differing impacts from the reform. Neighborhoods with missing values in our observed characteristics in any given year are also excluded. This leaves us with 8,530 neighborhoods: 2,187 in municipalities that lost their town hall, 2,933 in municipalities that kept the town hall, and 3,410 unaffected by the reform.

Table 1 presents a comparison of observed neighborhood characteristics across the three groups in 2004, prior to the national parliament's approval of the municipal merger reform. Despite the descriptive evidence from Bhatti and Hansen (2011) suggesting that the political and economic homogeneity of a municipality did not significantly influenced the outcome of the municipal mergers, Table 1 reveals significant differences in some neighborhood characteristics given what municipal group the neighborhoods belong to. Specifically, neighborhoods in municipalities that lost their town hall exhibit significant differences in the size of public administration compared to municipalities that retained their town hall or were unaffected by the reform. These differences also extend to housing prices and the share of public housing. The differences are particularly pronounced when comparing neighborhoods in municipalities that lost their town hall with those unaffected

[10] In Denmark, it is common for children to attend youth and continuation schools for one or two years after primary school to acquire more professional skills before progressing to secondary school.

by the reform. This is likely due to the fact that many of the unaffected municipalities are located within larger urban areas. On the other hand, neighborhoods within the three municipal groups appear to be similar in terms of other observed characteristics. These include the proportion of the working age population, the share of children, the share of unemployed or not part of the labor market, and more importantly, the average disposable income and public goods such as childcare, primary schools, and healthcare providers.

Table 1. Summary statistics for year 2004

	Lost town hall		Kept town hall		Unchanged	
	Mean	SD	Mean	SD	Mean	SD
Working age population (share)	0.65	0.05	0.67	0.07	0.70	0.09
Children below age 16 (share)	0.21	0.04	0.18	0.06	0.17	0.07
Unemployed (share)	0.06	0.03	0.07	0.04	0.07	0.03
Out of labor market (share)	0.18	0.06	0.18	0.07	0.17	0.08
Public housing (share)	0.07	0.16	0.17	0.30	0.23	0.36
Disposable income (DKK)	150,537	14,912	151,193	20,903	153,655	27,864
Public admin (full-time equivalent)	6.30	23.41	8.74	49.42	10.88	71.75
Doctors (full-time equivalent)	0.49	1.53	0.75	3.12	0.64	2.53
Primary and secondary schools (full-time equivalent)	11.98	21.00	11.76	25.96	9.28	25.26
Kindergarten (full-time equivalent)	3.00	5.51	3.03	6.29	3.66	8.59
House price index (sqm price in DKK)	4,603	1,774	5,946	2,004	11,009	3,143
Number of observations	2,187		2,933		3,410	

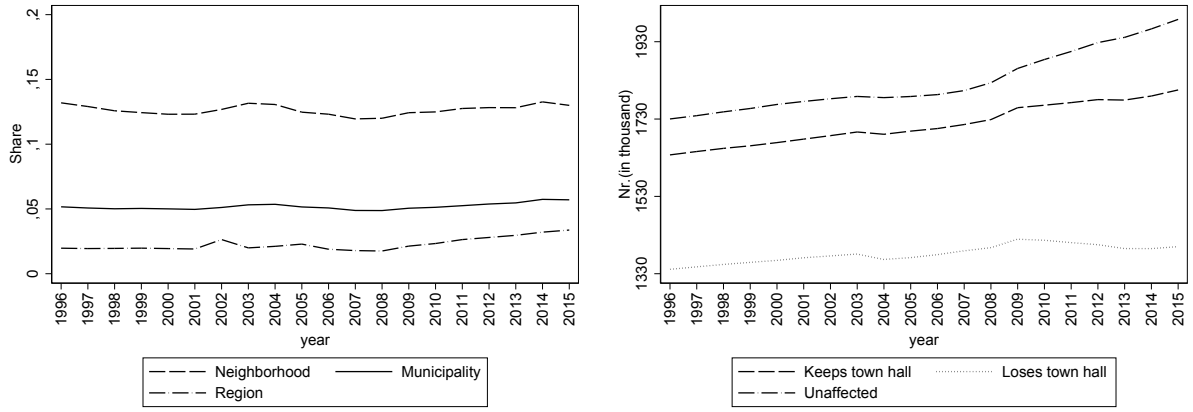
Notes: Unit of measurement is neighborhood. 1 DKK $\approx$ 0.13 EUR.

The descriptive evidence reveals some differences between neighborhoods in municipalities that lost their town hall and those in the other two types of neighborhoods. If these differences systematically correlate with our treatment, it could potentially bias the estimation results. In Section 4, we outline our empirical strategy and explain how it accounts for these differences.

While job mobility in Denmark is exceptionally high, even ranking as the highest in Europe according to (Mortensen, 2003), residential mobility rates are lower most likely due to steep housing transaction taxes and rent control policies. Figure 3a illustrates that approximately 10% of households relocate within neighborhoods, while less than half of these movers cross municipal borders. Only about 2% of households relocate across regions. Further analysis, presented in Figure A.2 through Figure A.4 in Appendix A, reveals interesting patterns. Households residing in municipalities that retained their town hall or were unaffected by the reform exhibit a higher propensity to relocate across neighborhood borders (approximately 14%). In contrast, households in municipalities that lost their town hall relocate less frequently (around 10%). When examining relocation across municipality borders, a different picture emerges. Over 6% of households in unaffected municipalities relocate, compared to only $4-5\%$ in the other two groups. Finally, a slightly lower share of households in municipalities that lost their town hall

relocate across regional borders (about 1.5%) compared to the other two groups (approximately 2%).

Figure 3. Share of movers and total neighborhood population



(a) Share of movers

(b) Total population

Interestingly, while the total population in municipalities unaffected by the reform or those that retained their town hall continued to grow steadily over the years, the population in neighborhoods within municipalities that lost their town halls experienced stagnation after the implementation of the municipal merger reform in 2007, see Figure 3b. This stagnation is a first sign of the reform's impact on household mobility.

4 Empirical Strategy

Mouritzen (2006) describes in several case studies the municipal mergers and indicates factors such as local identity, internal cohesion, political party composition of the future municipality, homogeneity in service and wealth, and influence in the future municipal structure were of importance. Moreover, Bhatti and Hansen (2011) investigate several observable characteristics of municipalities to identify the factors driving realized municipal mergers. The authors find descriptive evidence that the amount of commuting between municipalities, and population size are significant predictors of jurisdiction formation whereas political and economic homogeneity of the municipality did not seem to play a role. Given these factors, the differences between municipalities that retained their town halls and those that didn't are expected to be minimal. We therefore use the structural reform as a quasi-natural experiment, utilizing its execution across various municipalities for identification purposes.

The primary empirical challenge in identifying the impact of municipal mergers lies in the fact that other changes in the local economic landscape may potentially confound

the effects from the loss of the town hall. Consequently, estimating the causal impact of this loss presents several challenges. This section outlines our empirical strategy and explains how we address these challenges.

To estimate the impacts of the loss of the town hall on the local economic environment, neighborhood composition and household mobility, we carefully construct a difference-in-differences approach. Initially, we utilize a standard difference-in-differences method as our starting point. The first step involves the selection of treatment and control groups. The treatment group consists of all municipalities that experienced a loss of their town hall, or in other words, municipalities that were heavily impacted by the reform. Constructing the control group, which is negligibly or not at all affected by the reform, is more challenging. The main driver of the choice of treatment and control groups is a trade-off. We aim to minimize the treatment effect on the control group while maximizing the similarity between the treatment and control groups. The municipalities unaffected by the municipal mergers naturally serve as the control group. By choosing municipalities unaffected by the municipality mergers for the control group, we ensure that the reform's impact on the control group is minimal, if not non-existent. However, the similarity between the treatment and control groups is not so clear due to the low number of unaffected municipalities, many of which are located within larger urban areas, see Figure 1. To address this potential issue, we follow Abadie (2021) and Arkhangelsky et al. (2021) and apply synthetic controls techniques to maximize the similarity between the treatment and control groups. These methods produce a single synthetic control from a unique convex weighting of comparable control municipalities. This ensures that the synthetic control is closely matched to the treated municipalities in their pre-treatment outcomes. These weights remain constant over time, potentially assigning no weight to specific control units while allocating greater weights to others.[11] This is important because, by differencing the common trends in the outcome variable in the control group, we can eliminate common drivers and isolate the effects of the reform, specifically the loss of the town hall. The difference-in-differences framework is appropriate in our context because the reform led to only minor effects on the municipalities beyond those that accrued to the treatment area.

Another potential challenge is related to potential pre-trends. Although the reform was implemented in 2007, it had been announced as early as 2004. This design of the reform introduces a potential challenge to identification: the possibility of anticipation effects. We tackle this challenge by establishing suitable treatment windows and by

[11]The synthetic difference-in-differences estimator developed by Arkhangelsky et al. (2021) combines strengths from both the difference-in-differences method and synthetic controls methods. For more details see Arkhangelsky et al. (2021).

estimating a dynamic difference-in-difference model in which the treatment effects are estimated year-by-year. We focus on 10 years before and 10 years after the reform.

In 2008, Denmark experienced a substantial financial crisis triggered by the global economic downturn of 2007-2008 (Jensen and Johannesen, 2017). During this period, the country faced economic and financial challenges. Employment declined, and GDP growth significantly slowed down. Additionally, property values dropped in 2009 due to weakened demand and a slow housing market.[12] The impact on Denmark was less severe than in some other countries, but the crisis could potentially interfere with the municipality mergers. In our empirical models, we include year-fixed effects to address this challenge.

Formally, using the potential outcomes notation $y_{n,m,t}$, we have

$$y_{n,m,t} = \sum_{z \in \{\underline{z},\ldots,\overline{z}\} \setminus 0} \beta_z \mathbb{1}\left(z = t - E_n\right) + \mu_n + \eta_t + \varepsilon_{n,m,t}, \tag{1}$$

where $y_{n,m,t}$ represents the outcome for a neighborhood n in municipality m, observed in year t, E_n is the year in which municipal mergers take place (2007), μ_n are neighborhood fixed effects, η_t are year fixed effects, and $\varepsilon_{n,m,t}$ is the error term. The key coefficients of interest are β_z, which corresponds to the treatment effect. We examine various outcomes. These include the number of jobs, the number of full-time job equivalents in public administration, the average wage, the average commuting distance, the relocation distance, and the housing price.[13]

We also study alternative treatment definitions in which the control group consists of neighboring municipalities that were less impacted, thus retaining their town halls. Consequently, the control group includes municipalities that, despite merging with neighboring municipalities, managed to keep their town halls. This ensures a high degree of similarity between the treatment and control groups. However, it's important to note that the reform's impact on the control group is likely significant, as these municipalities not only retained their town halls but also likely experienced administration growth. We also perform a *placebo* test to verify the parallel trend assumption. Finally, we have also estimated simple difference-in-differences models, wherein the treatment group consists of municipalities that underwent the loss of their town hall, while the control group includes all other municipalities. To address potential endogeneity concerns, we instrumented the probability of a municipality loosing its town hall.

[12] See table EJ6 in DST statbank: https://statistikbanken.dk/EJ6. It shows the price index for sales property (2006=100) by category of real property and unit.

[13] We expect general equilibrium effects on the outcomes from the reform to be small in our setting. These effects would bias down our estimates, making our conclusions conservative.

5 Empirical Results

This section presents the estimation results. In Section 5.1 we focus on the econometric results of a dynamic difference-in-difference model for various outcomes based on equation (1). The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes those municipalities that remained unaffected, see Figure 1. We use the synthetic difference-in-differences estimator proposed by Arkhangelsky et al. (2021) to maximize the similarity between the treatment and control groups. We begin with the impact of municipal mergers on the provision of local public goods and the local labor market. Subsequently, we explore the effects of municipal mergers on residential mobility and housing prices. Section 5.2 presents the robustness checks. Finally, in Section 5.3, we discuss the implications of municipal mergers on the urbanisation process.

5.1 The Impact of Municipal Mergers

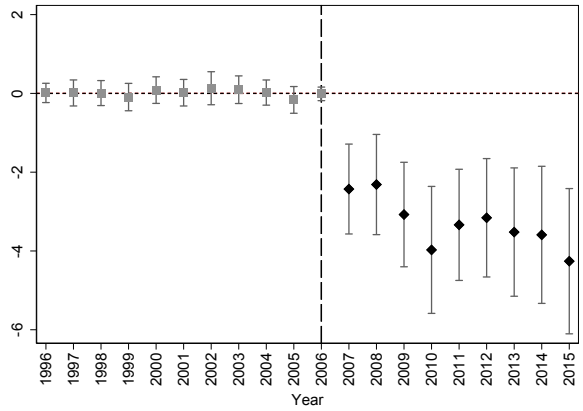
We first investigate in Figure 4 whether the loss of the town hall leads to a reduction in the size of the administrative staff.[14] We would expect that to happen if the administration moves or if economies of scale implying that certain services can be eliminated due to duplication in which case neighborhoods in municipalities that lose the town hall should see a decrease in administrative staff (Blesse and Baskaran, 2016). Figure 4a compares the number of full-time equivalents in neighborhoods within municipalities that lost the town hall with those in unaffected neighborhoods. As expected, we find an immediate decline in the number of full-time equivalents in the administrative staff following the reform. On average, the affected neighborhoods experience a decrease of 3 full-time equivalents in the administrative staff compared to unaffected neighborhoods. This corresponds to an average reduction of 52% over the nine-year post-treatment period, see Table B.1 in Appendix B.[15] Finally, Figure 4a shows that this decrease remains consistent throughout the nine years following the reform. Therefore, the results confirm that the reform in neighborhoods within municipalities that lost the town hall led to a significant reduction in the administrative staff, i.e. the loss of local public administration.

Figure 4 also reveals that the loss of the town hall, and consequently local public administration, had a significant impact on local public goods. Initially, the municipal

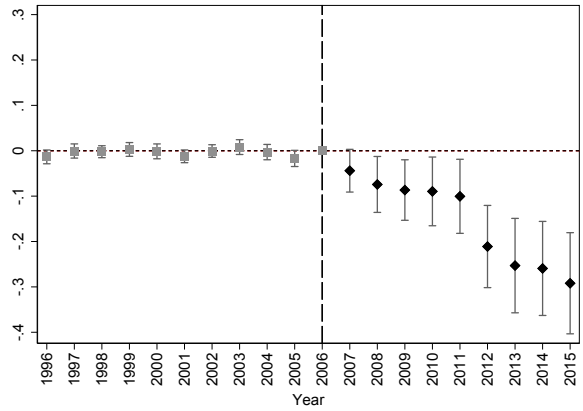
[14] Administrative staff includes general public services, administration within healthcare, teaching, culture and social conditions except social security, and administration of and contribution to business promotion.

[15] The mean number of full-time equivalents for public administration in the treated areas is 6.30, see Table 1. The impact of municipal mergers on the FTEs of the administrative staff over the nine-year post-treatment period is -3.295, see model (1) in panel (a) of Table B.1 in Appendix B. The average reduction is 52% ($-3.295/6.30$).

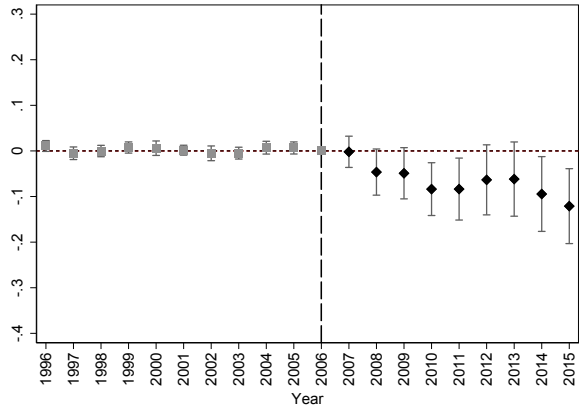
Figure 4. The impact of municipal mergers on administrative staff, teachers, and doctors



(a) FTEs of administrative staff



(b) FTEs in primary and high schools (in logs)



(c) FTEs of doctors (in logs)

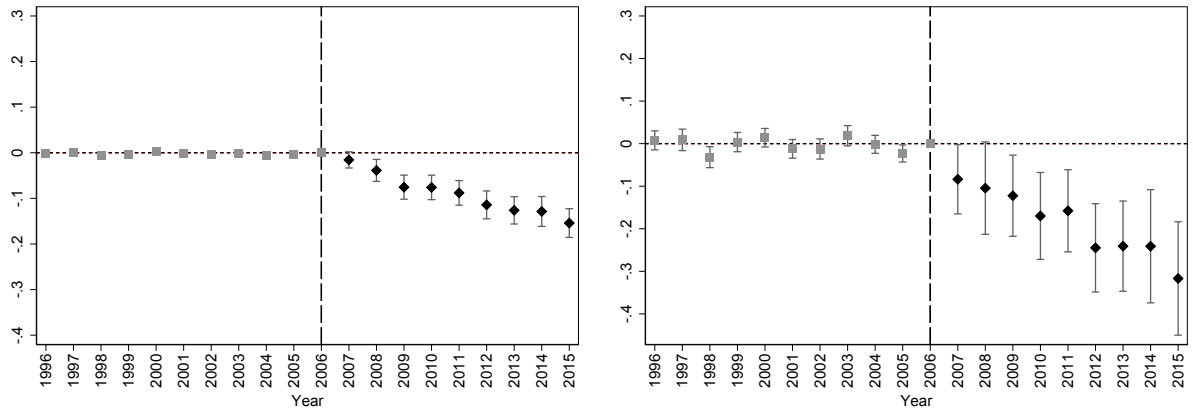
Notes: The number of observations is 111,860. The sample includes 2,187 treated and 3,410 unaffected neighborhoods. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes those municipalities that remained unaffected. FTE is Full-Time job Equivalents. The vertical lines indicate 95 percent confidence intervals.

mergers had a significant negative effect on primary and high schools in the treated neighborhoods. As Figure 4b shows, schools in these neighborhoods experienced a significant drop in their staff just two years after the change. This decline grew larger and remained statistically significant throughout the post-treatment period, with the average treatment effect corresponding to an average reduction of 17% ($exp(0.157) - 1$), see Table B.1 in Appendix B. Figure 4c shows also a decline in the number of full-time equivalents of doctors in treated neighborhoods following the municipal mergers. However, this negative trend is statistically insignificant. In summary, these findings suggest that neighborhoods within municipalities that lost their town hall experienced a substantial long-term decline in primary and high school staff, alongside a marginal reduction in the number of doctors.

Figure 5 shows the impact of municipal mergers on various labor market outcomes.

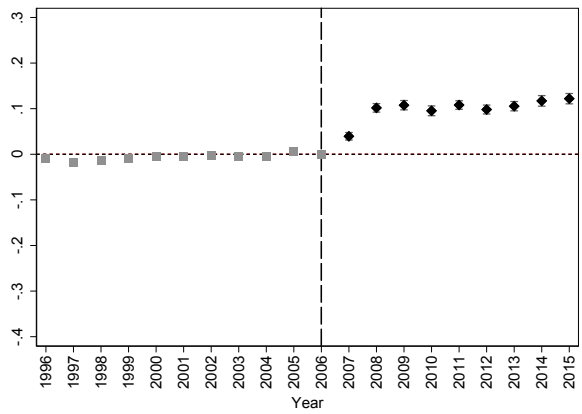
We focus here on employed individuals aged 16-66 years. Figure 5a and Figure 5b show a clear decline in the number of employed individuals in general as well as in the number of employed individuals in the public sector. The average treatment effect is 10% $(exp(0.091)-1)$ and 21% $(exp(0.187)-1)$ percent respectively during the post-treatment period of nine years, see Table B.1 in Appendix B. The latter result reveals the significant and larger impact of the municipal mergers on the public sector. Finally, the two figures show a steady decline after the reform.

Figure 5. The municipal mergers and the local labor markets

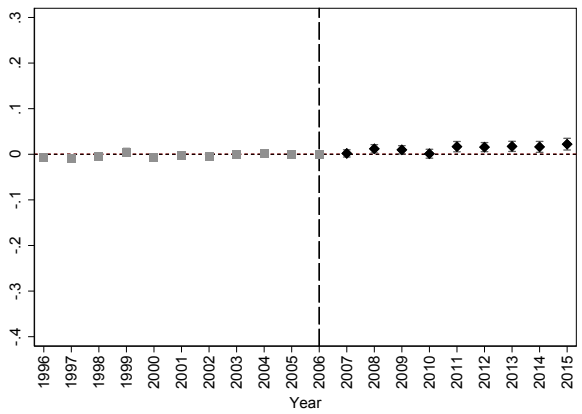


(a) No. employed (in logs)

(b) No. employed in the public sector (in logs)



(c) Commuting distance (in logs)



(d) Wages (in logs)

Notes: The number of observations is 109,480. The sample includes 2,187 treated and 3,410 unaffected neighborhoods The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes those municipalities that remained unaffected. The vertical lines indicate 95 percent confidence intervals.

Residents in neighborhoods belonging to municipalities that lost their town hall experienced a significant drop in the number of available jobs, and could therefore be more constrained to find suitable employment locally after the municipality mergers. Consequently, they might increase their job search radius and thereby increase their commuting

distance. We therefore also investigate the impact of the reform on commuting distance. Commuting distance refers to the distance between the centroids of the neighborhood of residence and that of the workplace. Figure 5c shows that workers in treated neighborhoods increased the commuting distance after the reform compared to the control group. The average increase during the post-treatment period is 10% ($exp(0.097) - 1$), see Table B.1 in Appendix B. Furthermore, Figure 5c shows a steady increase during the first two years after the reform was implemented, which remains relatively stable in the following years. In addition, we examine the evolution of the average wage among workers in neighborhoods belonging to municipalities that lost their town hall. We find a mild increase of 1% ($exp(0.013) - 1$) in wages during the post-treatment period, see Figure 5d and Table B.1 in Appendix B. This is in line with the literature that shows that workers who now compute longer are compensated with higher wages (Manning, 2003b,a). For example, using data for Denmark, Mulalic et al. (2016) shows that employees who face longer commutes receive a small wage increase.

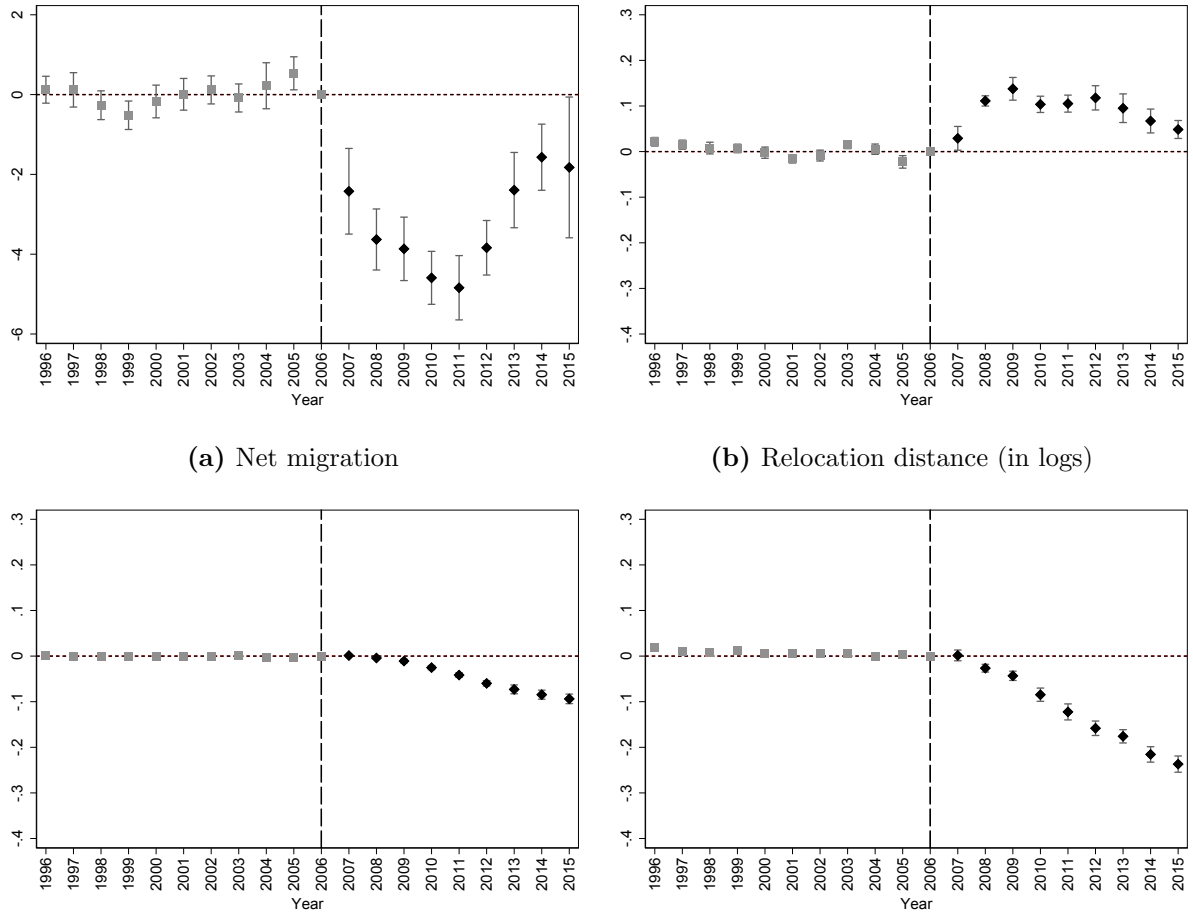
Next, we also investigate how neighborhood mobility is affected by the municipal mergers. This is important because urban economic literature shows that the quality of neighborhood amenities influences the relocation decision and the residential location choice of households (Bayer et al., 2007; Caetano, 2019). Furthermore, Hybel and Mulalic (2022) shows that in Denmark, households are attracted to areas with more amenities.

To explore neighborhood mobility, we rely on two measures, net migration, and relocation distance, see Figure 6. Net migration is the difference between the inflow of individuals aged 16-66 years and the outflow of individuals belonging to the same age group in the neighborhood. Consequently, a negative net migration indicates that more individuals move away from the neighborhood than move to. Figure 6a shows that neighborhoods in municipalities losing the town hall experienced a negative net migration throughout the whole post-reform period. Since net migration is in absolute numbers, the results indicate that on average 3 more individuals move away compared to the number of individuals moving to the neighborhoods. This corresponds to 0.7% of the neighborhood population.[16] Second, we measure relocation distance as the travel distance between the centroids of origin and destination neighborhoods. Figure 6b suggests that movers from neighborhoods belonging to municipalities that lost their town hall move longer away from their neighborhood of origin after the reform compared to movers from neighborhoods unaffected by the reform. The average increase corresponds to 10% ($exp(0.157) - 1$) for the whole post-reform period, see Table B.1 in Appendix B. Moreover, Figure 6c and Figure 6d show a clear decline in the working age population

[16]The average number of residents aged 16-66 years in treated neighborhoods was 408 in 2004, the year prior to the national parliament's approval of the municipal merger reform.

(the number of residents aged 16-66) as well as in the number of children. The average treatment effect is 4% ($exp(0.044) - 1$) and 13% ($exp(0.118) - 1$) percent respectively during a nine-year period after the reform, see Table B.1 in Appendix B. Finally, the two figures show a steady decline during the post-treatment period of nine years. While the number of children already starts to decline one year after the reform, the decline in the working-age population appears first after 3 years.

Figure 6. The impact of the municipal mergers on residential mobility



(a) Net migration

(b) Relocation distance (in logs)

(c) No residents aged 16-66 years (in logs)

(d) No. children aged below 16 (in logs)

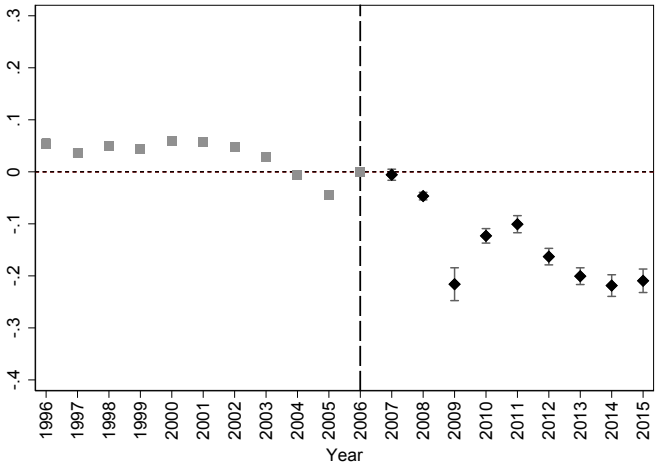
Notes: The number of observations is 111,860. The sample includes 2,187 treated and 3,410 unaffected neighborhoods. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes those municipalities that remained unaffected. The vertical lines indicate 95 percent confidence intervals.

Finally, the economic literature has shown how house prices reflect the overall quality of a neighborhood.[17] Therefore, investigating the impact of the municipal mergers on

[17]For example, several studies have shown how house prices capture the overall quality of a neighborhood in terms of school quality (Bayer et al., 2007; Caetano, 2019; Cheshire and Sheppard, 2004), crime (Gibbons and Machin, 2008), and transportation (Gibbons and Machin, 2008).

house prices provides insight into the overall changes in neighborhood quality due to the municipal mergers. For this analysis, we use a House Price Index described in Section 3. First, Figure 7 shows that house prices in treatment neighborhoods were significantly higher in the pre-reform period compared to those in control neighborhoods. Second, there is a significant drop in house prices beginning two years after the reform, and this decrease persists throughout the rest of the post-reform period. The average decline for the whole post-reform period is 16% $(exp(0.150)-1)$. This confirms our finding regarding the negative impact of the municipal mergers on local public goods and amenities, as well as the observed emigration of households from neighborhoods belonging to municipalities that lost their town hall.

Figure 7. The impact of the municipal mergers on house prices



Notes: The number of observations is 111,860. The sample includes 2,187 treated and 3,410 unaffected neighborhoods. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes those municipalities that remained unaffected. The vertical lines indicate 95 percent confidence intervals.

To conclude this section, we report the results of exploring the weights applied by the synthetic controls technique in Appendix B. We followed Arkhangelsky et al. (2021) and applied synthetic controls techniques to maximize the similarity between the treatment and control groups. This method generates a synthetic control by weighting comparable control municipalities. Although these weights remain consistent over time, they are estimated individually for each considered model, potentially resulting in variations between models. Consequently, the composition of the control group may differ across various models.

Figure B.1 in Appendix B illustrates the ranking of municipalities based on the aggregated weights across various models. Notably, the estimated weights exhibit a remarkable

degree of similarity across different models. For instance, as shown in Figure B.1a, regardless of the model in Figure 4, municipalities in major urban centers such as Copenhagen, Frederiksberg, Aarhus, and Odense consistently occupy top positions within the ranking. This is unsurprising given that these densely populated municipalities includes a large number of heterogeneous neighborhoods, many of which may be similar to the treated neighborhoods. Furthermore, the ranking of municipalities remains notably consistent across all models presented in Figure 4 – Figure 6, see Figure B.1a, Figure B.1b and Figure B.1c. Although there are few examples where models concerning commuting distance and the number of children exhibit slight disparities in their weighting schemes, the overall pattern remains remarkably similar. However, there is an exception observed in the estimated weights for the housing prices model, see Figure B.1d. These findings suggest that the control groups across various models exhibit a high degree of similarity. While the weights estimated for other models demonstrate considerable uniformity, those for the housing price model show slight variations. In this case, municipalities outside the major urban centers such as Fredericia, Morsø, and Odder ascend to the top 5 ranks. This divergence can be attributed to the substantially higher housing prices prevalent in the Copenhagen metropolitan area compared to the rest of the country.

5.2 Robustness Checks

We now provide robustness checks of these results. We first focus on the control group selection. Then we report the results of a simple placebo test. Finally, we present the results of simple difference-in-differences models. In these models, the treatment group consists of municipalities that lost their town hall, while the control group comprises all other municipalities. Additionally, we instrument the probability of town hall retention.

In our study, we select municipalities that remained unaffected by the municipality mergers as our control group. This selection strategy minimizes the impact of the reform on the control group. However, due to the small sample size, the similarity between the treatment and control groups may not be immediately evident. We therefore explore an alternative definition of treatment where the control group consists of neighboring municipalities that retained their town halls. This ensures the comparability between the treatment and control groups. It is however important to note that the reform's influence on this control group could be significant.

The results are presented in Figure B.2 through Figure B.5 in Appendix B. The estimated impacts of the municipal mergers appear to be essentially identical. However, the estimated effects are generally slightly lower in absolute terms, as shown by the results for FTEs in public administration, the working-age population, the number of children

below 16, net migration, and commuting distance. Furthermore, Figure B.5 shows that now house prices in treated neighborhoods are not significantly different in the pre-reform period compared to those in control neighborhoods. Additionally, we now find a gradual and persistent decrease in house prices beginning the year following the reform. These findings suggest that both approaches yield consistent results.

When exploring the impact of municipal mergers using the difference-in-differen-ces methodology, one significant challenge is the omitted variable problem. This issue arises when unobserved factors have a significant impact on the observations. We use a placebo test to address this issue. We artificially set the year of municipal merger implementation to be 10 years earlier than the actual implementation year, specifically to 1997. If we still observe a significant impact of the municipal mergers on the FTEs of administrative staff in neighborhoods that experienced a loss of their town hall, it suggests the presence of other unanticipated factors affecting public administration. However, if no significant impact is estimated, we can argue that the baseline regression results are robust.

The results of the placebo test are presented in Figure B.6 in Appendix B. The figure shows that the treatment effect becomes statistically insignificant when we artificially set the implementation year of the municipal mergers to 10 years earlier. This allows us to conclude that the omitted variable problem is marginal. Therefore, it can be concluded that the loss of local public administration does have a significant impact on neighborhood mobility and the local economic environment.

Finally, we use difference-in-differences models to estimate the impact of town hall loss where the treatment group consists of municipalities that lost their town hall, while the control group comprises others. To address potential endogeneity concerns, we instrument the probability of town hall loss using the number of municipal council members. In Denmark, municipal council members are elected representatives serving on local councils. They are elected through local elections and are tasked with decision-making on various local issues. Municipalities with fewer councilors were more likely to lose their town halls. More importantly, there is no evidence to suggest that the number of councilors is influenced by local economic conditions in the short term. Therefore, we use the number of municipal council members as an instrument the probability of town hall loss.

The results of the estimation are presented in Table B.2 in Appendix B. Across all specifications, the instrument is very strong with high F-values and has the expected negative sign. The estimated impacts of the municipal mergers closely resemble those of the other provided estimation results. In cases where the estimated effects diverge, being either lower in absolute terms (as observed for FTEs of administrative staff, FTEs of doctors, and the number employed in the public sector) or lower in absolute terms (as seen with commuting distance and net migration), the differences are minimal. Only for

the model for relocation distance, the estimated effect is now not significantly different from zero. These supplementary findings reinforce the claim of the robustness of the estimation results.

5.3 Urbanisation

The primary motivation behind municipal mergers in Denmark lies in capitalizing on economies of scale for the provision of local public goods. The municipal mergers are however not only linked to administrative restructuring but also closely tied to the phenomenon of urbanization (Askim et al., 2016).

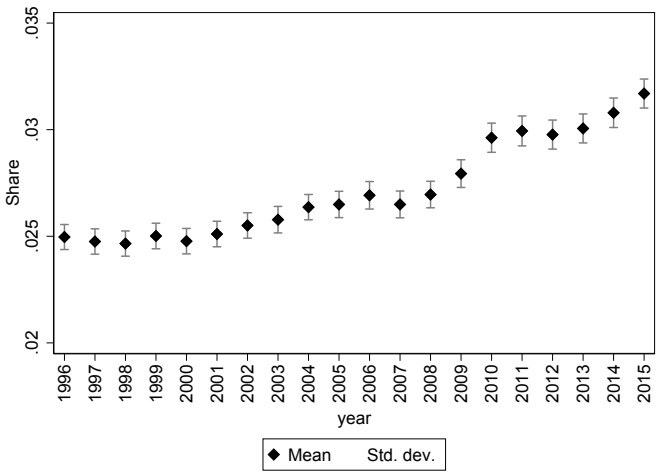
According to Henderson et al. (2003), urbanization typically arises from exogenous forces, such as technological advancements favoring urban areas or shifts in trade dynamics that benefit urban sectors.[18] Additionally, urbanization is significantly affected by policy decisions and political actions (Davis and Henderson, 2003). This phenomenon is further associated with the disparities in incomes and living standards between urban and rural regions (Young, 2013). While urbanization is often considered the engine of growth (Bertinelli and Black, 2004), the Danish government has proactively implemented various policy reforms aimed at mitigating or reversing the ongoing urbanization process.

Our empirical findings indicate that municipal mergers, albeit unintentionally, may contribute to the urbanization process in Denmark. Specifically, neighborhoods that lost their town hall experienced a negative net migration, while residents from neighborhoods within municipalities that also lost their town hall tended to relocate farther away from their original neighborhoods after the reform. In contrast, movers from unaffected neighborhoods showed no significant change in their relocation behavior. Furthermore, we observed a reduction in the provision of local public goods. This reduction can be attributed, in part, to the loss of local public administration. However, it is also likely linked to a diminishing client base for public services, resulting in efficiency losses due to reverse economies of scale (Askim et al., 2016). Additionally, the extended commuting distances observed among workers residing in neighborhoods that lost their town halls could be a mechanism, potentially substituting for urban migration. Ultimately, this suggests to consider the broader question of global movement toward urban areas (urbanization) in response to the municipal mergers.

[18] Urbanization occurs as technological advancements in domestic agriculture free up labor, prompting migration to cities (Henderson et al., 2003). The economic literature offers various explanations for urbanization, e.g. investments in inter-regional infrastructure and increasing democratization and fiscal decentralization (Davis and Henderson, 2003), differences in initial agricultural employment across population densities, combined with structural changes (Michaels et al., 2012), and even the introduction of the potato (Nunn and Qian, 2011). Additionally, governments can restrict residential mobility. For instance, former planned economies discourage rural-urban migration (Fallenbuchl, 1977).

To answer this question, we investigate if the loss of a town hall triggers a shift to urban areas, specifically referring to the four largest cities in Denmark, namely Copenhagen, Aarhus, Odense and Aalborg. We compare these cases with a control group composed of neighboring municipalities that have maintained their town halls.

Figure 8. The share of individuals relocating from municipalities that lost their town halls to those that have maintained their town halls



Notes: The sample includes 2,187 treated neighborhoods. The vertical lines indicate std. dev.

We do not find empirical evidence that the closure of a town hall leads to households moving to larger urban areas, see Figure B.7 in Appendix B.[19] The figure suggests that the loss of the town hall does not contribute to the urbanization to the largest four cities in Denmark. However, residents from neighborhoods within municipalities that lost their town halls tend to relocate farther away from their original neighborhoods after the reform, see Figure 6b. Descriptive evidence, as shown in Figure 8, suggests that the share of individuals relocating from municipalities that lost their town halls to those that have maintained them is increasing after the reform from 2.5% in 2006 to about 3.2% ten years later. This increase was particularly pronounced a few years after the reform. In conclusion, while the loss of local public administration did not significantly induce households to move to larger urban areas, it did lead to households relocating to local urban centers.

[19]The figure shows the impact of the municipal mergers on the share of individuals relocating from municipalities that lost their town halls to the four largest cities in Denmark. We have also tried to estimate models using various outcome variables, including the number of individuals relocating to larger urban areas (in logs), the share of individuals relocating to larger urban areas, and the share of movers relocating to larger urban areas. The result remains consistent.

6 Conclusion

This paper investigates the impact of municipal mergers on the dynamics of neighborhood mobility and the availability of local public goods and amenities. We exploit a major reform of the Danish local government system in 2007, where 239 municipalities were merged into 66, while 32 remained unchanged. In particular, only one municipality within each newly formed entity retained its town hall as the primary administrative unit, leading to the loss of town halls in the remaining municipalities.

Utilizing comprehensive neighborhood-level data from Denmark between 1996 and 2015 combined with the difference-in-differences methodology, we compare neighborhoods in municipalities that underwent a loss of their town hall with those that remained unaffected by the municipal mergers. Overall, we find that neighborhoods that lost their town hall, which we interpret as a loss of local public administration, experienced a decrease in the population, negative net migration, and a significant reduction in the provision of public goods and job availability. These changes also resulted in lower housing prices and increased commuting distances and wages for workers in treated neighborhoods. Our results are robust to several specifications where we change the control group, as well as placebo tests. Consequently, our results suggest that municipal mergers aiming to take advantage of economies of scale in public service provision and to slow down urbanization induces unintended negative consequences for locally provided public goods, as well as the demographic and socioeconomic residential composition of the neighborhood. The closure of the town hall has significant negative consequences for residents.

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A Additional Data Descriptives

Figure A.1. New municipalities in Denmark

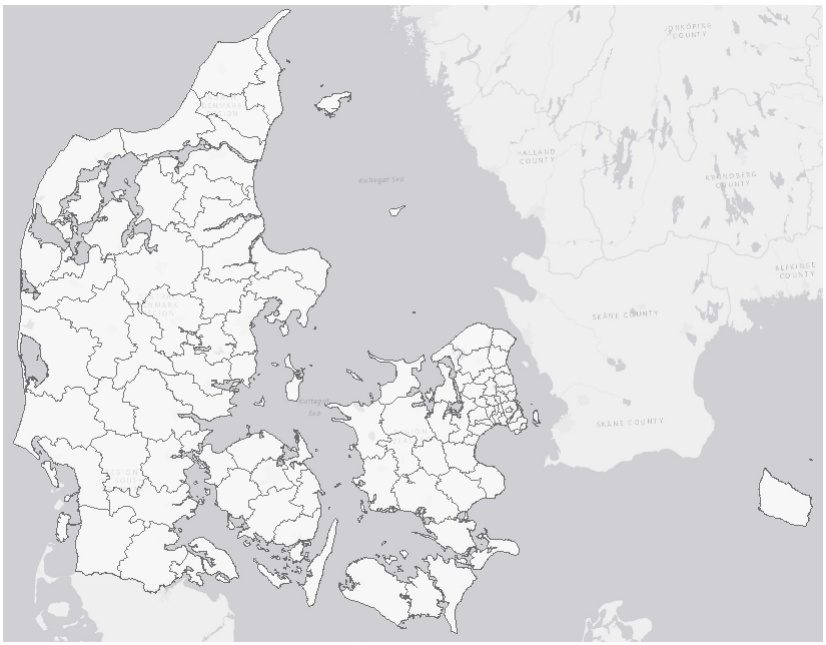
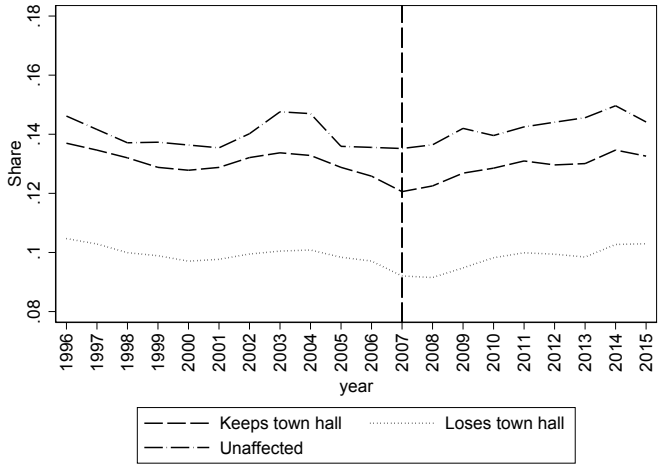


Table A.1. Timeline for the municipal merger process

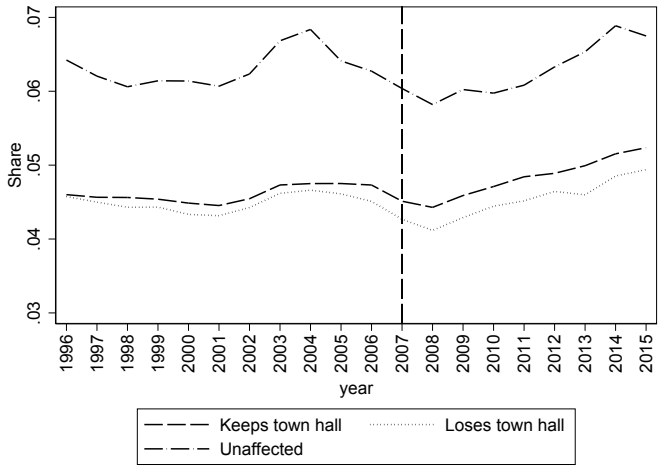
When	What
October, 2002	Formation of Structural Commission
January, 2004	Commission's recommendations
April, 2004	The Commission's report is sent to hearing in the Parliament
May-June, 2004	Negotiations between the government and its coalition partners
June, 2004	Signing of a political agreement
June, 2005	The legislative package is passed in the Parliament
2005-2006	Local preparations
January, 2007	The reform comes into effect

Figure A.2. Share of movers cross neighborhood border



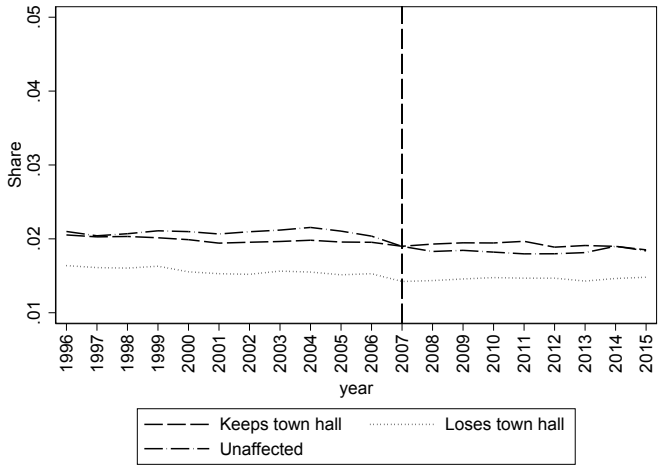
Notes: The vertical line indicates the year when the reform comes into effect.

Figure A.3. Share of movers cross municipality border



Notes: The vertical line indicates the year when the reform comes into effect.

Figure A.4. Share of movers cross region border



Notes: The vertical line indicates the year when the reform comes into effect.

B Additional Estimation Results

Table B.1. Average treatment effect of the municipal mergers, synthetic controls

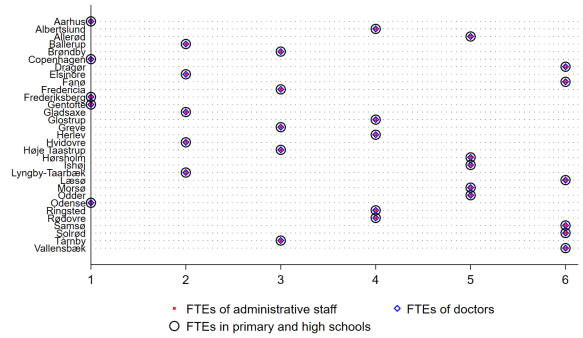
	(a) Administrative staff, teachers, and doctors		
	(1) Admin staff	(2) Primary and high school	(3) Doctors
Municipal amalgamation	-3.295***	-0.157***	-0.067
	(1.272)	(0.042)	(0.042)
Neighborhood FE	yes	yes	yes
Year FE	yes	yes	yes
R^2			
Observations	111,860	111,860	111,860

	(b) Local labor markets			
	(1) No. employed (in logs)	(2) No. employed in the public sector (in logs)	(3) Commuting dist. (in logs)	(4) Wages (in logs)
Municipal amalgamation	-0.091***	-0.187***	0.097**	0.013**
	(0.018)	(0.059)	(0.008)	(0.005)
Neighborhood FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
R^2				
Observations	109,480	109,480	109,480	109,480

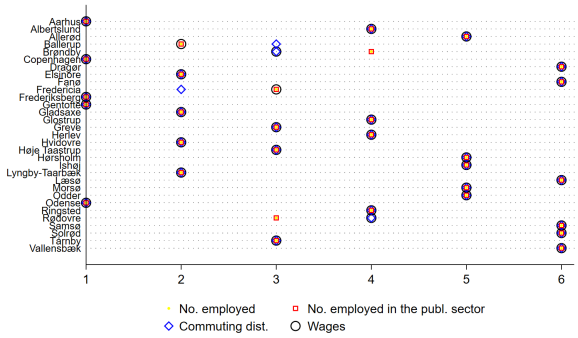
	(c) Residential mobility and population			
	(1) Net migration	(2) Relocation distance (in logs)	(3) No. residents aged 16-66 years (in logs)	(4) No. children aged below 16 (in logs)
Municipal amalgamation	-3.220***	0.092***	-0.044***	-0.118***
	(0.342)	(0.011)	(0.004)	(0.008)
Neighborhood FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
R^2				
Observations	111,860	111,860	111,860	111,860

Notes: This table presents results for a simple difference in differences model in which we regress the outcomes on the indicator for treated areas after the municipal merger reform, $y_{n,m,t} = \beta T_{m,t} + \mu_n + \eta_t + \varepsilon_{n,m,t}$, where $y_{n,m,t}$ represents the outcome for a neighborhood n in municipality m, observed in year t, $T_{m,t}$ is an indicator for treated neighborhoods that equals 1 if the neighborhood is located in the treated municipality after the municipal merger reform was implemented, μ_n are neighborhood fixed effects, η_t are year fixed effects, and $\varepsilon_{n,m,t}$ is the error term. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes those municipalities that remained unaffected. * p<0.10, ** p<0.05, *** p<0.01.

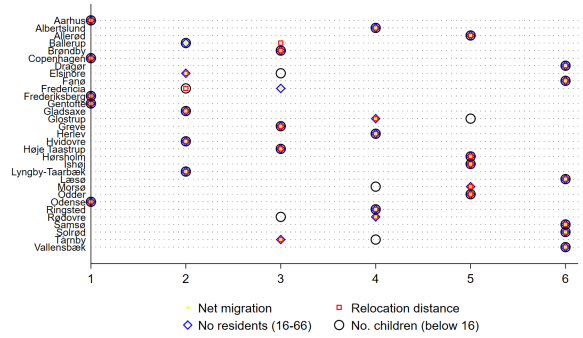
Figure B.1. The ranking of municipalities based on the aggregated weights for the synthetic controls for different models



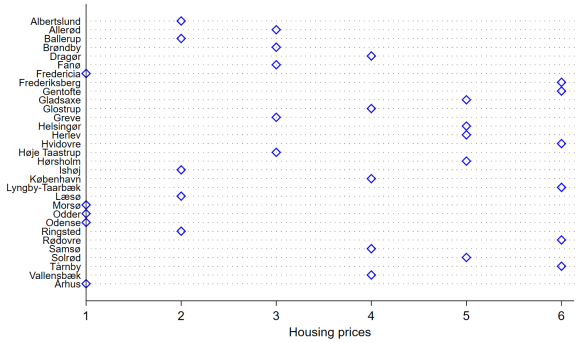
(a) Ranking for models in Figure 4



(b) Ranking for models in Figure 5



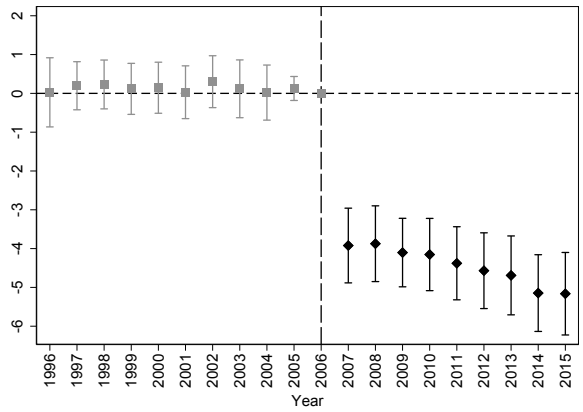
(c) Ranking for models in Figure 6



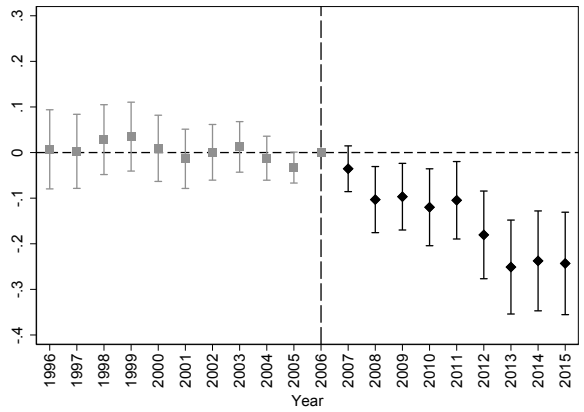
(d) Ranking for model in Figure 7

Notes: This figure illustrates the ranking of municipalities based on the aggregated weights (for neighborhoods within these municipalities) across various models. The labels on x-axis represent: 1: rank 1-5, 2: rank 6-10, 3: rank 11-15, 4: rank 16-20, 5: rank 21-25, and 6: rank 26-31.

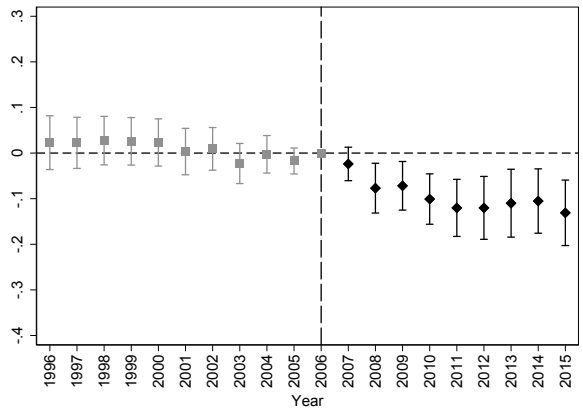
Figure B.2. The impact of municipal mergers on administrative staff, teachers, and doctors, alternative control group



(a) FTEs of administrative staff



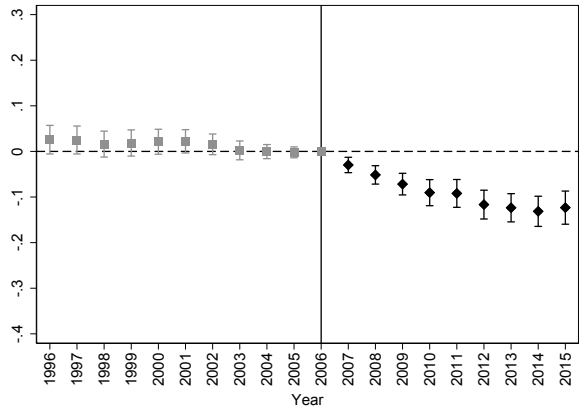
(b) FTEs in primary and high schools (in logs)



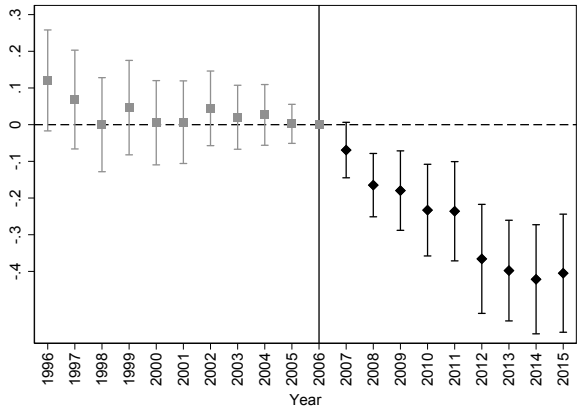
(c) FTEs of doctors (in logs)

Notes: The number of observations is 111,860. The sample includes 2,187 treated and 2,933 neighborhoods in municipalities that keep town hall. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes neighboring municipalities that retained their town halls. FTE is Full-Time job Equivalents. The vertical lines indicate 95 percent confidence intervals.

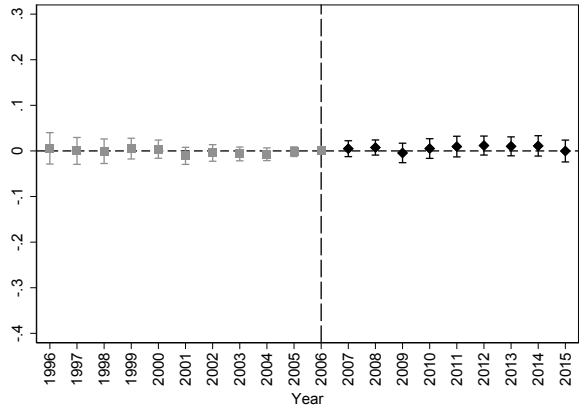
Figure B.3. The municipal mergers and the local labour markets, alternative control group



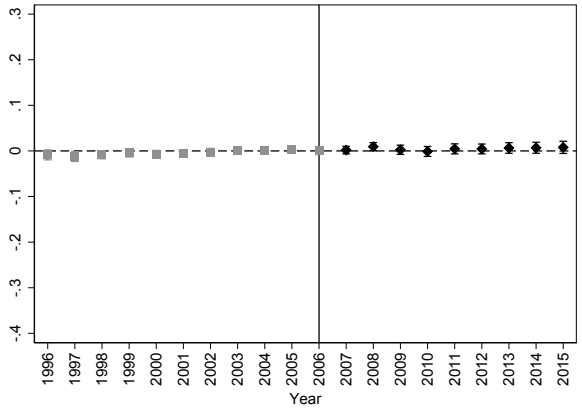
(a) No. employed (in logs)



(b) No. employed in the public sector (in logs)



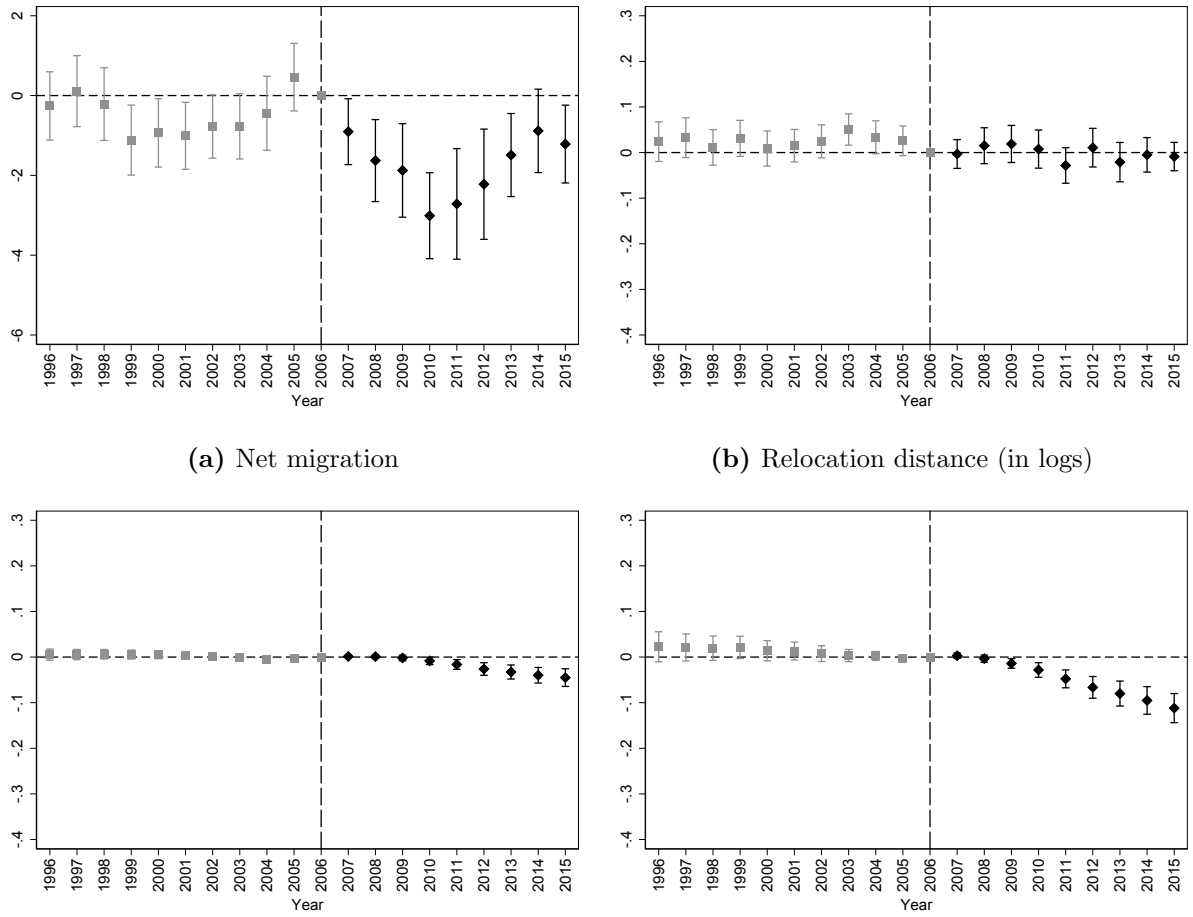
(c) Commuting distance (in logs)



(d) Wages (in logs)

Notes: The number of observations is 109,480. The sample includes 2,187 treated and 2,933 neighborhoods in municipalities that keep town hall. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes neighboring municipalities that retained their town halls. The vertical lines indicate 95 percent confidence intervals. .

Figure B.4. The impact of the municipal mergers on residential mobility, alternative control group



(a) Net migration

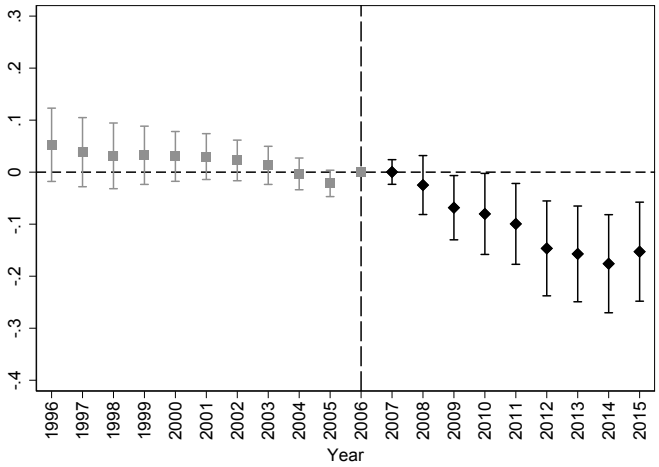
(b) Relocation distance (in logs)

(c) No. residents aged 16-66 years (in logs)

(d) No. children aged below 16 (in logs)

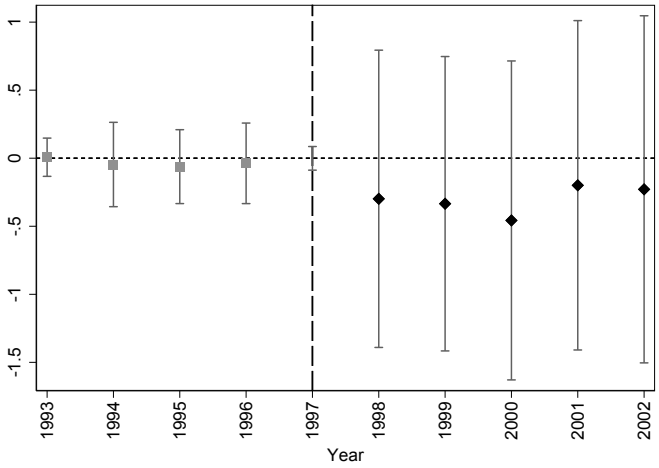
Notes: The number of observations is 111,860. The sample includes 2,187 treated and 2,933 neighborhoods in municipalities that keep town hall. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes neighboring municipalities that retained their town halls. The vertical lines indicate 95 percent confidence intervals.

Figure B.5. The impact of the municipal mergers on house prices, alternative control group



Notes: The sample includes 2,187 treated and 2,933 neighborhood in municipalities that keep town hall. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes neighboring municipalities that retained their town halls. The vertical lines indicate 95 percent confidence intervals.

Figure B.6. Placebo test for FTEs of administrative staff,



Notes: The number of observations is 111,860. The sample includes 2,187 treated and 2,933 neighborhood in municipalities that keep town hall. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes neighboring municipalities that retained their town halls. FTE is Full-Time job Equivalents. The vertical lines indicate 95 percent confidence intervals.

Table B.2. Average treatment effect of the municipal mergers for all municipalities, IV

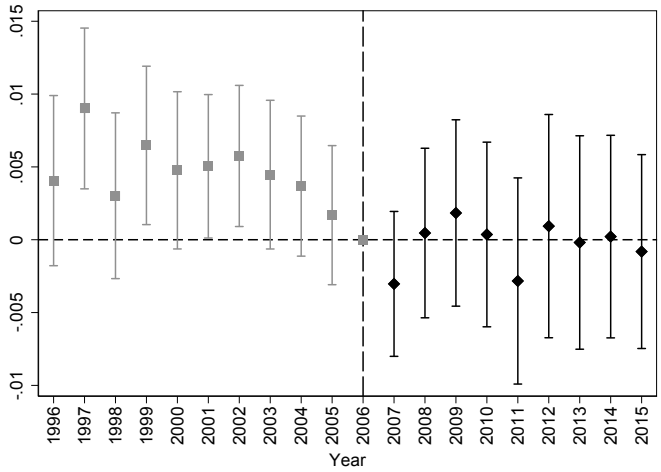
	(a) Administrative staff, teachers, and doctors		
	(1) Admin staff	(2) Primary and high school	(3) Doctors
Municipal amalgamation	-4.654***	-0.153***	-0.108***
	(0.283)	(0.014)	(0.0115)
First stage results			
No municipal council members	-0.042***	-0.042***	-0.042***
	(0.0001)	(0.0001)	(0.0001)
F-statistic for IV	710,534	710,534	710,534
Neighborhood FE	yes	yes	yes
Year FE	yes	yes	yes
Observations	170,640	170,640	170,640

	(b) Local labor markets			
	(1) No. employed (in logs)	(2) No. employed in the public sector (in logs)	(3) Commuting dist. (in logs)	(4) Wages (in logs)
Municipal amalgamation	-0.096***	-0.282***	0.027*****	0.009***
	(0.005)	(0.019)	(0.002)	(0.002)
First stage results				
No. municipal council members	-0.042***	-0.042***	-0.042***	-0.042***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
F-statistic for IV	703,548	703,548	703,548	703,548
Neighborhood FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Observations	165,980	165,980	165,980	165,980

	(c) Residential mobility and population			
	(1) Net migration	(2) Relocation distance (in logs)	(3) No. residents aged 16-66 years (in logs)	(4) No. children aged below 16 (in logs)
Municipal amalgamation	-1.449***	-0.008	-0.025***	-0.080***
	(0.174)	(0.006)	(0.001)	(0.003)
First stage results				
No. municipal council members	-0.042***	-0.042***	-0.042***	-0.042***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
F-statistic for IV	710,534	710,534	710,534	710,534
Neighborhood FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Observations	170,640	170,640	170,640	170,640

Notes: This table presents results for a simple difference in differences model in which we regress the outcomes on the indicator for treated areas after the municipal merger reform, $y_{n,m,t} = \beta T_{m,t} + \mu_n + \eta_t + \varepsilon_{n,m,t}$, where $y_{n,m,t}$ represents the outcome for a neighborhood n in municipality m, observed in year t, $T_{m,t}$ is an indicator for treated neighborhoods that equals 1 if the neighborhood is located in the treated municipality after the municipal merger reform was implemented, μ_n are neighborhood fixed effects, η_t are year fixed effects, and $\varepsilon_{n,m,t}$ is the error term. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes others. The probability of town hall retention is instrumented with the number of municipal council members. * p<0.10, ** p<0.05, *** p<0.01.

Figure B.7. The impact of the municipal mergers on the share of individuals relocating from municipalities that lost their town halls to the four largest cities in Denmark.



Notes: The number of observations is 111,860. The four larges cities in Denmark Copenhagen, Aarhus, Odense and Aalborg. The sample includes 2,187 treated and 3,410 unaffected neighborhoods. The treatment group comprises all municipalities that experienced a loss of their town hall due to municipal mergers, while the control group includes those municipalities that remained unaffected. The vertical lines indicate 95 percent confidence intervals.