Effect of Municipal Mergers on Local Taxes in the Canton of Bern

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Abstract

Over the past decades, local governments all over the world have merged in the expectation of realising economies of scale to ensure the provision of municipal services and enhance administrative efficiency to reduce per capita costs. This study examines the impact of municipal mergers on local taxes in the canton of Bern between 2004 and 2024. Tax multipliers serve here as a proxy for per capita costs to analyse whether the completed mergers have led to economies of scale and, consequently, a reduction in municipal tax rates. To estimate the effects of mergers, the framework proposed by Callaway & Sant'Anna (2021) is applied, as it allows for an accurate measurement of average treatment effects in the presence of multiple periods and variation in treatment timing. The overall effect shows an average reduction in tax multipliers of 0.95 points, corresponding to a 5.4% decrease for merged municipalities. The decline is most pronounced in the first year following consolidation, with an average reduction of 0.12 multiplier points, equivalent to a 7% decrease. Furthermore, the results indicate that municipalities with a higher tax base and a smaller pre-merger population, which were dissolved after the merger, experienced a significant reduction in tax rates. Conversely, no significant reduction was found in municipalities with a below-average tax level and a larger population before the merger, which were not dissolved after the completed consolidation. However, it should be noted that tax levels are an integral part of merger negotiations, meaning that the observed effects may not be entirely causal, particularly as the affected municipal population must approve the merger. This thesis demonstrates that municipalities with certain characteristics can sustainably lower their tax multipliers following a merger. However, it also underscores the need for further research on costs, debt levels, and service provision to gain a more comprehensive understanding of the financial and operational consequences of municipal mergers. Nonetheless, the findings on tax levels offer some valuable insights for policymakers considering mergers to enhance municipal efficiency and service delivery.

Contents

List of Tables

List of Figures

1 Introduction

Municipal administrations face constant pressure to reform and evolve in response to challenges such as financial sustainability, maintaining and or expanding services, addressing staffing issues, meeting the changing needs and expectations of citizens, and fulfilling the demands of higher levels of government. Since the mid-century, countries around the world have increasingly merged local jurisdictions or fostered stronger inter-communal cooperation (Blom-Hansen et al., 2016). These efforts are seen in countries such as Japan (Nakazawa, 2013), Australia (Aulich et al., 2014), Germany (Roesel, 2017), the U.S. (Faulk & Hicks, 2011) and as well in smaller countries like the Netherlands (Allers & Geertsema, 2016), Israel (Reingewertz, 2012) and Switzerland (Steiner, 2003).

Municipal consoloditations are mainly being made to ensure the local governments deliver services efficiently in line with local needs. Furthermore, a merger can also be beneficial for regional planning. A larger, better-coordinated area can tackle geographic challenges more effectively. Trough mergers, municipalities can increase political influence, and boosting its economic growth (Fox & Gurley-Calvez, 2006). Also solving personnel problems, whether in administration or in filling executive positions, is often cited as a trigger for a merger (Steiner, 2003). In most cases, however, economic considerations are the dominant reason for initiating a merger process. It is hoped that the resulting economies of scale will enable municipal services to be provided more cost-effectively per resident (Reingewertz, 2012; Blom-Hansen et al., 2016).

By increasing the input factors of capital and labor, it is expected that the cost per unit of output can be reduced, while also leveraging the advantages of the larger scale to enhance the quality and variety of output. This approach originates from the theory of production processes in organizations, which

aims to improve efficiency and productivity. In the context of municipal mergers, it is anticipated that economies of scale and economies size will enable the provision of more cost-effective and broader services. If economies of scale are realized, the average cost per unit of service will decrease. These services may include local government functions such as sewage disposal and domestic water supply. Typically, capital-intensive activities are more scalable than labour-intensive ones. Size economies, unlike economies of scale, involve changing the ratio of input factors without necessarily increasing all inputs. As a result, total output can increase in a favourable proportion to the total input. In practice, however, these distinctions are often not emphasized and are generally grouped under the term economies of scale. Nonetheless, differentiating these concepts highlights the production process considerations underlying the discussions on more efficient service delivery by municipalities. Additionally, expanding the size of municipal administration can lead to economies of scope, allowing for the provision of additional services that individual municipalities would not be able to offer (Dollery & Fleming, 2006).

As a side effect of merger processes, the immediate costs incurred as well as the longer-term costs, like monitoring costs, due to the increase in size must always be taken into account (Nakazawa, 2013). As a negative consequence of municipal mergers, taxes can rise afterwards due to reduced inter-municipal fiscal competition (Charlot et al., 2015) and the democratic participation of municipal citizens can also decrease (Roesel, 2017). Critics of municipal mergers argue that the issues faced by small municipalities are not primarily due to their size but are linked to factors associated with being small. Merging small municipalities does not create a single, robust large municipality but rather a collection of communes with diverse interests and challenges. Instead, it is suggested to consider inter-communal cooperation rather than an amalgamation (Eichenberger, 2010).

In the canton of Bern, for these reasons, administrative, judicial and church districts, as well as numerous municipalities have been restructured over the past twenty years (Kanton Bern, 2010; 2024a). Due to the broad autonomy of Swiss municipalities, municipalities decide to merge by themselves, based on a democratic mandate from their electorate. This autonomy is also reflected in their authority to independently levy taxes to fund the activities of the local government (Ladner & Haus, 2021).

The aim of this thesis is to examine the economic argument regarding whether municipal mergers lead to economies of scale, based on mergers in the canton of Bern between 2004 and 2024. As mentioned, economies of scale should reduce costs per resident, which in turn is expected to have an effect on municipal tax rates. To analyze this, the changes and development of tax multipliers (tax rates) in municipalities following a merger are being measured and afterwards discussed. The scope of this work would be exceeded if the costs per capita and per municipality were to be calculated and analyzed. Therefore, tax multipliers are used as a proxy for costs per capita.

To estimate the average treatment effects on the treated (ATT) relative to pre-treatment trends, the approach proposed by Callaway & Sant'Anna (2021) is used. This method allows for the measurement of the ATT with staggered treatment timing, as municipal mergers occurred throughout the observed period. Traditionally, a Two-Way Fixed Effects (TWFE) estimator was often employed to measure such staggered effects, which uses a weighted sum of different treatment effects, potentially leading to biased estimates (Goodman-Bacon, 2021). The method by Callaway & Sant'Anna (2021), which avoids these known pitfalls, provides a clean estimation of the ATT's and allows for their aggregation to measure effects by group, calendar year, and event time.

However, it is important to note that the effect of mergers on tax rates is not entirely causal, as the level of the tax multiplier is always part of the merger negotiations. Therefore, successful mergers are not a random sample, and the effect of a merger is not exogenous. Nevertheless, the long-term observation of the tax rate development of merged municipalities compared to non-merged ones provides an important contribution to research on the economic arguments for consolidations. If a merger increases the efficiency of administrative service delivery, it would be reflected in a more optimal cost structure, which would, in turn, lead to lower tax rates. Furthermore, a differentiation of the treatment group reveals heterogeneous effects, which provide important insights into the characteristics of merging municipalities.

The thesis starts by explaining the Institutional Setting in which municipal mergers take place in Switzerland in general, and specifically in the canton of Bern, to provide a foundational understanding. This is followed by a comprehensive Literature Review on municipal mergers. Afterwards, the chapter Descriptive Statistics outlines the key characteristics of the dataset and presents important insights regarding the municipalities of Bern and the completed amalgamations. Before diving into the Results, the Estimation Strategy to achieve them is explained. The Results are then presented in depth in the following chapter. Finally, these findings are contextualised in the Discussion chapter.

2 Institutional Setting

2.1 *Municipalities*

In the Middle Ages, farmers, craftsmen, and traders banded together to form cooperatives in order to protect their interests and defend them against aristocratic rulers. In both urban and rural communities, only men with residency and property had the right to participate in governance. However, the foundations of the modern municipality, as we know it today, were established under French rule during the period of the Helvetic Republic (1798-1815) under Napoleon Bonaparte. During this time, communities evolved into administrative units, referred to as political municipalities, while the estates of the former municipalities, typically controlled by a small number of patrician families, were separated and reorganized into the Citizen's Community (Burgergemeinde) (Steiner & Ladner, 2013).

In Switzerland's three-tiered state structure, the political municipality represents the lowest level of public administration, positioned below the Confederation and the cantons, which are comparable to states in the US and Germany (Meyer, 2011). Unlike the Confederation and the cantons, however, municipalities are not sovereign entities; instead, they are subordinate to the cantons, which define their legal status and responsibilities within the respective cantonal constitutions. While the Federal Constitution includes an article (Art. 50) concerning municipal autonomy, it does not guarantee its existence. However, many but not all cantons have enshrined a guarantee of existence in their constitutions, protecting municipalities from being forcibly merged (Ladner & Haus, 2021). The municipal mergers analyzed in this study however were voluntary. The Constitution of the canton of Bern, for example, explicitly states in Article 108 that the cantonal parliament can order the merger of municipalities if overriding communal, regional, or cantonal interests necessitate it.

Swiss municipalities carry out both mandatory tasks assigned by the cantons and federal government, as well as tasks chosen autonomously based on voter preferences. The specific tasks assigned to municipalities, and the extent of their self-chosen duties, can vary from canton to canton and municipality to municipality. However, the following areas of responsibility are commonly assigned to municipalities: organization of their own administration, certain aspects of zoning and building law, construction of infrastructure such as sports facilities, provision of utilities like water supply and waste collection, as well as education and other social services (Fiechter, 2010). The fulfilment of these tasks involves of course some financial outlay.

In 2022, the municipalities in Switzerland are responsible of around 22% of total government expenditure, with the remainder being allocated to the cantons (43%) and the federal government (35%) (EFV, 2024). Swiss municipalities have a rather small population, by international comparison, with an average of 3'962 - and a median of 1'556 inhabitants per municipality in 2019 (BFS, 2024b) since the OECD average is around 9'000 inhabitants, which is very similar to the United States (OECD, 2014). The population size of the municipalities in the canton of Berne does not differ considerably from the Swiss mean. On average, each municipality has 3,110 inhabitants, with the median being 1,266 (Kanton Bern, 2024c).

2.2 *Municipal Mergers*

In Switzerland, as mentioned above, municipal mergers generally take place voluntarily, meaning with the approval of the electorate of the affected municipalities. In recent decades, there have been only a few exceptions in the cantons of Thurgau, Ticino, and Valais, which forced some communities to amalgamate (Meyer, 2011). The mergers in the canton of Bern analysed in this study were "bottom-up," therefore approved by the municipalities in a direct democratic process. However, many cantons provide incentives and

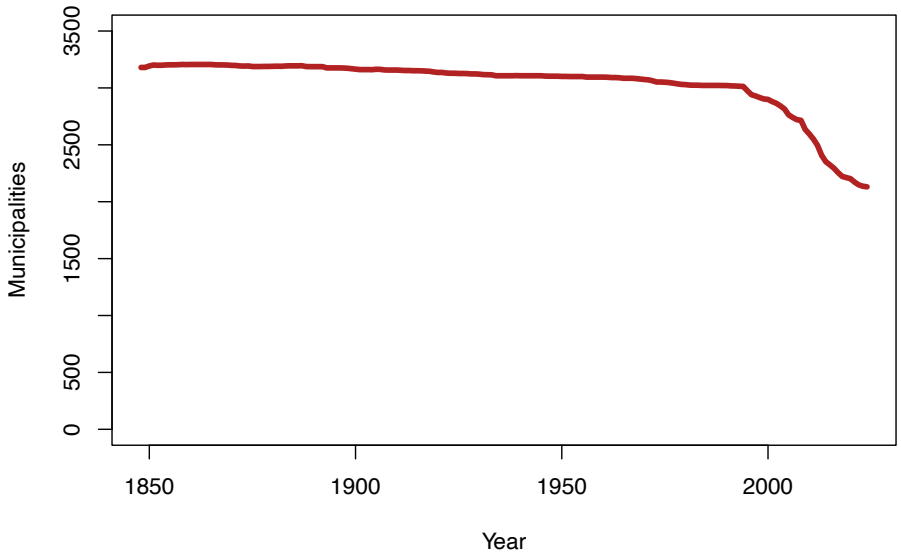
offer professional counselling, and financial support to municipalities willing to merge. On the one hand, the cantons are interested in having financially healthy, professionally organised, and efficiently managed municipalities, which are all desired effects of mergers. On the other hand, decreasing the number of municipalities reduces the administrative, coordination, and monitoring costs for the cantonal authorities (Steiner & Kaiser, 2013).

The canton of Bern, for example, provides support to municipalities in all project stages of the merger process based on the cantonal municipal merger law. The Municipal Merger Act "Gemeindefusionsgesetz (GFG)" was passed in 2004 by the Bernese Cantonal Parliament at the request of the Cantonal Government. The purpose of this law is to provide logistical and financial support for voluntary municipal mergers within the canton. One of its objectives is to ensure the operational efficiency of municipalities, which can include the professionalization of administration, the reduction of redundances, and an increased attractiveness as employers. Furthermore, the law aims to strengthen municipal autonomy, allowing municipalities to better perform their duties and gain greater influence within their region and the canton. The third objective is to enable municipalities to provide services effectively and cost-efficiently (Ecoplan, 2009). Furthermore, the canton compensates for the losses in cantonal financial and equalisation payments up to a maximum of ten years (Kanton Bern, 2024a).

The stronger the fragmentation of municipalities in a canton, the more incentives the canton provides to motivate the communes to merge. In turn, these cantonal incentives actually increase municipal merger activity (Kaiser, 2014). Cantons therefore play a central role in stimulating and executing the mergers. The consolidation process is usually initiated through discussions between the political representatives of the municipalities or by the cantonal authorities. Eichenberger (2010) identifies these incentives set by the cantons as the main reason for the surge in merger activity. The cantons have a

vested interest in reducing the number of municipalities and standardizing their operations to decrease the administrative burden at the cantonal level. Ecoplan (2009), in their study about the first nice municipal mergers in the canton of Bern, concludes that the primary benefits of mergers are realized by the municipalities. Although the canton also gains certain advantages, which are mostly difficult to quantify in financial terms. The number of municipalities in Switzerland remained stable for a very long time. It was not until the mid-1990s, partly due to the conditions created by the cantons, that the number began to fall steadily, as can be seen in figure 1.

Figure 1: Number of Municipalities in Switzerland since 1848



Source: BFS (2024a)

The reasons for a municipality considering a merger are manifold. While the financial situation is usually the decisive factor, it can also be related to staff shortages in the administration or political offices, as well as the desire to maintain or increase the level of service. Municipalities hope that an increase in population, and in particular taxpayers, will bring advantages in fulfilling their tasks. They expect that economies of scale will lead to a

relative reduction in administrative costs and a more professional provision of services (Steiner, 2003). The personal ambitions of local politicians, who may wish to govern a relatively larger community should also not be underestimated. Cantonal regulations and laws can pose administrative challenges for municipalities, which may be particularly difficult for small ones to manage in the long term (Eichenberger, 2010).

If the political representatives of the municipalities indicate their willingness to undertake further merger negotiations, assessments and feasibility studies are carried out. As these activities are usually associated with additional expenditures, the voters can eventually decide on the matter. It is not uncommon for a merger project to fail at an early stage because the general decision has been made not to conduct any (further) assessments or negotiations. As mentioned, the further steps towards a successful merger are always accompanied by cantonal authorities and must also be approved by the federal authorities. In addition to the coat of arms, name, and the new tax multiplier, which is often newly determined, these are often part of the communal negotiations. At the end of the process, the electorate of the affected jurisdictions then votes on the proposition. Even at this stage, approval is by no means guaranteed. Since 1999, 28 merger projects have failed at various stages in the canton of Bern alone. It should be noted that some of these municipalities did merge at a later stage, some also in a different constellation (Kanton Bern, 2024a). Strebel (2023) shows that relative size and wealth play a role in the likelihood of acceptance of mergers. Larger and/or poorer municipalities are more likely to accept a merger than richer and/or smaller ones. The two variables can also cancel each other out or reinforce each other. Furthermore, there is robust evidence that voters are open to compensate losses in wealth with increases in political power. The opposite is also true, as voters are willing to give up political power for economic benefits.

2.3 *Tax System*

The three-tier system of government is also reflected in the way taxes are levied. Both the Confederation and the cantons have tax competences to finance their expenditures. The municipalities, however, do not have specifically stated tax competences under federal law but are granted these by the cantons so they can finance the aforementioned municipal tasks (Hänni, 2021). Nevertheless, it should also be mentioned that there are financial transfers within and across cantons in the form of equalisation payments, which shows that, despite the federal nature of the system, there exists some horizontal balancing (EFD, 2024).

The cantons define the exemptions and deductions for individuals and legal entities in order to determine their taxable income, as well as the tax schedule. The canton and each individual municipality define a tax multiplier that can be applied to the respective tax schedule. Municipalities are therefore bound by the cantonal definition of taxable income and the tax schedule but can determine the multiplier themselves, which ultimately defines the amount of the individual tax (Parchet, 2019). In practical terms, for example, a single person without children in the city of Bern with a gross income of CHF 100,000 would be assessed a single tax rate of around CHF 3,200, which would be multiplied by the cantonal tax multiplier of 3.025 and the municipal tax multiplier of 1.540, resulting in an effective tax of around CHF 10,000 for the canton and CHF 5,000 for the municipality of Bern (ESTV, 2024). The advantage of the multiplier specification is that it allows the inter-cantonal variation in tax levels to be perfectly compared using only a single variable: the municipal tax multiplier (Parchet, 2019).

In contrast to many other developed countries, wealth in Switzerland is taxed at both the cantonal and municipal levels (Brülhart et al., 2016). In this thesis, however, only the income tax multipliers for individuals are compared. Revenues from personal income taxes account for around 60% (canton of Bern:

63%) of the total municipal fiscal revenues in Switzerland. The remaining amount is accounted for by corporate profit tax, wealth and capital tax, and various other direct and indirect taxes. The municipalities' share of all direct tax revenues in Switzerland is roughly one-third, while the cantons account for around half of all fiscal revenues. If all direct and indirect taxes are included, the federal government has a higher share of around 45% of all fiscal revenues since the federal government can also levy taxes on consumption and customs (EFV, 2024).

3 Literature Review

3.1 *Potential Tax Rate Reductions*

Only limited research exists on the effects of municipal mergers on the respective tax rates. This is certainly also due to the fact that municipalities in other countries do not have as much tax autonomy, whether in the area of revenue or expenditure, as in Switzerland (Mauri, 2024). However, some studies on the topic of local mergers and tax rates are discussed subsequently.

For example, Faulk & Hicks (2011) observe in their study on potential efficiency gains in the US state of Indiana a significant negative correlation between population and costs, with the latter being measured in local tax rates. They therefore predict that the smaller a county is, the greater the potential economies of scale in municipal mergers, since it would immediately increase the population of the jurisdiction. They state that more taxing districts increase the county's average tax rate and that, therefore, mergers could lead to efficiency gains in the form of lower district taxes. A slightly different conclusion is reached by Charlot et al. (2015) in their study on cooperation between local governments and its effects on tax competition in France. The national government wants to promote such cooperation through financial incentives in order to prevent municipal fragmentation

and, therefore, eliminate inefficiencies. However, controlled for population size, fiscal cooperation reduces tax competition and, consequently, the local business tax increases. This conclusion corresponds to the theoretical two-tier tax competition model by Breuillé & Zanaj (2013) on mergers of regions and their effects on regional and local tax rates. Their model implies, that when regions merge, the regional tax rates rise, while local tax rates decrease. This is intuitively plausible, as the elimination of top-tier jurisdictions reduces regional competition, while additional lower-tier jurisdictions in a region lead to increased competition. These arguments align with the theoretical model of Tiebout (1956), which suggests that citizens sort themselves into different municipalities according to their preferences for taxes, public goods, and amenities. A reduction in the number of municipalities would restrict the ability of citizens to 'vote with their feet' resulting in less intense competition between the municipalities. Similarly, Oates (1972) argues that local authorities, due to their proximity to citizens, can better cater to their preferences and manage the local cost structure more efficiently than central institutions (Blom-Hansen et al., 2016).

The most relevant research contribution in regard of municipal mergers and tax rates was made by Stettler (2022) in his dissertation on tax and expenditure effects of municipal mergers in Switzerland. To conduct this work, 327 mergers with 1042 municipalities involved in the period from 1991 to 2020 were analysed. The merger of municipalities significantly reduced the tax multiplier by aound 6%. The post-merger effect generally remains significant after five years. For smaller municipalities, the decrease is even more pronounced, with a 10% reduction in tax multipliers. The slightly falling tax rates between the approval and implementation of the merger are an indication of free-riding behaviour, although the debt levels of the municipalities were not assessed. On the expenditure side, the effects are rather more heterogeneous. Up to four years before the merger, municipal expenditure increases, especially administrative expenditures. This is explained,

in part, by the costs which arise prior to a merger. After the consolidation, administrative costs per capita fall significantly by between 10% and 13%. In this respect, the effect is also stronger in smaller municipalities. No significant savings are observed in larger municipalities. However, total municipal expenditure is not significantly reduced.

3.2 *Further Effects of Mergers*

Existing international studies on possible economies of scale of municipal mergers have mainly focussed on the effects on expenditure, on costs of the transformation. There are, also, various studies that analyse the impact on local democracy in terms of voter turnout and democratic participation, however, these papers are discussed in the next subsection. Aulich et al. (2014) for instance analyzed cases of municipal consolidations, including mergers, in Australia, and found insufficient evidence that mergers in their sample led to substantial economies of scale. They see stronger economies of scope in the form of an expansion in service delivery and an increase in strategic capacity as a result of consolidation. Many other authors also discussed the quality or level of service delivery after an amalgamation but hesitated to make a concluding statement since it is empirically difficult to estimate. Liner's (1992) research on annexation activities in US cities shows no increase in total per capita expenditures due to possible inefficiencies of mergers, but no significant savings in spending could be realized either. Furthermore, Roesel (2017) found no reduction in overall expenditure per capita in his study of compulsory merged Saxon districts, nor in major expenditure categories such as administration, education, and social care. However, it should be noted that the observed districts are large jurisdictions with an average population of 113,000 before the merger and 290,000 after the merger. Blesse & Roesel (2019) also show no significant cost or staff reductions from county mergers in Austria. This is particularly noteworthy as Austrian counties are not local autonomous bottom-up authorities, as in Germany or the municipalities in

Switzerland, but decentralized institutions of the state. Savings in municipal staff, for example, could presumably be made with less objection, as less consideration has to be given to local interests. Furthermore, Steiner & Kaiser (2017) also concluded from their analysis of Swiss municipal mergers that there was no significant effect on local finances, be it in capital spending proportion, self-financing level, or consolidated gross debt share.

Blesse & Baskaran (2016), on the other hand, found a reduction in administrative expenditures of compulsory merged municipalities in their analysis of the German state Brandenburg. The more municipalities merged to form a new unit, the higher the cost savings. Astonishingly, voluntary mergers did not lead to a reduction in any of the expenditure categories. The reason for this surprising finding could be that the voluntarily merged municipalities had already been involved in inter-municipal cooperation beforehand, which resulted in cost savings. Forced merger partners, if so, capitalized on the new synergies only afterwards. The analysis by Blom-Hansen et al. (2016) of the large municipal merger in Denmark in 2007 also detects no significant effect on the total expenditure of the municipalities in general. In domains such as child and elderly care, larger municipalities were unable to generate any economies of scale, while costs even increased in the area of labour market programs. However, administrative costs and expenditure on roads fell. Given the transaction costs of such projects, the authors are critical of municipal mergers regarding the materialization of economies of scale. Also, Fritz (2015) saw a decrease in both administrative and construction costs in an analysis of mergers in Germany. Total per capita expenditure actually increased in the first few years after the merger, resulting in higher debt. Transaction costs may serve as a possible explanation for this observation. However, total expenditure stabilized again and was afterwards not different from the non-merged municipalities. In their study of Dutch municipal mergers, Allers & Geertsema (2016) also found that municipal per capita administrative costs could be significantly reduced. However, the effect was not strong

enough to affect the total municipal expenditure per capita. Moreover, Dutch municipalities are also free to choose local tax rates, of which the property tax is the most important. The authors analyzed the resulting tax revenues, which did not change significantly in the merged municipalities. Thus, the local tax rates could or were not significantly reduced by mergers. The newly formed municipalities also failed to become more attractive places to live, as house prices did not develop differently than in the non-amalgamated control group. Blom-Hansen et al. (2014) show in their difference-in-difference analysis of 239 Danish municipalities that they were able to significantly reduce administrative expenditure per capita by 10% after a few years compared to the non-amalgamated group. The analysis was limited to administrative costs, though, without taking total expenditure into account. The reform was imposed by the central government and can therefore be compared to a non-voluntary exogenous shock for the affected municipalities.

Studerus (2014) examined efficiency gains of local governments through municipal mergers based on 140 examples that took place in Switzerland between 2001 and 2014. The study compares amalgamated municipalities with non-merged municipalities, which are selected based on the propensity score matching method. The control group consists of municipalities that are located in the same canton and have comparable economic, social, and geographical characteristics, and therefore a similar propensity score. This creates a control group that can serve as a counterfactual to the merged municipalities. In the longer term, only the administrative costs in the merged group could be reduced. Significant savings in other areas such as education, infrastructure, security, and so on could not be identified. Even after 10 years, the mergers had no impact on total per capita expenditure, with the exception of the first year after the merger, when this rose sharply, although this can be explained by the integration process. Based on house and rental prices, the attractiveness of the merged municipalities has also, in Switzerland, not increased comparatively.

Ecoplan (2009) sees slightly lower administrative costs per capita for Bernese municipalities in general for municipalities with a higher population. However, the total expenditure per capita is not lower the larger the municipality. One reason given for this is the higher level of expectations of the population. Ecoplan (2009) further examined whether the objectives of the Gemeindefördergesetz could be achieved through the first nine municipal mergers in Bern. The efficiency of the municipalities was enhanced in various ways, for example, the professionalisation of administration and governance, increased attractiveness as employers, shift land-use planning to a larger area and the elimination of redundancies. Municipal autonomy was strengthened as the influence within the region and regional associations increased. Additionally, fewer executive positions needed to be filled. The authors also observed a reduction in tax rates for the nine newly formed municipalities compared to the previous 19 existing municipalities. However, the authors caution that many savings can only be realised later, as job security often applies to administrative positions, at least in the initial period following the merger, along with now decentralised government units.

With data from the US, Holcombe & Williams (2009) analyse whether economies of scale exist in municipal government spending. They separate municipalities according to population and population density and show that economies of scale can exist when differences in population densities are taken into account. This also makes intuitive sense, as relatively less infrastructure needs to be provided per capita and area. If only the population and municipal government spending are taken into account, there are no significant economies or diseconomies of scale. The authors emphasise that the consolidation of municipalities, which leads to an increase solely in population and not in density, has no fiscal effects in either direction. A similar conclusion is drawn by Bodkin & Conklin (1971) in their analysis of data from Ontario, Canada. They observe that rising population density tends to lower municipal

per capita expenditures overall. However, this reduction is confined to specific areas, as spending on services such as water supply, public works, and waste management has kept pace with the growing population. In general, provincial and federal grants were partially directed towards increasing municipal expenditures and partially used to reduce local taxes. Studerus (2014) also noted that this practice is also within the realms of possibility in Switzerland, since cantons provide varying amounts of financial assistance to merging municipalities to help mitigate the costs associated with the merger.

In contrast, Reingewertz (2012) found in his study of the Israeli municipal reform in 2003 that municipal expenditure was reduced by 9% after the merger, with no apparent effect on the level of services. However, the author points out that the sample only includes relatively small municipalities, and that the result could be different if larger jurisdictions had merged. In a similar vein, Hanes (2015) asserts that the effect of a merger of small and similarly sized municipalities on per capita expenditure is negative, with no observed effect in cases where a large and small municipality merged. This suggests that municipalities below a certain size can achieve economies of scale, thereby reducing their expenditure. Hansen et al. (2014) underscore the multifaceted nature of municipal mergers, highlighting their capacity to not only alter the size of municipalities but also to provide a conduit for fundamental structural reforms that would otherwise remain unattainable without the consolidation dynamics engendered by mergers. Nevertheless, it is challenging to empirically disentangle the scaling and reform effects. Notwithstanding the aforementioned challenges, it is important to note that mergers of local authorities can also exert a positive influence on the economic growth of the respective region. Blume & Blume (2007) analysed district-level mergers in monocentric regions in Germany, which showed higher economic growth rates and lower debt in the decade following the merger phase.

Tavares (2018) analyses in his review 52 studies related to municipal amal-

gamations. He examines the impact of mergers on the following categories: economic efficiency, managerial implications, and democracy. His conclusion does not deviate substantially from the previously discussed research contributions. If costs could be reduced, there was usually only a decrease in administrative expenditure. Other areas of expenditure experienced no effect or even some increase. Mergers, especially mandatory ones, provide an incentive for rational agents to exploit the common pool, which is also observed. On the other hand, in terms of local service delivery, the studies found no negative effects of consolidation. The effects, if they could be measured accurately at all, were either non-existent or, in some cases, positive.

3.3 *Potential Costs of Mergers*

Moisio & Uusitalo (2013), who analysed municipal mergers in Finland, show that administrative costs fell less sharply than costs in other areas rose, which is why total expenditure is ultimately higher in merged municipalities. This statement remains true even 10 years after the merger. The higher expenditure could therefore not be explained by short-term transaction costs or other frictions. Municipal mergers involve implementation costs regardless of possible long-term efficiency gains. Nakazawa (2013) shows in his study of Japanese municipalities that mergers are associated with significant administrative slack costs and citizen oversight costs. If the newly created municipalities do not carry out administrative reorganisation and efficiency improvements, the temporary slack costs could even lead to prolonged higher local public expenditure. Furthermore, the findings of Andrews & Boyne (2012) suggest that the short-term financial consequences of restructuring are negative, resulting in higher costs for the consolidating municipalities. In some cases, these transaction inefficiencies are not sufficiently included in the cost-benefit analysis (Aulich et al., 2014).

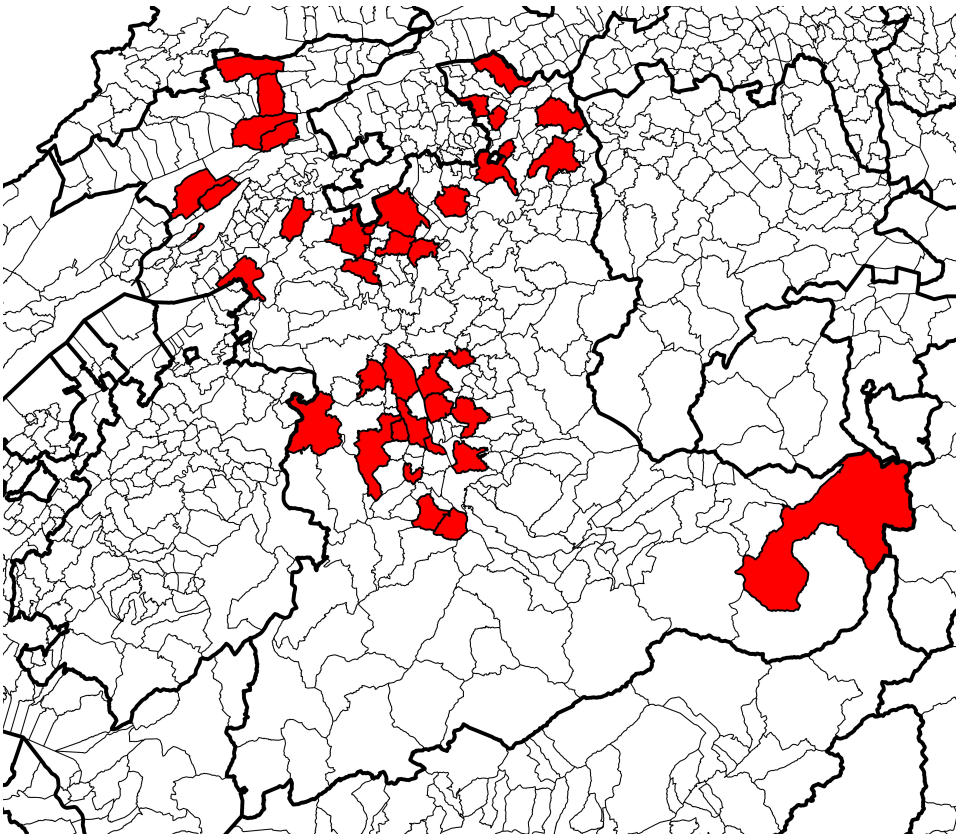
There are also other hidden costs in the form of free-riding behaviour by municipalities during the merger process. Hinnerich (2009) found in his study of compulsory Swedish municipal mergers that municipalities increase their debt before the merger is carried out, which is a classic common pool problem. Saarimaa & Tukiainen (2015) investigated the free-rider behaviour of Finnish municipalities between the decision to merge and its implementation. The stronger the incentive for free-rider behaviour, the greater the increase in municipal per capita debt and the consumption of liquidity reserves. The incentives are stronger the more municipalities merge, as the debt burden can be spread across more parties. This is even more remarkable given that the Finnish mergers are voluntary. Like the Swiss, Finnish municipalities also have far-reaching tax autonomy. Common pool problems also arose in the major Danish local government reform of 2007, as municipalities made significantly higher expenditures shortly before the mergers were implemented. However, the size of the common pool (number of municipalities) had no impact on expenditure, only its availability (Blom-Hansen, 2010). Studerus (2018) states that the duration between the merger decision and its implementation is decisive for the degree of free-riding behaviour. In Switzerland, there is usually less than a year between the vote and its implementation, which means that the exploitation of the common pool is not very pronounced, but can still be observed in municipalities where the merger is delayed. In contrast, Allers & Geertsema (2016) found no free-riding behaviour among Dutch local governments in the form of higher municipal expenditures before or after the merger.

A further form of costs can be a decrease in democratic participation in newly formed jurisdictions. Some studies have documented this effect. Roesel (2017), for example, analysed the political effects of district reforms in the federal state of Saxony, which led to a decline in candidates for political positions and voter turnout, while right-wing populist parties gained electoral share. In their study of Finnish municipal mergers, Lapointe et al. (2018)

found the same effect, as did Blesse & Roesel (2019) in Austria. Similarly, Derungs & Fetz (2020) observed a robust decline in political engagement in their study of 46 municipal mergers in Switzerland. However, these results do not necessarily apply in the long run. The more time that has passed since the merger, the more positively interest and participation in municipal politics, satisfaction with the political authorities, and the political trust of the population have developed again. Koch & Rochat (2017) also came to a similar conclusion, finding a decline in voter participation in Swiss municipalities in the immediate post-merger period, although the effect weakened over time. Tavares (2018) also mentions further in his literature review that that mergers can have a negative impact on local democracy. In many territorial reforms, there is therefore a trade-off between the hoped-for improvement in efficiency and the preservation of democracy.

4 Descriptive Statistics

Figure 2: Merged Municipalities in the Canton of Bern

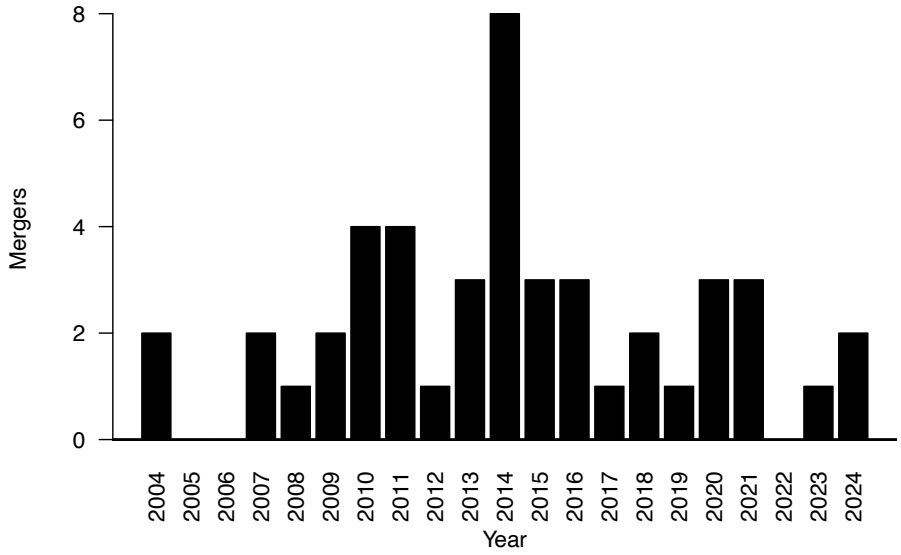


4.1 *Analysis*

This thesis analyses a total of 46 municipal mergers that have taken place in the canton of Bern since 2004, with a total of 110 municipalities involved. The newly formed municipalities are coloured red on the map above (2). One merger was not included, as this municipality changed canton (Clavaleyres joined the canton of Fribourg in 2022). However, 28 projects were also abandoned or rejected during the same period. As mentioned above, some of these municipalities merged at a later date, sometimes in different constellations. The largest number of municipalities that joined together at once was eight; however, most amalgamations are bilateral deals. The number of municipalities in the canton of Bern fell from 400 to 335 during the period from 2003 to 2024 (Kanton Bern, 2024b). In 2003, however, the cantonal

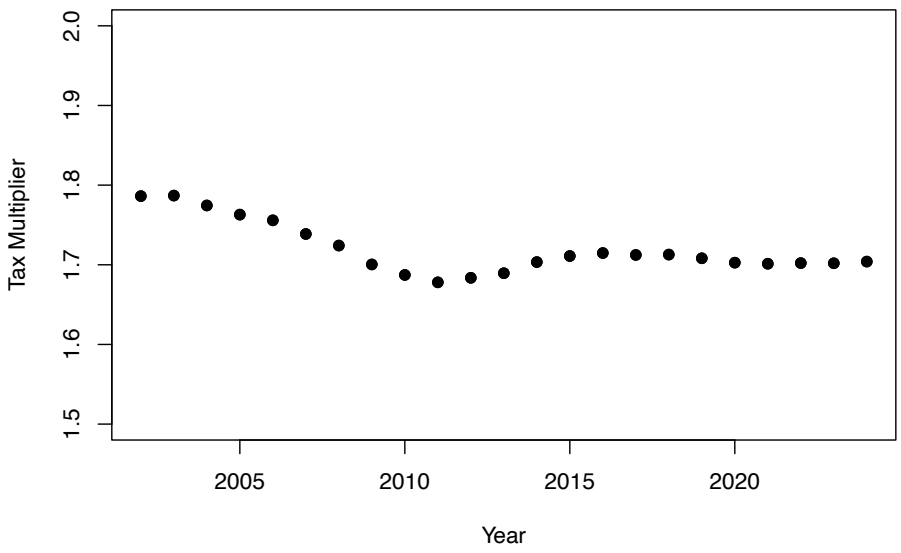
government set itself the target of reducing the number of municipalities to 300 by 2017 (Ecoplan, 2009), a goal that was clearly missed. Nevertheless, the incentives provided by the canton triggered a veritable wave of mergers compared to the time before. Before 2004, the last merger took place in 1973, which, in turn, was the first since 1952 (Kanton Bern, 2024a).

Figure 3: Municipal Mergers in the Canton of Bern per year since 2004



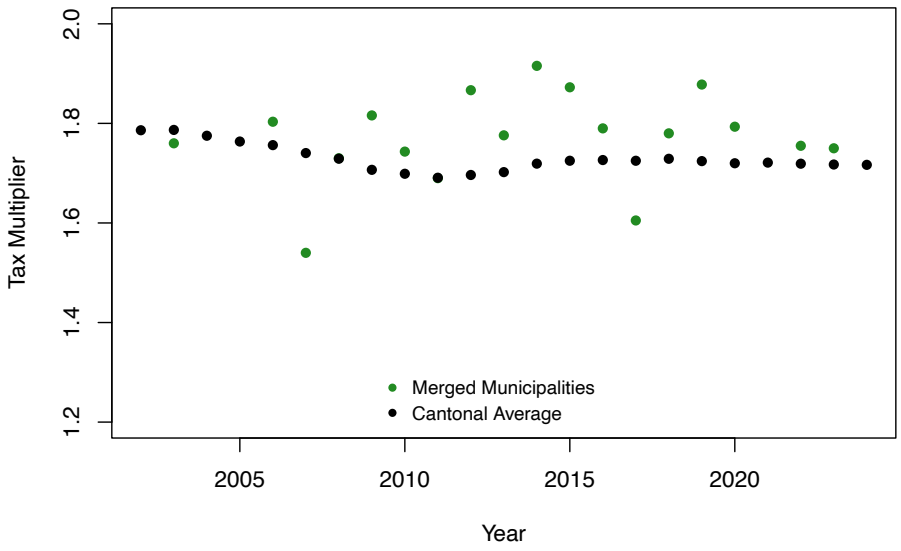
It is also remarkable that there were also some splits in the 1990s and 1980s (Kanton Bern, 2024a). These were municipalities whose communes were growing rapidly and therefore preferred to administer themselves. After the amalgamation has been completed, 59% of the former municipalities saw their tax rate reduced. For 29% of the municipalities, the tax rate remained the same after the merger, while for 12% it actually increased. The average tax multiplier of all municipalities has fallen from 1.79 in 2003 to 1.70 in 2024, whereby municipalities that were never involved in a merger were also able to reduce their rate (Kanton Bern, 2024b).

Figure 4: Average Municipal Tax Multiplier per Year



The figure 5 below show a comparison of the average tax multipliers before the merger. The cantonal averages are calculated from municipalities that have never or not yet been treated at this time. It is evident that municipalities that decide to merge generally have an above-average tax rate. This does not necessarily mean that the tax rate is the reason for undergoing a merging process, but it could be interpreted as a symptom of an underlying inefficiency that could lead to considerations regarding consolidation.

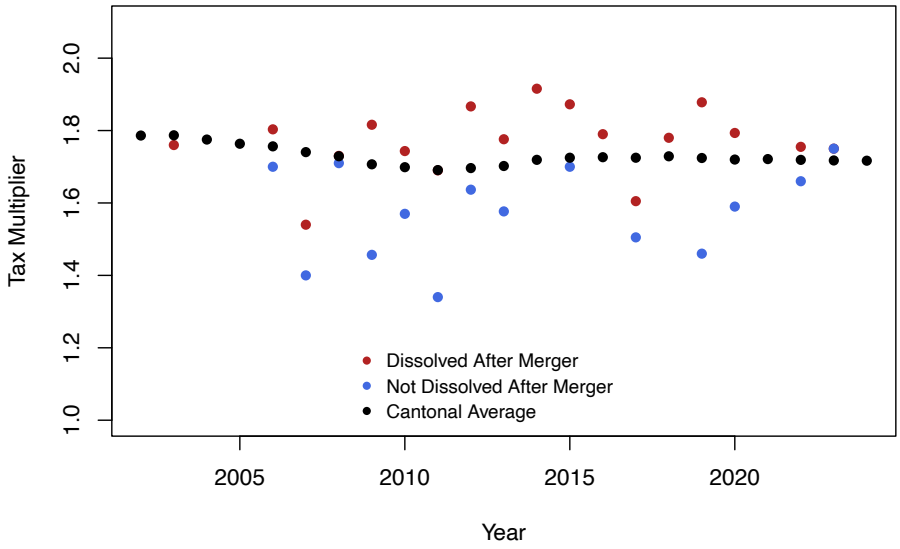
Figure 5: Average Municipal Tax Multiplier Before Merger



After the completed merger, there are two different types of status with which the municipality could be defined: *dissolved* and *not dissolved*. The following example with two municipalities describes these terms in more detail: Let's call one municipality A and the other B. Due to a merge, Municipality B joins Municipality A. After the completed consolidation, B is classified as *dissolved*, since the municipality ceasing to exist legally. This means that it is completely integrated into the new municipality A and takes on its name and BFS (Federal Statistical Office) number. In this study, municipality B is thus given the attribute *dissolved*, while municipality A is *not dissolved*. In some cases, municipalities A and B merge to form municipality C, in which both municipalities are treated as *dissolved*, as both municipalities receive a new number from the BFS and a new name. If the municipalities are divided into the *dissolved* and *not dissolved* categories, an even more differentiated result emerges, as seen in Figure 6. It is obvious that the municipalities that were *dissolved*, had above-average tax multipliers, while the *not dissolved* municipalities were below the cantonal average before the merge. This indicates that, in the majority of cases, municipalities with above-average tax

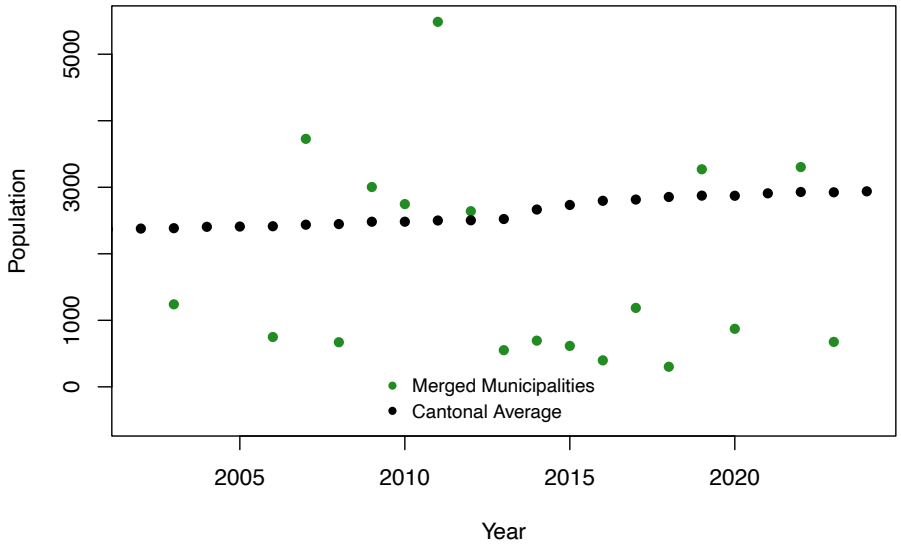
rates have joined their more efficient, low-tax neighbours.

Figure 6: Average Municipal Tax Multiplier Before Merger (Differentiated)



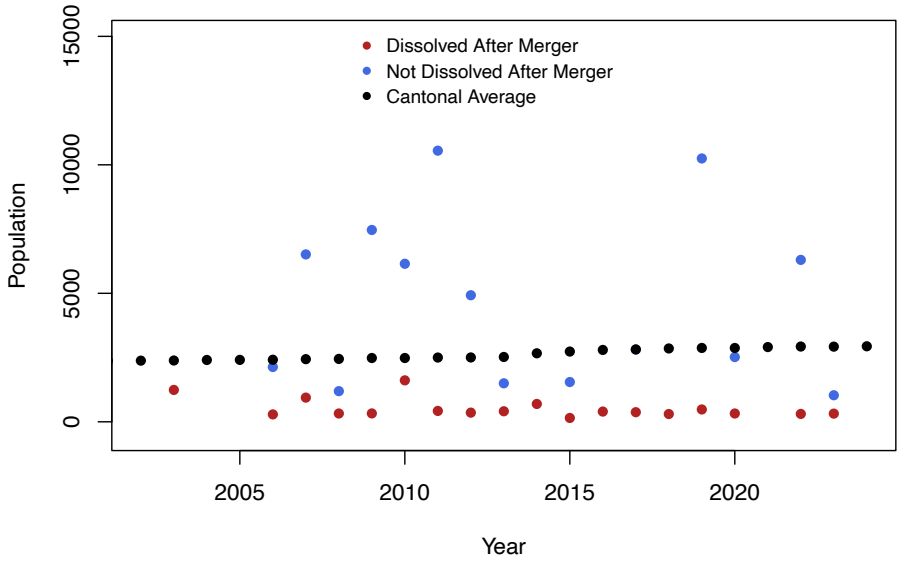
It is also interesting to compare the population sizes of the merged municipalities with the cantonal average as seen in figure 7. Here as well, the cantonal average consists of the never-merged and not-yet-merged municipalities. In most years, the amalgamated municipalities have fewer citizens than the cantonal average, with a few exceptions of course.

Figure 7: Average Municipal Population Before Merger



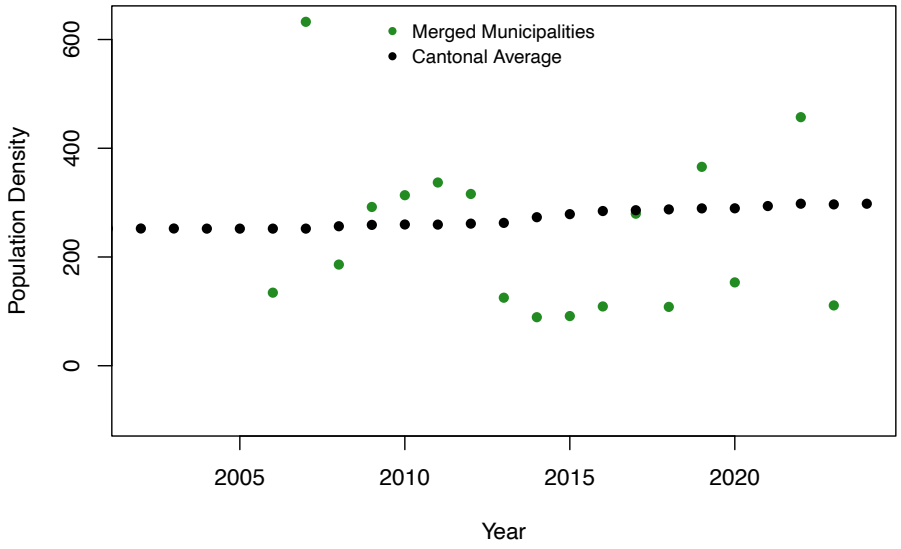
A comparison of the population sizes of the two merger groups also reveals a differentiated pattern, as shown in figure 8. The dissolved municipalities were significantly smaller than the cantonal average, while the not-dissolved municipalities do not provide an obvious picture. However, the population averages of the merged and still existing municipalities are considerably higher than those of the other municipalities in most years.

Figure 8: Average Municipal Population Before Merger (Differentiated)



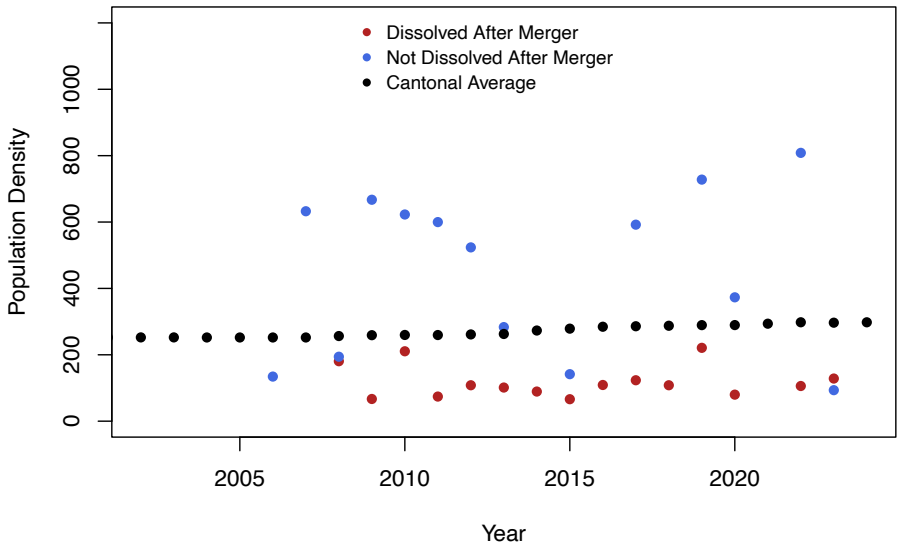
The comparison of the treated and not-treated municipalities regarding population density provides a similar picture, albeit a somewhat more ambiguous one. Municipalities that have merged had a lower population density than the cantonal average in most years, although there are certain exceptions here too.

Figure 9: Average Municipal Population Density Before Merger



As soon as the treated municipalities are grouped again into dissolved and not dissolved, a different pattern emerges. Unsurprisingly, the non-dissolved municipalities generally have a higher population density than the comparison group before the completed merger.

Figure 10: Average Municipal Population Density Before Merger (Differentiated)



In line with Holcombe & Williams (2009) findings, an interesting pattern can be seen when comparing the tax multipliers with population and population density as shown in figure 11 and 12. The costs per capita, for which the tax rate serves as a proxy, decrease significantly with a higher population density per municipality. However, there is still a lot of overall variation, which is why the adjusted R-squared value is around 0.11.

Figure 11: Municipal Tax Multiplier and Population in 2023

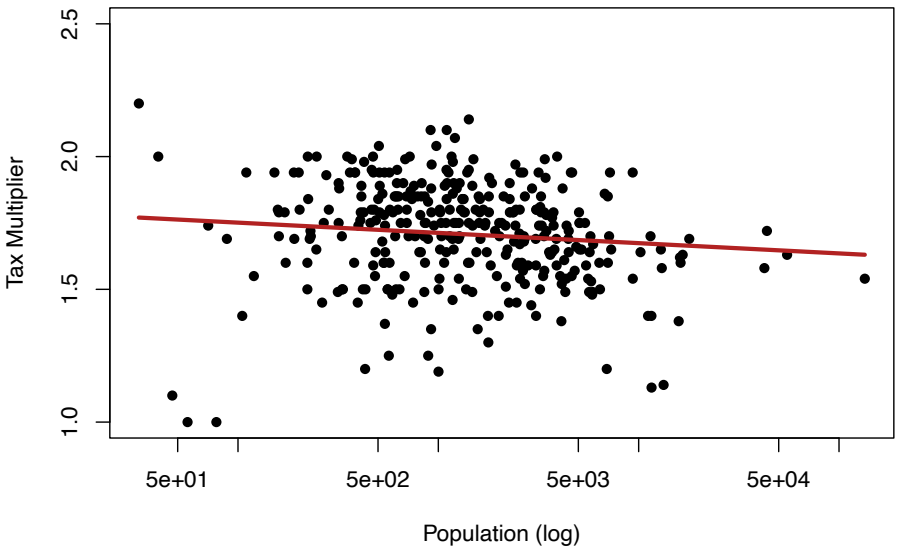
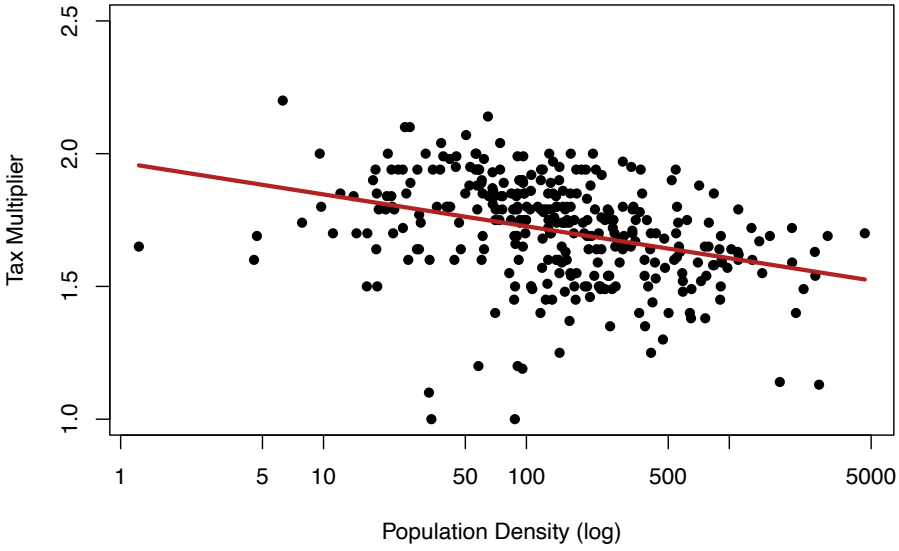


Figure 12: Municipal Tax Multiplier and Population Density in 2023



These findings provide overall a clearer picture of the dynamics of mergers. In general, smaller, less dense, high-tax communes join more populated, more

dense municipalities with lower tax rates. It is intuitively comprehensible that smaller councils have more trouble balancing their finances and finding staff and are therefore more likely to merge, and in many cases, with a larger commune. In the chapter Results, the reduction in the tax rates of these different groups is examined in more detail and analysed for possible heterogeneity.

4.2 *Municipal Finances*

In order to better assess the potential for economies of scale in communal mergers, this subchapter briefly analyses the financial statistics of the municipalities in the canton of Bern. In 2022, the municipalities in Bern spent an average of just over a third of their budget on staffing. The proportion of teachers amounts to 14%, which roughly corresponds to the money used for equipment and operating expenses. The salaries of administrative and operational staff account for 15% of municipal expenditure. These administrative costs, as shown in other studies, is the expenditure category in which the biggest savings with mergers can be made. However, if the financial statistics for 2022 are compared with 2003, i.e. the year before the start of the intensified merger activities, a decline that should not be ignored, can be observed. In 2003, personnel expenditure still accounted for 40% of total expenditures, compared to 34% in 2022 and salaries for administrative and operational staff in particular were significantly higher at 22.5%, compared to the aforementioned 15%. The development of the nominal amounts (without taking inflation into account) is also interesting. Personnel expenditure in total increased by around 11%, while wages for administrative and operational staff fell by 15% over the same period. A reduction in this area is therefore evident. Whether this is an effect that is primarily attributable to mergers or whether a general increase in efficiency has occurred cannot be answered within the scope of this work. A large proportion of over 40% of the municipal budget is spend on transfer payments to the community and to the national

and cantonal fiscal equalisation fund. Expenditure on investments, such as infrastructure accounts for 9% of the municipal budget.

If the expenses are broken down by function, a rather more distinct view emerges. The largest overall spending categories are education (30%), social security (20%) and healthcare (12%). Only around 6.5% of expenditure is allocated to "general administration", this value also hasn't changed much since 2003 (EFV, 2024). However, administrative work is also carried out in sectors such as education and social security, which also could be completed more efficiently by merging them. Anyway, it is evident that a large proportion of municipal expenditure is already fixed, and no major reductions can be expected as a result of mergers. For example, no significant economies of scale can be hoped for schools, social security and healthcare. However, it is important to note that these percentage points relate to the absolute expenditure of all municipalities in the canton of Berne. This essentially means that the budget structures of populous municipalities such as cities are given a high weighting. In a rural municipality, for example, the expenditure ratios of the various expenditure positions are likely to be allocated somehow differently, therefore, a final judgement on possible budget effects can only be made with caution.

5 Estimation Strategy

The strategy of Callaway & Sant'Anna (2021), which the authors set out in their paper 'Difference-in-Differences with Multiple Time Periods', is ideally suited to show the effects of a municipal merger on tax rates. In the canonical difference-in-differences (DiD) framework, there are two time periods and two groups: the treated group and the not-treated group, which acts as a control group. In the first period, neither group is treated. In the second period, the average treatment effect for the treatment (ATT) can then be calculated by comparing the average change in outcomes experienced by the treated group with the average change in outcomes experienced by the control group. It is important to assume parallel trends, as it is expected that the two groups would have developed in the same way without treatment. In the past, estimates with varying treatment periods were usually made using the Two-Way Fixed Effects (TWFE) estimator, which is an extension of the DiD research design. The TWFE estimator accounts for both unit-fixed and time-fixed effects (Cunningham, 2021). However as de Chaisemartin & D'Haultfoeuille (2020), Goodman-Bacon (2021), and Sun & Abraham (2021) pointed out, problems arise when using the TWFE estimator when the treatment is time-varying, as in this analysis. Due to the duration that a treated unit is in the treatment group, the stronger its weighting is, which leads to distortions. Therefore, the ATT of a TWFE estimator may be biased in this case. Callaway & Sant'Anna have introduced an estimation method that can avoid these known pitfalls of the conventional estimation methods (Callaway & Sant'Anna, 2021). However, due to potential self-sorting, where municipalities may choose to merge based on characteristics influencing tax rates, the effect may not be entirely causal.

5.1 *Callaway & Sant'Anna (2021) Estimator*

The Callaway & Sant'Anna (2021) framework enables the estimation of average treatment effects across multiple time periods and with variation in treatment timings. Its primary purpose is to break down the DiD approach into three key steps: first, identifying group-time-specific treatment effects; second, aggregating these effects; and third, making estimations with these aggregated parameters. This approach allows for the estimation and interpretation of treatment effects that account for dynamic changes over time and heterogeneity in the effects across different groups.

In the first step, the group-time average treatment effect ($ATT(g,t)$) (1), is identified, which represents the average treatment effect for group g at time t. This parameter forms the basis of the framework and can be aggregated in various ways to provide an easy interpretable group, time, and dynamic effect. Group g consists of units that first received treatment at time t. In this analysis, the treatment groups are municipalities that merged in a particular year. For example, the overall ATT for the 2006 group shows the effect, aggregated over all time periods, of all units treated in 2006, in this case the merged municipalities. The cumulative average treatment effects by calendar year shows the average effect in a specific calendar year. This approach allows the tracking of the cumulative average treatment effect over calendar time. Due to the limited informative value for the aggregation by calendar time, it will not be examined in more detail.

$$\mathbf{ATT}^{ny}_{unc}(g,t) \;=\; \mathbb{E}\left[Y_t \;-\; Y_{g-1} \,|G_g = 1\right] \;-\; \mathbb{E}\left[Y_t \;-\; Y_{g-1} \,|D_t = 0,\; G_g = 0\right] \tag{1}$$

$\mathbf{ATT}^{ny}_{unc}(g,t)$ = group-time average treatment effect.

g = period receiving first treatment.

$g-1$ = period before the treatment.

t = time, $t \geq g$.

Y_t = average value of the outcome at time t.

Y_{g-1} = average value of the outcome at time $g-1$.

G_g = binary variable equal to one if first treated in period g.

D_t = binary variable equal to one if treated in period t and equal to zero otherwise.

When analysing the impact of a municipal merger on tax rates, the dynamic effect is particularly important, as it aggregates the ATT's by the length of exposure to treatment (event time) (2). Event time (e) is defined as the difference between the current time (t) and the time (g) when the unit was treated (e = t - g). This aggregation helps in understanding the average changes in tax rates per year following the merger.

$$\theta_{\text{es}}(e) = \sum_{g \in G} \mathbf{1}\{g + e \leq T\}\, P(G = g \mid G + e \leq T)\text{ATT}(g, g+e) \tag{2}$$

$\theta_{\text{es}}(e)$ = average effect of participating in the treatment e time periods after the treatment.

e = t - g.

T = maximum time period considered.

G = time period when unit first becomes treated.

Finally, the overall treatment effect is of particular interest. This parameter represents the summarised group average effect of participating in the treatment. It reflects how much tax rates have changed, on average, across all groups and time periods as a result of the merger. To calculate this, the average effect for each group across all time periods is first calculated (3), and then these group averages are combined to show an overall average effect of participation in the treatment (4). Its interpretation is similar to the ATT in the standard DiD setup with two periods and two groups.

$$\boldsymbol{\theta}_{\text{sel}(\boldsymbol{g})} = \frac{\mathbf{1}}{\boldsymbol{T} - \boldsymbol{g} + \mathbf{1}} \sum_{\boldsymbol{t}=\boldsymbol{g}}^{\boldsymbol{T}} \text{ATT}(\boldsymbol{g}, \boldsymbol{t}). \tag{3}$$

$\boldsymbol{\theta}_{\text{sel}}(\boldsymbol{g})$ = average effect of participating in the treatment for units in group $\boldsymbol{g}$.

$$\boldsymbol{\theta}^{\boldsymbol{O}}_{\text{sel}} = \sum_{\boldsymbol{g} \in \boldsymbol{G}} \boldsymbol{\theta}_{\text{sel}}(\boldsymbol{g}) \boldsymbol{P}(\boldsymbol{G} = \boldsymbol{g} \mid \boldsymbol{G} \leq \boldsymbol{T}) \tag{4}$$

$\boldsymbol{\theta}^{\boldsymbol{O}}_{\text{sel}}$ = overall average effect of participating in the treatment.

An alternative approach would be to calculate the simple average by weighting the average of all group-time average treatment effects. However, this would give more weight to municipalities that were treated from the very beginning, which could lead to bias. Another option is to balance the event-time parameters and only include municipalities in the treated group that have been treated for at least a certain period. While this would improve accuracy, it would also exclude municipalities treated for fewer than the specified number of periods, thereby reducing the sample size. Since the sample is

already somewhat limited, this adjustment will not be made.

Two groups could act as a control group: on one hand, the never-treated units, which, as the name suggests, include only the municipalities that have never merged; on the other hand, the not-yet-treated group, which, in addition to the never-treated units, includes municipalities that have not yet merged, making this group larger. In this analysis, for obvious reasons, the not-yet-treated group will act as the control group, unless otherwise specified.

The framework of Callaway & Sant'Anna (2021) allows for precisely measuring and displaying these effects of interest. Showing the average change in tax multipliers overall and also for each year after the merger (event time), allows to get a little closer to the answer to the question. Furthermore, the aggregated group effect allows a reliable overall estimate to be made that is easy to interpret. In the following subsection, the assumptions that are made to perform the analysis with the framework of Callaway & Sant'Anna are listed.

5.2 *Assumptions*

Irreversibility of Treatment: This assumption, also called staggered treatment adoption, means that once a unit has undergone treatment, it remains treated. This assumption is fulfilled in this analysis, as no municipal merger was ever reversed.

Random Sampling: To measure the causal effect of a treatment, both groups should be selected randomly, without any dependencies. However, this assumption is not fully met. The municipalities that chose to merge likely did so due to specific characteristics or circumstances that distinguish them from those that did not merge (self-selection). Additionally, many municipal mergers failed, resulting in selective non-participation, which leads to a non-random selection of the treatment group. Moreover, tax rates are

often a key factor in merger negotiations, meaning that the effect of a merger on tax rates is not independent. Furthermore, it is possible that certain characteristics influencing the merger decision also influence existing tax rates, which can lead to endogeneity. In this case, a correlation could cause a bias in the estimates. Despite these challenges, the analysis is still being conducted, as understanding the development of tax rates in the merged municipalities remains a crucial aspect of this study.

Limited Treatment Anticipation: The limited treatment anticipation assumption suggests that the groups receiving treatment do not, or only limited, anticipate it. In this analysis, it implies that municipalities do not reduce their tax rates before the merger. An analysis of the data using a pre-trend test shows no significant differences between the two groups over the years prior to the merger, which is intuitively reasonable since it is also visually evident in the event study plot. Therefore, this assumption holds.

Conditional Parallel: This assumption implies, that the average results of the group that was treated in period g and the control group would have been parallel if there had been no treatment. This is a crucial assumption that is considered valid after conducting a placebo test. The year before the merger was chosen as the treatment date. The estimate is very close to 0 and is also highly insignificant, which therefore shows no effect. This indicates that the tax rates of the merged and non-merged groups would have developed in parallel without the treatment. Any deviation from this would also be intuitively surprising.

Overlap: This assumption eliminates the possibility of irregular identification, which implies that for each time period t and each treatment group g, a positive fraction of municipalities begin treatment and that the generalized propensity score remains strictly less than one.

5.3 *Dataset*

The dataset used for estimating the tax multiplier effects contains a total of 9,999 observations. The municipal tax multipliers for all municipalities since 1983 can be accessed on the website of the Canton of Bern (Kanton Bern, 2024b). Additionally, the dataset was supplemented with data on population (Kanton Bern, 2024c) and population density (BFS, 2024b) for the municipalities, although the data of the latter is incomplete for some municipalities and years. As mentioned above, there are essentially two types of mergers: Municipality B joins Municipality A to form Municipality A, and Municipality A and Municipality B merge to form Municipality C. In this case, both Municipality A and Municipality B remain in the data set after their merger, allowing for an effect to be measured. The municipalities of type C are not relevant for the estimation, as they represent an artificial entity that did not exist before the merger, and thus no effect on taxes can be measured. The effects were then measured using the DiD package provided by Callaway & Sant'Anna (2021) in R.

6 Results

In this section, the effect of a municipal merger on the participating municipalities tax multipliers is estimated. The chapter is structured so that the overall effect of participating in the treatment is described first. In addition to the absolute effect on tax rates, the tax multipliers are log-transformed to improve understanding and allow for the presentation of the percentage effect. Following this, the treated group is specified in various ways to measure the effect on municipalities with different characteristics, such as pre-merger tax multiplier, population size, and post-merger status. As already mentioned, the overall average effect (4) is calculated on the basis of the aggregates at group level (3), which can be seen in the respective tables. The values for the event study plots are based on equation (2). The observation period by length of exposure is limited to 15 years after the treatment, as the number of munic-

ipalities involved would decrease to single digits in the following years. This would make only limited sense in terms of the informative value of the results. Municipalities that have never merged and those that are not yet merged at the time serve as the control group. The logarithmised population size is included as a covariate. While population density has a stronger predictive power for tax rates, the log-transformed population size is used instead, due to missing data on population density for several municipalities that merged at the beginning of the observation period. The correlation of population and population density is anyway relatively high at 0.54. The consistency of the results was ensured by controlling random variations, thereby eliminating potential deviations in repeated applications of the method.

6.1 Full Sample

6.1.1 Absolute Values

In this first subsection, the general development of tax rates after a merger is discussed without dividing into subgroups, as is done in the subsequent chapters. Initially, the aggregated treatment effect is calculated, which is the aggregation of group-time average treatment effects. To recall, a group consists of units that all were treated at the same time. All group estimates, except for the years 2008 and 2024, are negative, indicating that tax rates tend to decrease and remain low following a merger. Consequently, the overall summary of ATT's based on group aggregation is negative, and is also statistically significant at a 95% confidence interval level. A decrease of 0.095 points in the tax multiplier could translate into several hundred francs in tax savings for an individual, depending on their income. A single person with a gross income of 100,000 CHF would save over around 500 CHF per year in municipal taxes (ESTV, 2024).

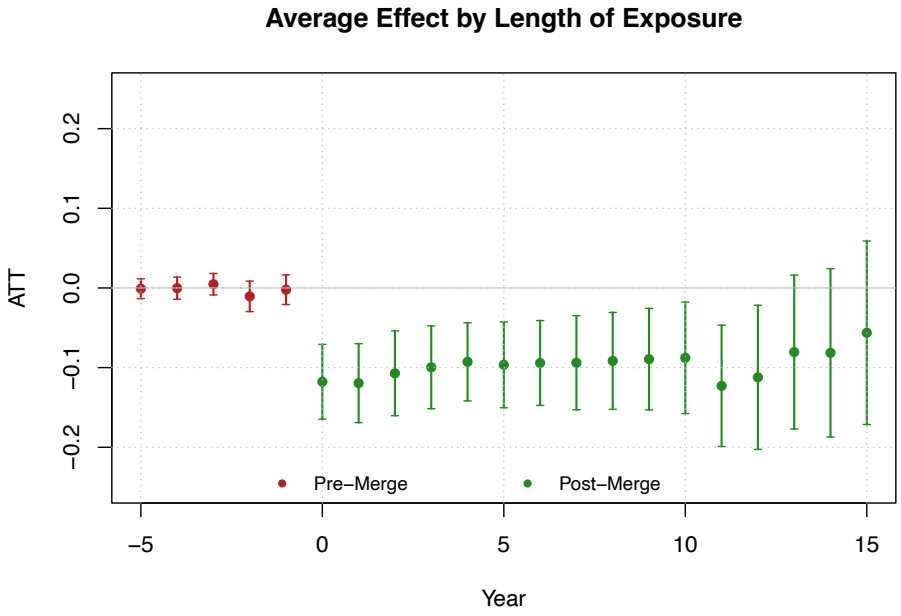
Table 1: Overall summary of ATT's based on group aggregation: Full Sample, Absolute Values.

ATT	**Std. Error**	**95% Conf. Int.**
-0.095	0.0165	[-0.1274, -0.0626]*

Furthermore, the group-time effects can be aggregated into average treatment effects based on varying durations of exposure to the treatment. This allows for a dynamic observation of the development of municipal tax multipliers, making it possible to track changes for each year following the treatment. The values aggregated by event time are undoubtedly the key estimates in this study, as they provide insights into the dynamics of tax rates, serving as a proxy for cost reductions driven by increased efficiency.

In the event study plot (figure 13), the x-axis represents the duration of exposure to the treatment, while the y-axis shows the estimates of the average treatment effect on the treated (ATT). An exposure duration of 0 indicates the average effect of participating in the treatment across all groups during the period when they first undergo the treatment. In this case, this means the first year after the completed merger. An exposure duration up to and including -1 corresponds to the period before the groups' initial participation in the treatment, ergo the consolidation.

Figure 13: Event Study Plot: Full Sample, Absolute Values



First, it can be confirmed that there were no anticipation effects, meaning that municipalities implemented the new tax rates only after the merger, not before. This is likely due to the relatively short period between the decision and the execution of the merger, as previously mentioned. Additionally, it is evident that in the first year of the merger, tax rates were reduced by an average of 0.12 points (-7%), which is slightly higher than the average across all event times, that lies at -0.0873. Following this, a slight increase is observed, reducing the effect to -0.06 points by the 15th year after the merger - essentially halving it. Only the years 0 to 12 show a statistically significant difference from 0 at the 95% confidence level. From the 13th year onward, a slight upward trend in the average estimates can be seen, suggesting that tax rates may indeed rise again after a certain period. Interestingly, the rates remain relatively constant during the first 10 years, coinciding with the maximum period in which the Canton of Bern financially supports the merged municipalities to mitigate the externalities of a merger. However, it should be noted that as the sample size for analysis diminishes over time, the uncertainty and the confidence intervals widen, making definitive conclusions

in this regard more difficult.

Absolute Values: Modified Control Group

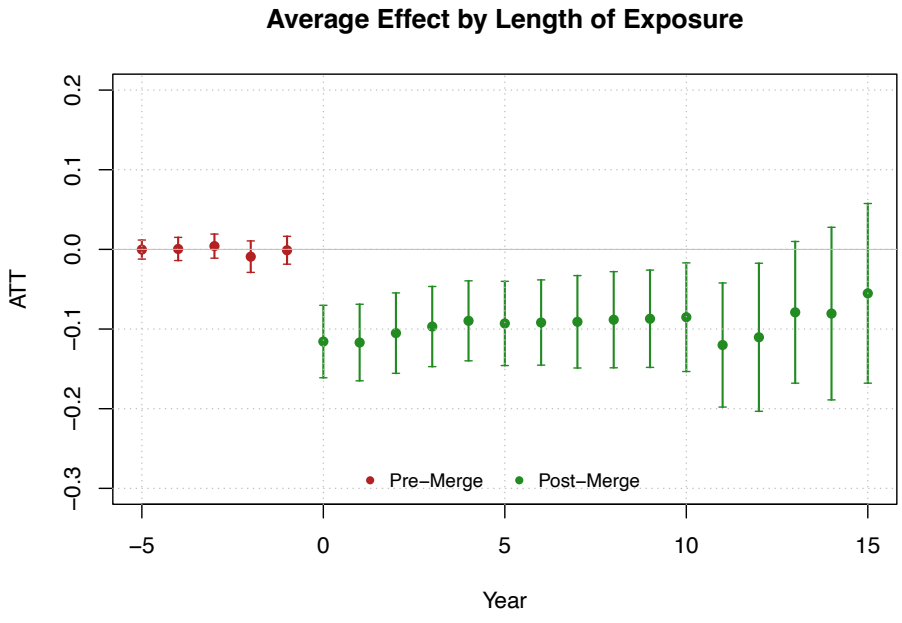
Here, instead of using the not-yet-treated units, the never-treated units are employed as the control group. The overall summarised ATT changes only minimally and remains statistically significant.

Table 2: Overall summary of ATT's based on group aggregation: Full Sample, Never Treated Control Group

ATT	Std. Error	95% Conf. Int.
-0.093	0.0165	[-0.1254, -0.0606]*

Furthermore, the values in the event-study plot do not differ markedly from those of the not-yet-treated control group. This finding suggests that the not-yet-treated group serves as an excellent control group, as it not only encompasses a larger number of units but also demonstrates a consistent effect with the more narrowly defined never-treated control group.

Figure 14: Event Study Plot: Full Sample, Never Treated Control Group



6.1.2 Logarithmised Values

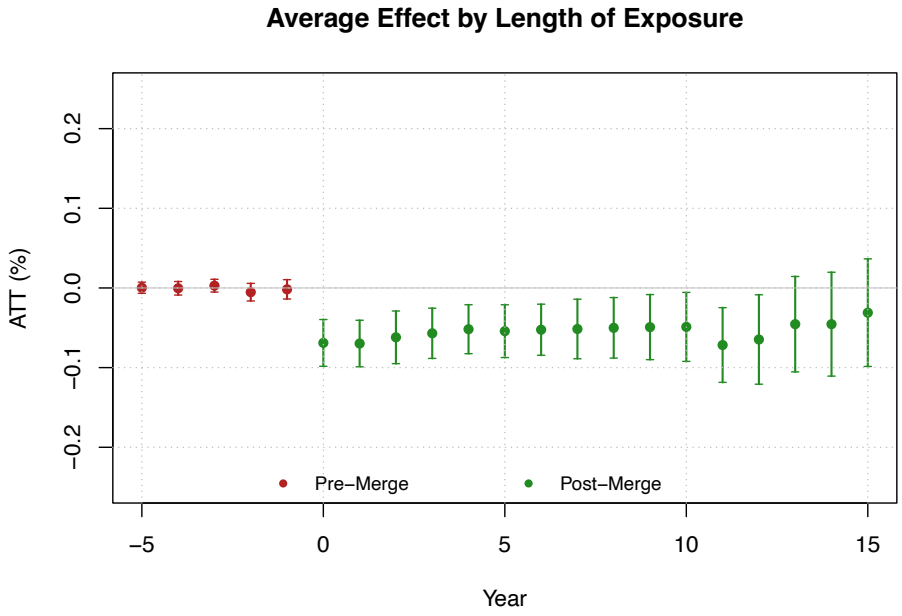
For better understanding, the percentage change in tax rates, by logarithmizing the tax multipliers, will be analysed in this part. In the general case, where all merged municipalities are included in the treated sample, the average effect aggregated by groups is around -5.4%. This means that, on average, across all time periods and municipal groups, the tax rate of merged municipalities decreases by 5.4% compared to the control group.

Table 3: Overall summary of ATT's based on group aggregation: Full Sample, Logarithmised Values

ATT	**Std. Error**	**95% Conf. Int.**
-0.0536	0.0105	[-0.0741, -0.0331]*

In the event study plot, the same pattern emerges as with absolute values, but with smaller uncertainties — meaning a smaller standard error and thus a narrower confidence interval. In the first year, the tax rate decreases by an average of 6.9%, and by the 15th year after the merger, the reduction rises to 3.1%, though with an increasing uncertainty.

Figure 15: Event Study Plot: Full Sample, Logarithmised Values



These findings are in line with the results of Stettler (2022), who estimated an average tax rate reduction of about 6%. His model, like the one used here, also estimated a stable development of tax rates for the first six years. In the subsequent subsections, where the treated group is specified to measure heterogeneous effects, the percentage change is indicated in parentheses.

6.2 Differentiated Sample

In the previous part, the general case was addressed. In this chapter, heterogeneous effects are estimated by specifying the treatment group. The characteristics of the subgroups are analyzed in three parts: the first focuses on the tax level before the merger, the second on population size, and the third on the municipality's status after the merger. This allows for a better understanding of merger dynamics, regarding the development of tax rates in municipalities with different characteristics.

6.2.1 Pre-Merger Tax Multiplier

In the first differentiation, the treated sample is divided based on their tax multipliers before the merger in two groups. The first (Above Average Tax Multiplier) includes only those municipalities in the treated sample that had a tax multiplier equal to or higher than the cantonal average in the year preceding the merger. This group consists of 57 municipalities. The second group (Below Average Tax Multiplier), which includes 45 municipalities, consists of municipalities whose pre-merger tax rate was below the cantonal average in that specific year.

Above Average Tax Multiplier

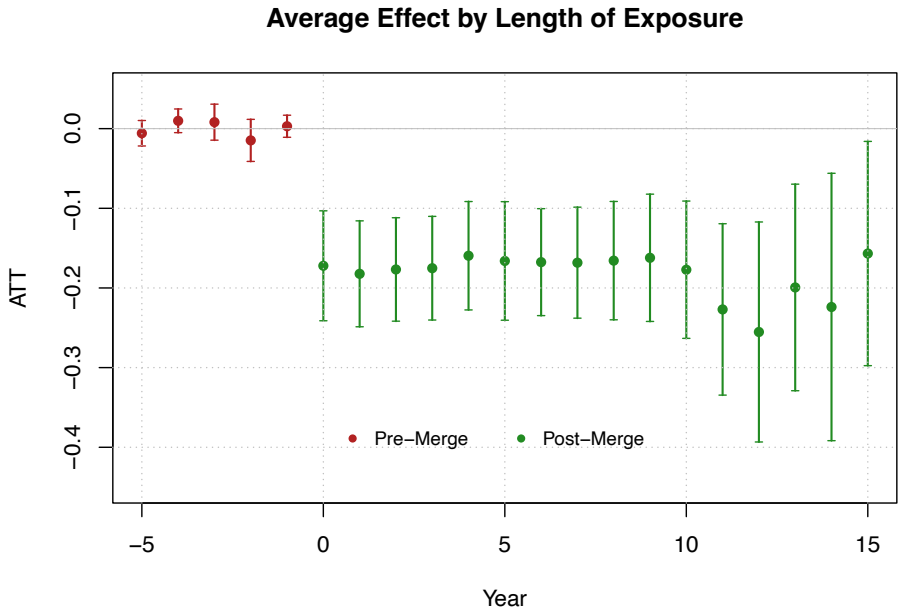
Municipalities whose tax rates were above the cantonal average in the period before the merger experience a strong reduction of, on average, nearly 0.17 points in the tax multiplier, which corresponds to a 9.5% reduction.

Table 4: Overall summary of ATT's based on group aggregation: Above Average Tax Multiplier

ATT	**Std. Error**	**95% Conf. Int.**
-0.1686	0.0236	[-0.2148, -0.1223]*

When analysed over time in the event study plot, the reduction remains stable in the first 10 years after the merger and then later begins to fluctuate.

Figure 16: Event Study Plot: Above Average Tax Multiplier



Below Average Tax Multiplier

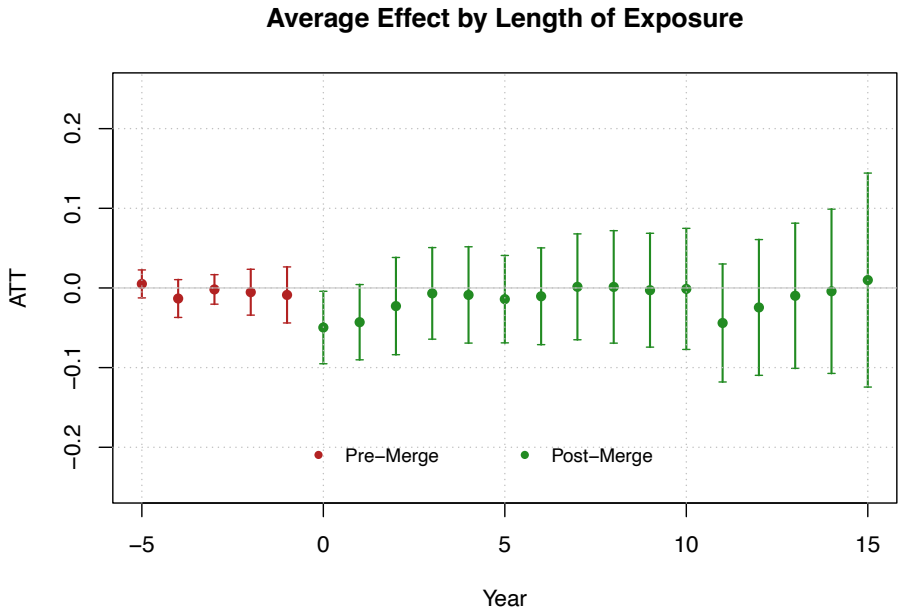
The average treatment effect on the treated for municipalities with an below-average tax rate one year before the merger is -0.0023 (-0.12%), which is distinctly smaller, if not non-existent. The change in the tax rate is also not statistically significantly different from 0 at the 95% confidence interval.

Table 5: Overall summary of ATT's based on group aggregation: Below Average Tax Multiplier

ATT	Std. Error	95% Conf. Int.
-0.0023	0.0156	[-0.0329, 0.0283]

According to the event study, this non-existent effect is stable over the entire period. With the exception of the first year of the merger, all event-time effects are statistically insignificant away from 0. On average, these below average tax multiplier municipalities are therefore unable to reduce their taxes following a merger.

Figure 17: Event Study Plot: Below Average Tax Multiplier



This indicates that the tax multiplier for municipalities with pre-merge above average taxes experiences a strong and significant reduction, in contrast to municipalities with below-average taxes.

6.2.2 Pre-Merger Population

In this differentiation, the treated sample is divided based on their population size before the merger. The first group (Above Average Population) includes only those municipalities in the treated sample whose population size in the year prior to the merger was equal to or larger than the cantonal average. However, this group consists of only 12 municipalities. The second group (Below Average Population) consists of a significantly larger number of 90 municipalities whose population size in the year before the merger was below the cantonal average. This suggests a tendency for primarily smaller municipalities to merge into a larger one.

Above Average Population

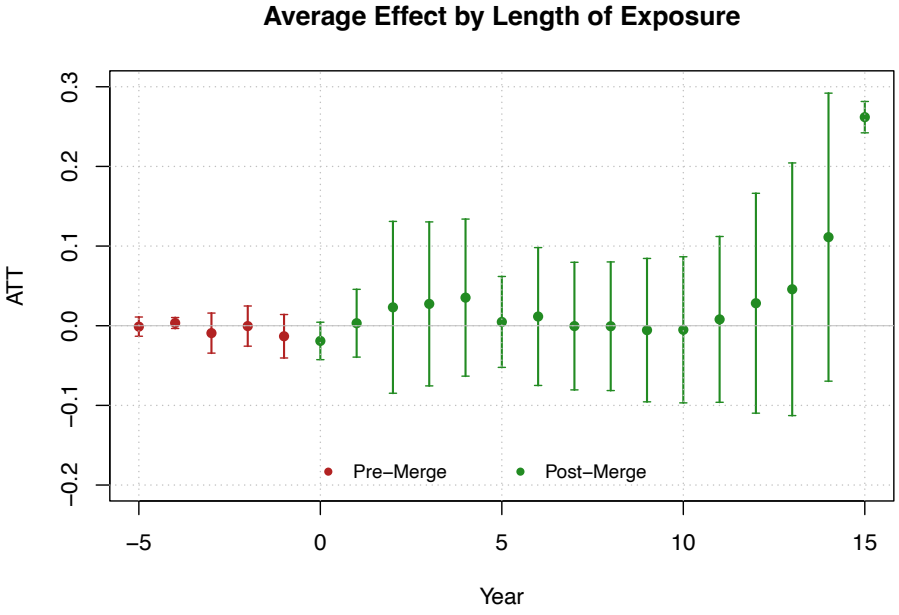
Above-average population size municipalities, do not experience a reduction after their merger. In fact, the effect is slightly positive at 0.0283 (1.86%), although it is noticeable insignificant.

Table 6: Overall summary of ATT's based on group aggregation: Above Average Population

ATT	Std. Error	95% Conf. Int.
0.0283	0.0209	[-0.0126, 0.0692]

The ATT's aggregated by event time since the treatment confirm the pattern that this group does not experience a reduction in taxes. In no period is the average effect significantly different from 0. With the exception of the year 15, which has more to do with the very small data set than with a statistically valid statement.

Figure 18: Event Study Plot: Above Average Population



Below Average Population

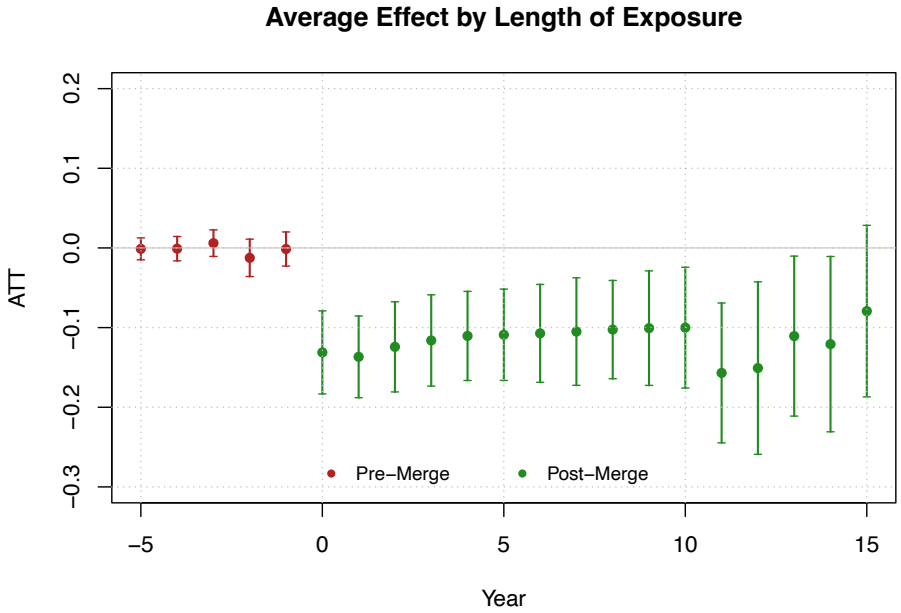
When the treated sample is restricted to municipalities with below-average population sizes, a relatively strong average reduction of -0.11 points (-6.31%) is to be expected. This estimated change is also significant on the 95% confidence interval.

Table 7: Overall summary of ATT's based on group aggregation: Below Average Population

ATT	Std. Error	95% Conf. Int.
-0.1115	0.0205	[-0.1516, -0.0714]*

In the event study plot, it is shown that the reduction remains constant across all time periods. All periods, except for period 15, are significantly different from 0 at the 95% confidence level. In period 0, which corresponds to the first year of the newly merged municipality, the reduction averages 0.13 points.

Figure 19: Event Study Plot: Below Average Population



The results indicate that the tax multiplier for smaller municipalities experiences a strong and significant reduction, in contrast to municipalities with an

above- average population size compared to the period before the merger.

6.2.3 Status after the Merger

As described in the data chapter , there are two types of status after the merger a municipality is given. The first property, dissolved, is given to municipalities that are fully integrated into their merged municipality or formed with their merging partner(s) a new municipality (type C). The dissolved sample includes a total of 76 municipalities. The other property is the opposite, not dissolved, which applies to municipalities that have absorbed the other municipality. In this sample, there are a total of 26 such municipalities that continue to exist after the merger. The change in taxes of those groups will now be examined.

Dissolved

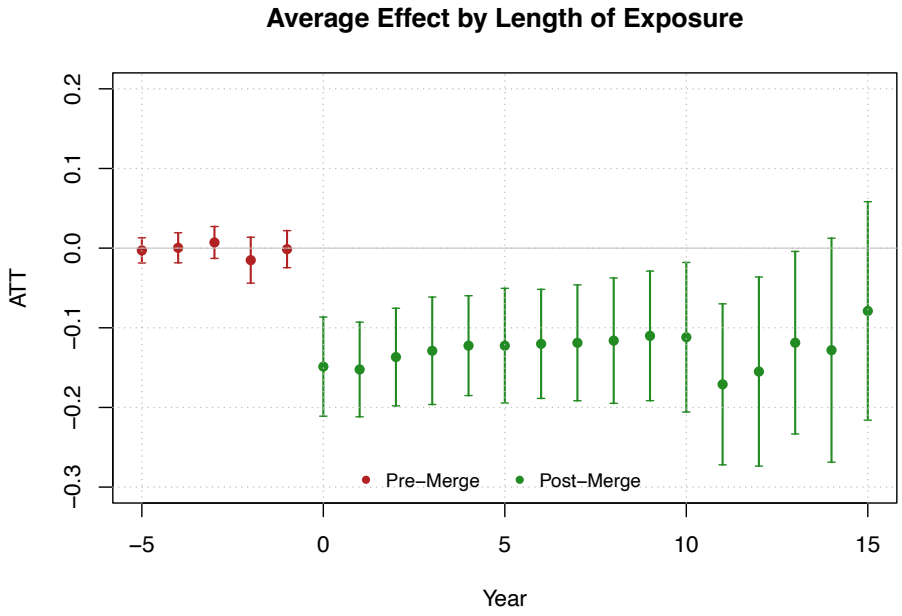
First, the estimated change in tax rates is examined for municipalities that are dissolved after the merger. This reduction of -0.13 in the tax multiplier, or -7.1%, is relatively pronounced and significantly different from 0.

Table 8: Overall summary of ATT's based on group aggregation: Dissolved

ATT	**Std. Error**	**95% Conf. Int.**
-0.1268	0.0228	[-0.1715, -0.082]*

When the ATT(g,t) is aggregated by event time, a stable reduction is observed that lasts for at least 10 years across all time periods. In the first year of the merger, the average decline is 0.15 points, which corresponds to a reduction of about 8.7%.

Figure 20: Event Study Plot: Dissolved



Not Dissolved

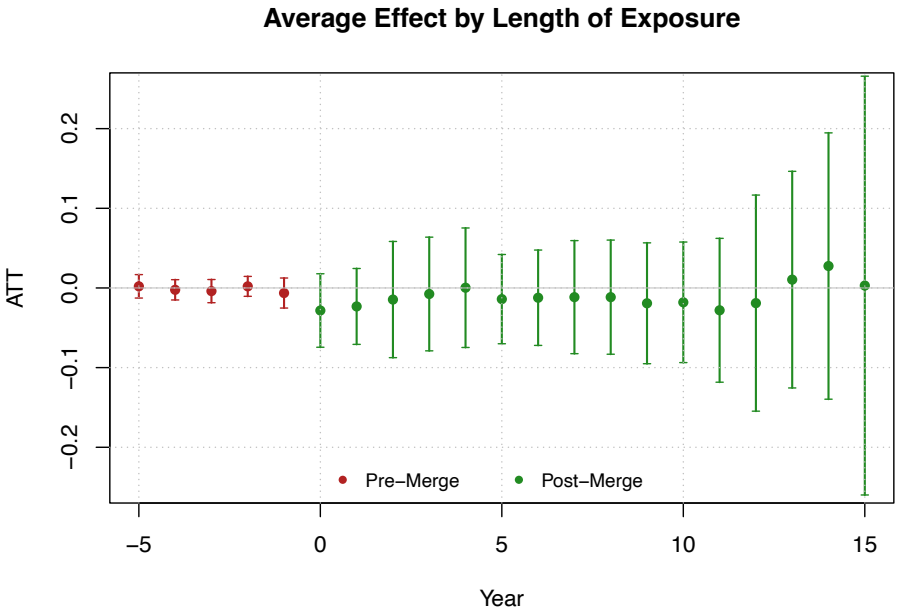
When the treatment sample is limited to municipalities that continue to exist after the merger, classified as not dissolved, there is minimal change in the tax rate. The cumulative ATT across this group is -0.0021 (-0.12%), which is slightly negative but statistically insignificant.

Table 9: Overall summary of ATT's based on group aggregation: Not Dissolved

ATT	Std. Error	95% Conf. Int.
-0.0021	0.0132	[-0.028, 0.0238]

The ATT's aggregated by event time present a similar picture. Although the variation increases significantly after the treatment, the direction of the effect remains unclear, which is why the aggregated ATT's in every event time stay around 0.

Figure 21: Event Study Plot: Not Dissolved



The division of the treatment sample into *dissolved* and *not dissolved* also reveals a differentiated picture of the changes in the tax multiplier. Municipalities that merged with neighbouring municipalities or formed an entirely new one, experienced a significant and pronounced reduction in taxes. In contrast, the other group of municipalities did not record a significant reduction in tax multipliers, although there are certainly some exceptions among them.

6.3 Conclusion

The change in the tax level was analysed and assessed using both the full sample and six differentiated subsets. A consistent finding across all specifications is the absence of anticipatory pre-treatment effects. This indicates that municipal tax rates remained stable in the period leading up to the merger. Consequently, it suggests that municipalities did not engage in free-riding behaviour, as has been observed in some other countries. Post-treatment, the behaviour of tax rates varies significantly across the different samples.

In three of the differentiated groups, the tax rate remains relatively stable on average after the merger, albeit with increased uncertainty, reflected in the standard error. These groups consist of municipalities with a below-average pre-merger tax multiplier, an above-average population, and those categorized as *not dissolved*. It is intuitive that municipalities already operating with a below-average taxes do not reduce it further after the merger. However, this also indicates that mergers do not necessarily lead to increased efficiency for all municipalities, insofar as taxes can serve as an indicator. Furthermore, as demonstrated in the chapter Descriptive Statistics, there is a loose but nonetheless negative correlation between population size and tax multipliers: the larger the population, the lower the average tax multiplier. The group of municipalities with an above-average population did not experience a significant tax reduction post-merger. Additionally, municipalities labelled as *not dissolved* after the merger did not noticeably reduce their tax rates either. As highlighted in the chapter Descriptive Statistics, these non-dissolved municipalities tend to have an above-average population size and below-average tax rates.

This raises the fundamental question, which remains unanswered in this context: do these municipalities have lower tax rates because of their larger population, or does the higher number of taxpayers make it possible to maintain lower municipal taxes? At the very least, the larger and fiscally attractive municipalities were able to continue as legal entities post-merger, albeit without reducing taxes.

On the other hand, municipalities with an above-average tax level, a below-average population, and those that were absorbed into the new legal entity have, on average, experienced a significant reduction in their tax rates. The negative effect was most pronounced in the sample of municipalities with an above-average tax rate. This is certainly an interesting finding, highlighting

that municipalities with a higher tax burden prior to the merger were able to adopt lower rates within the new municipality. Given the slight negative correlation between population size and municipal tax multipliers, it is not surprising that the tax rate reduction is significant for municipalities with a below-average population. Municipalities with above-average pre-merger taxes and a population smaller than the cantonal average were more likely to be dissolved during the merger process. It is therefore clear to see that a small population and high taxes influence the continued legal existence of the municipality after a merger. These characteristics stand in contrast to the municipalities described in the previous section, which were not dissolved.

However, considering the entire sample of all treated municipalities, the reduction remains relatively stable during the first ten years following the merger, after which it fluctuates more noticeably, providing some indications of a potential later increase. It can thus be demonstrated that this reduction, both across all treated municipalities and within the more distinctly differentiated samples, is significant and sustainable over several years. The subsequent chapter will further contextualize and discuss these results.

7 Discussion

In this study, based on the municipal mergers in the canton of Bern between 2004 and 2024, several important insights were gained. The results suggest that, on average, smaller municipalities with a lower population density and higher tax levels, which are absorbed into their merger partner municipalities, could reduce their tax levels significantly. This indicates that they either adopt the lower tax multiplier of the municipality they merge with or a new, lower joint tax rate is chosen. However, it is also important to note that there were cases where all involved municipalities have been dissolved and formed a completely new one. How tax rates behaved in these specific cases was not

explicitly investigated, but this would undoubtedly be interesting, as such mergers are the closest to a new partnership rather than a quasi-integration. The municipalities, classified as not dissolved, tend to have, in comparison, larger populations, higher population densities, and below-average tax levels and have not experienced a significant decrease in their tax multipliers.

As mentioned, the tax multipliers in this study serve as a proxy for the costs municipalities expect and incur to provide their services. It becomes evident that a merger does not necessarily reduce costs in all cases. There are several reasons for this. Firstly, the administration of some municipalities merging with larger and financially stronger ones may be too small to achieve economies of scale. At the same time, these administrations may be absorbed by the larger municipality without requiring an increase in its tax rates, even in the presence of an inefficient municipal structure. Secondly, mergers are not solely motivated by cost considerations; for example, difficulties in filling positions, whether in administration or political offices, can also drive municipalities to amalgamate. Or the municipalities have already been working closely together for some time, allowing a merger to reduce coordination costs. Thirdly, it is often challenging to realise efficiencies immediately, as infrastructure such as administrative buildings or maintenance depots must also be consolidated. Additionally, municipal administration staff cannot (or can only gradually) be dismissed due to legal constraints or considerations of public acceptance, which significantly limits the scope for savings. However, the tax level reduction did not get any larger over time on average but, within the range of statistical uncertainty, have even increased slightly at the end of the observation period. This suggests that savings are also not realised at a later stage. Fourthly, the literature review revealed that, when cost reductions can be achieved, they often occur in the administration of the commune. Since administrative tasks constitute only a portion of municipal activities, the potential for cost reductions is inherently limited. Furthermore, many municipal services are difficult to scale, as their delivery costs increase with

the size of the municipality. Nevertheless, a statistically significant reduction in tax multipliers was observed.

As previously mentioned, this effect is not entirely causal, as tax rates are always a component of merger negotiations. It would also be highly interesting to further analyse the actual administrative costs and/or the debt development of the newly created municipalities in comparison to the control group. This would undoubtedly provide additional insights into the extent to which economies of scale can emerge in municipal mergers. Specifically, it would be valuable to identify the areas of activity where cost reductions, if achieved, are most likely to occur. Other researchers have primarily observed an effect on administrative costs.

This study did not address the level of service provision, either. While it is very difficult to measure, findings in this regard could shed light on one of the main arguments for mergers. Larger municipalities, if unable to reduce per capita costs, should at the very least be able to provide their taxpayers with a broader and more professional range of services. A more detailed analysis of this topic could also examine the specific main reasons behind each merger. This would help to determine whether a focus on cost advantages is even necessary to classify a merger as successful. As other authors have noted, the reasons behind amalgamations projects are often highly diverse, and the dynamics between merger partners are typically unique, with some cases involving a longstanding partnership prior to the merger. For this reason, broader generalisations about municipal mergers may not necessarily apply to every project. Whether a consolidation or inter-municipal cooperation is reasonable largely depends on the specific circumstances. Nonetheless, it is essential to gain further insights to allow for a more comprehensive understanding and assessment of this topic. By addressing existing research and conducting its own analysis, this thesis can serve as an additional basis for making well-founded decisions for future merger projects.

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