What would be the ideal size for municipalities? Evidence from municipal amalgamation in Netherlands

In recent decades, though with much reluctance, municipalities in the Netherlands have been encouraged to amalgamate with each other to increase their scales. Scale enlargement is seen as a cost-saving instrument for local governance, although in academics, evidence for the existence of scale effects in municipalities is not abundant. There are many problems with looking at per capita spending or service levels, not to mention satisfaction or other subjective criteria. That is why, after looking into current literature about local governance sizes extensively, this paper investigates, exploiting a phenomenon called "Tiebout sorting", or voting-by-feet, whether municipalities become more attractive in the long run after municipal amalgamation, using population data from 1830 until 2018. If municipalities become more attractive after amalgamation, using Difference-in-Difference methods, we should be able to see breaks in population trends of municipalities after they amalgamate, compared to a close "twin" that does not. We find some evidence that amalgamation could be beneficial for attracting population, assuming it has no influence on natural population development.

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1. Introduction

Increasingly in Europe, legislation is being moved away from the level of national government. As also the EU becomes more influential, municipalities are being put in the driver's seat. In the Netherlands, municipalities are charged with implementing social care and benefit schemes, environmental management, providing infrastructure and more, while also receiving more and more freedom and independence to implement policy as they see fit. Although directives are set at the national or provincial level, the idea is that they are closer to the public, hence best responsible for carrying out local tasks effectively. Logically, the sizes of local government service areas matter for effective implementation of local policy.

Municipality sizes vary much in Europe, and even within countries. The European average municipal population is below 5,000 inhabitants, for instance, while it is above 50,000 in the Netherlands (2022). In the Netherlands it varies even, from just above 900 (Schiermonnikoog, 2022) to almost 900.000 (Amsterdam, 2022). Clearly, it is not possible for such differently sized municipalities to manage the same package of tasks. This is recognized, as even the Amsterdam municipality currently has multiple partnerships with neighbouring municipalities to provide certain services, because it is more efficient at larger scales. Numerous regional cooperation initiatives to provide local services at varying scales in the Netherlands exist, as municipal areas and borders, more often than not, are results of historic and environmental coincidences that only play minor roles today. Many cities' metropolitan areas, currently, vastly exceed their respective municipal borders.

The Dutch government, in 2012, had unpopular plans to encourage municipal amalgamation until only municipalities with populations of over 100,000 people would exist. The argument was that scale effects would bring about cost savings. Not only are the cost-effects of amalgamations unclear, though, among municipalities themselves there is a reluctancy to be integrated into others, as they resist giving up their perceived identity and/or sovereignty. When smaller municipalities do amalgamate, it is often with anyone but their bigger urban neighbour, in order to avoid becoming "swallowed up", which explains why in the Netherlands we currently see "doughnut municipalities". These are isolated central city municipalities, surrounded by doughnuts of merged rural or suburban municipalities, unwilling to officially become part of a larger city's urban area (Marlet & Van Woerkens, 2014).

The question is whether this is the most efficient way for local governance to organise itself. Interaction regions became larger through improved infrastructure and communication, though municipality sizes did not grow at the same pace. We are interested in whether scale enlargement makes municipalities more attractive in the long run. That is why this paper investigates, using a Difference-in-Difference design, whether amalgamated municipalities become more attractive in the long run, exploiting a phenomenon called "Tiebout sorting", or voting by feet. Attractive areas for living attract more people, therefore see higher population growth numbers, than unattractive places. We would expect that, if amalgamation makes municipalities more attractive, a break in population growth trends should occur. We consider that pre-amalgamation trends make that not every municipality is as likely to be amalgamated. We expect varying results, namely that: municipalities showing relatively slower population growth are more likely to be amalgamated; municipal amalgamation leads to stronger population growth, or weaker negative population growth; amalgamated municipalities see stronger population growth, post-amalgamation, than similar groups of non-amalgamated municipalities that are similar to it, pre-amalgamation; amalgamated municipalities see population growth more similar to municipalities that are similar to it, post-amalgamation. We define similar (sets of) municipalities as having similar population densities, peripherality and attributes (proximity to rivers, borders, bigger cities etc.).

2. Literature Review[1]

2.1 The roles of municipalities

In O'Sullivan's ***Urban Economics*** (2000), he lays out what he sees as the role of local government and fiscal federalism in the US. Although not exactly like the Dutch situation, it is useful to think about when to use local government is, which his framework allows us to do. Three types of government policies are identified, namely: 1) stabilisation policy, monetary and fiscal policy to control unemployment and inflation; 2) income redistribution, taxes and transfers to alter the distributions of income and wealth; 3) and resource allocation, subsidizing and taxing goods activities to influence decisions of the private sector. Local governance is unfit for stabilisation policy, as their scale is too small, and unfit for income redistribution, because local tax regimes would cause wealthy people to move to where taxes are lowest, and the poor to where transfers are highest. Local governance is there mainly to perform, apart from administration, resource allocation: to provide and fund goods and services like education, highways, police and parks.

This is not a very wrong description of what Dutch municipalities do, although they also play significant roles in implementing the Social Support Act (WMO), the Participation Act (for the unemployed), as well as youth care, for example. For provisions of infrastructure, nature and agricultural area, as well as the expansion of cities and industrial sites, directives are set by the provinces. This makes sense as transport and nature cross municipal borders, as these borders demarcate interactions zones accurately, currently. The provinces take care of maintenance of bridges and provincial (bike) roads, and monitor environmental and water management, as well as municipal policy.

2.2 Scale effects vs. tailoring

Scale effects exist when the production of one additional good is cheaper than that of the last good, bringing the average unit cost of production down as production increases. When they exist, it is good for society to concentrate production, and let the market enjoy lower costs. A famous example is smartphones, where high overhead costs are spread over many costumers. In the neoclassical economic view, conventional wisdom is that increasing local governance scales will bring down the per capita cost of local government, due to spreading labour and other costs over larger populations (O'Sullivan, 2000).

Allers & Geertsema (2014) studied the effects of municipal amalgamation in the Netherlands on spending and service levels of municipalities, but found no significant effect. In tax collection, scale effects do exist, but not in an economically significant way (Niaounakis & Blank, 2017). Research on municipal amalgamations in other countries points to decreases in per capita spending in Israel and Germany (Reingewertz, 2012; Blesse & Baskaran, 2013), as well as increases in spending in Switzerland, Denmark and Finland (Lüchinger & Stutzer, 2002; Hansen, 2014; Moiso & Uusitalo, 2013), although the mechanisms of these cost effects are not yet clear.

Proponents of smaller municipalities state that as the population becomes more homogeneous, there will be less disagreement. Though here, Boogers (2013) observed something peculiar. In the Netherlands, merged municipalities, with multiple kernels, could in theory have more political fragmentation, but actually experience it less, as if the presence of potential centrifugal forces in multi-kernelled municipalities leads to the unity of that municipality being treated with extra care. Relative political allies are more inclined to

[1]Section 2.1 until 2.5 leans heavily on ***What would be the ideal size of municipalities?*** (Ruben Velsink, jan 2023).

overcome minor differences, while small municipalities have more, smaller parties on average with few clear differences at first sight, often as a result of disagreement on relatively minor issues, (Aalberts, 2018).

Another advantage of smaller municipalities could be that they might be more efficient because democracy benefits from the smaller distance between local politics and voters, as shown in higher voter-turnouts in local, as well as national elections (Allers et al. 2021). Note, however, that this is a subjective phenomenon, and not actual democratic efficiency. The effect of decentralisation on democracy is intuitive, although democratic efficiency theory would suggest that the size of local governance should match the region where its decisions have consequences in order to properly take all costs and benefits of decisions into account. One can debate the democratic efficiency of a small rural municipality being pushed over by its bigger urban neighbour on every regional issue. A difficulty is that we cannot have a matching layer of local governance for every type of good or service that local governance provides.

2.3 Partnerships vs. competition

Intermunicipal partnerships have been offered as solutions to the problem of scale. The idea is that we can have scaling on demand. Many partnerships for services like garbage or tax collection exist. Without, arguably, we would already have much fewer municipalities. Allers et al (2015) found, however, that the price these partnerships pay for risk-free credit, for instance, is significantly higher than single municipalities do, providing the same services. Amalgamation, often the alternative to partnership, does not lead to higher interest rates. Though, being only one of the costs of dispersed ownership, consistent with corporate governance theory, it can be interpreted as an inefficiency.

In practice, scale issues are resolved through partnerships, but we also enter in an untransparent web of collaborations at varying regional levels. Transparency is desirable for democracy, as it allows voters to compare their local officials' performances to others'. Through this ability to compare, a 'yardstick-competition' effect is introduced (Salmon, 1987). After implementation of policies by all municipalities, winning practices can be adopted by lagging municipalities, creating the yardstick-effect. This has been shown in the Netherlands, fostering policy innovation in the early 2000's while implementing the WMO after initial decentralisation to the municipal level (Edzes, 2010). In theory, officials only need to think that their performances are compared to others' for this effect to occur, without voters actually having to invest time in doing so.

Competition can also be harmful. For instance, municipalities try to grow employment in their local economy by providing new industrial land to attract businesses, or support and retain existing businesses. De Vor (2011) showed that industrial-site planning, with municipalities competing for local businesses, is highly ineffective, and likely leads to overprovisions of industrial sites, inducing high degrees of inefficient land use and other distortive landscape effects. Externalities are present and occur outside of municipal boundaries. They come into play when the service areas of decisionmakers do not match the area where their decisions have consequences, and, maybe better than scale effects, they could help us understand more about proper service area sizes.

2.4 Externalities

Externalities are costs or benefits imposed on people outside of the initial transaction, and therefore not included in prices. The market fails to include the climate cost of fuel, or the benefit of the presence of nature in transactions, which is why government intervention, through taxation or other policy, is desirable. Amsterdam could invest in a theatre, while people

living close to Amsterdam in other municipalities also benefit from this. Because of this situation, we currently see government intervention in the form of the Municipal fund, which allocates funding to municipalities, depending on their population sizes, facilities and other factors.

De Groot et al. (2010) show that land price surpluses around cities, compared to the price of agricultural land, are closely related to the near provision of public goods and facilities, and act as a proxy for people's monetary appreciation of them. Concluding from looking at land price surpluses throughout the Netherlands, they state that a city extends to approximately one hour of traveling from its central city area, containing most of the amenities. Unsurprisingly then, in a small, well connected country like the Netherlands, areas with land price surpluses transcend municipal boundaries vastly, leaving little space for rural areas. Near the Randstad, rural areas have significantly higher land prices than in peripheral regions, while no one would argue that they only could owe this to superior governance. These surpluses are to a significant extent imposed by the Randstad. Total land price surpluses of residential destinations in the Netherlands attributed to provision of goods and facilities amounted to 340 billion euros in 2010 (De Groot et al., 2010). This figure still excluded the land price surpluses of industrial terrains, but already illustrates the economic importance of the provision of goods and facilities, as well as their externalities.

According to Samuelson's condition (1954), municipalities should act as land developers that invest in goods and facilities until the marginal societal benefit of extra development equals the marginal costs to arrive at the social optimum. If costs are the tax costs for an electorate to provide goods and facilities in their service area, while significant parts of the societal benefit is noticed through land and other price surpluses outside of area, first-best decision making becomes impossible. Yet, this happens in the Netherlands and in many other places. It could lead to underprovisions of public goods and facilities without government intervention, causing municipalities with central cities to need more national funding. This brings about tensions in the democratic landscape, because for instance, the fact that most national decisionmakers reside in bigger cities that need more of that funding. It is not an uncommon phenomena that central city municipalities struggle with finances, while near, surrounding suburban municipalities, often providing very few services themselves, have plenty of money sloshing around, creating an unwillingness to amalgamate as they would be "paying for the city's bad behaviour". There is also the possibility of negative externalities crossing borders, like when one municipality benefits from tourism, while its neighbours receive the traffic.

Looking at commuting behaviour in the Netherlands, one sees that many people cross municipal, and even provincial boundaries on a daily basis, providing more evidence to support the idea that cities transcend their municipal borders. In fact, looking at commuting for work and leisure, and the presence of infrastructure and public goods and facilities per region, Marlet & Van Woerkens (2014) identify only 57 regions in the Netherlands that are reasonably self-sufficient (Appendix C.). Furthermore, the Dutch government, asked by the EU to identify regions with urban cores and strongly integrated surroundings, itself identifies only 40 regions (NUTS 3). The numbers are significantly lower than the number of municipalities (342 in 2023) we currently see in the Netherlands. Thinking about what defines cities or interaction regions, could lead us to think that there are currently too many municipalities, especially considering that their taskpackage is evergrowing. These numbers are still significantly larger than the number of provinces (12 in 2023), however. An appropriate size of local governance is likely closer what we now refer to as 'the region'.

2.5 Political and affectionate implications

Boogers (2013) noticed that scale enlargements should take a possible weakening of democracy into account. Decreases in voter-turnout after municipal amalgamations are worrying, but require further investigation before we use it as a reason not to pursue scale enlargement. In Europe, studies found that municipal elections are largely determined by the state of the national economy (Bosch, 2016; Martins & Veiga, 2013). In the Netherlands this appears to be the case as well. Two types of irrational economic voting are important: firstly, local-economic voting, by the state of the local economy, regardless of the state of similar local economies in the country; and secondly, second-order economic voting, by the state of the national economy and the party-relations of local officials to the national coalition parties, even though they have no influence on these. Allers & Coenradij (2017) show that these occur in the Netherlands when local and national coalitions overlap, suggesting that judgement of local officials is not functioning properly. If the perception and the reality of the performance of local representatives are very different, or the local representatives are not known and only their party-relations are looked at, perhaps there is not always need for extra funding or efficiency, but rather for knowledge-, and perception-focused solutions.

Through this light we should also look at the very questionable opposition between the city and the countryside, as often referred to. Smaller, rural municipalities have rarely been the most prosperous in the country, and these are municipalities where national government-critical parties gain significantly. Government-critical parties also gain, though, in less prosperous (parts of) cities, experiencing shrinkage and economic decline. In most major cities, coalition parties, or less national government-critical parties book their successes. Rather than saying there is a gap between city and countryside, we could say there is a gap between people in those regions that succesfully participate, and those that do not. Looking at it this way, the fact that smaller, less prosperous municipalities are reluctant to hand over their perceived sovereignty to a bigger neighbour can be seen, not purely as economic calculation, but also in itself as national government-critical sentiment.

Some suggest to solve issues like alienation of local politics through decentralising even further, to increase people's awareness of the importance of local issues at municipal elections and engage them to participate more. Others are to hold municipal elections at different days, like practised in the U.K., or more radically, exclude national parties from local elections overall (Allers & Coenradij, 2017). None of these solutions, yet, have much empirical evidence to support them. As urbanisation and agglomeration increase, though, these questions gain even more significance. It is essential for society to realise the increased importance of local government structures, especially as national governments are giving more legislative power to the EU, while also significantly decentralising others to the local level, and the regional becomes more important than ever.

2.6 Sorting

In order to look at what the best size of a municipality could be, or whether they should be increased in scales or not, we can look at various mechanisms. Some have looked at expenditure or service levels, as mentioned before, but one can also look at the attractiveness of a municipality. Assuming that people are perfectly mobile, and know about the amenities, as well as the cost of living in various types of, or specific municipalities, Tiebout (1956) argued that consumer-voters sort themselves into communities that offer the most utility to them, as heterogeneous individuals. Consequently, a municipality that becomes more attractive in general, will generally attract more consumer-voters, and would see an increase in population growth compared to other municipalities. People are not perfectly mobile, and the cost of

living, and especially the level of amenities are not perfectly transparent, yet the idea that this process could be happening does not seem too unreasonable. As modern, suburban population kernels like Hoofddorp and Zoetermeer emerged after World War II, people left central cities en masse for space, nature and safe streets. In recent decades, as urban life improved significantly, people have been drawn into central cities again, and to some more than others, indicating, perhaps to some extent, sorting and utility-maximising behaviour.

Determining whether scale enlargement is desirable by looking at the costs or service levels of local governance in the short or medium term, can be problematic due to nationwide economic events or behaviour by municipalities around amalgamation processes. The level of post-amalgamation funding is often based on the levels of pre-amalgamation spending, bringing about spending incentives for the municipalities that are to be amalgamated, for instance. The service level of municipalities is difficult to measure, and might not always tell the complete story, considering that many people in the Netherlands do not only consume public goods and facilities in their own municipalities, but also in others' on a frequent basis. If municipal amalgamation would increase the living quality of a service area, we would expect to see stronger population growth than in similar areas that did not undergo amalgamation. As people are relatively mobile, but not necessarily in the short term, there could be breaks in long term trends of population growth where amalgamations happen, also if it makes the municipality less attractive. In the next chapter we set up a research design to try and investigate whether increases in local governance service area sizes make the service areas more attractive.

3. Data and methodology

Amalgamations, as mentioned before, happen for various reasons. They can be a big, urban municipality swallowing up their smaller neighbour, which, analytically, is not so interesting for our analysis, as we are here mainly talking about the growth-succes of a central city, and not so much about the benefits of scale enlargement. Another reason for amalgamation is for multiple, smaller municipalities to amalgamate to prevent being swallowed up by their common urban neighbor, creating doughnut municipalities. These defensive amalgamations, one can imagine, are not strategies to increase attractiveness and attract population, rather, they are tactics to prevent or fight ongoing urbanization and agglomeration, making them analytically messy. The amalgamations we are interested in are those of agglomeration projects, where the municipalities in the set are each trying to become bigger, if not the biggest in the region in terms of population or negotiation power, and multi-kernelled municipalities are the result. We will see examples where amalgamation is followed by that municipality growing significantly faster than a close comparable "twin", but also where amalgamation is followed by increases in growth rates, catching up on its respective twin, when pre-amalgamation growth rates were lagging.

We investigate population developments in various examples of sets of municipalities, similar in terms of population, population density, being a cental city, geographic location and attributes (proximity to rivers, borders, bigger cities etc.) throughout almost two centuries, where, ideally, one municipality did amalgamate, whereas its closest twin did not. Obviously, identical twin municipalities do not exist, and only very few municipalities did not amalgamate at least once since being drawn up. Population data is obtained from the Dutch censuses' municipal population numbers from 1830 (= 1), the first census after the end of Napoleon's rule in the Netherlands, when the (mostly) definitive geographic outline of municipal border locations was initially set, until 1971, the last census. From 1988 until 2018, public (CBS)

municipal population data is used, as well as municipal area data. Population numbers reflect those of municipality areas in 2018, or the latest year on which data is available, where pre-amalgamation numbers reflect those of cumulative population numbers of the respective administrative zones in that 2018 area.

Due to the time-intensive task of data gathering in the historical Dutch censuses over this long timeframe, many missing entries, and the fact that many amalgamation waves include most of the municipalities in the region, often eradicating possible control groups, we use only ten twin municipality-sets. They have been selected, partly by looking at data, as described above, and sometimes by looking at known "rivalries" between cities or within a region. Judging what category an amalgamation falls into, and what municipalities are similar is not completely objective, which is a serious limitation of this study. But, using our criterea, we mainly end up with, for Dutch standards, small and medium sized cities in the same region and of similar size initially, or towards the end of our time-frame. With straightforward Difference-in-Difference models, we take much variation over time into account and focus on similarity and breaks in population development trends in the sets of municipalities we consider, visually, as well as statistically.

We look at logarithms of populations numbers, as well as pure population growth, by using indexed population numbers (1830 population = 1). By using ***year*** as our independent variable, we look at the impact of amalgamations on yearly population development/growth. The Difference-in-Difference models are constructed below. Ψ is a variable that equals 0 if a municipality ***i*** has never amalgamated, and 1 from the moment it has it has. If a municipality amalgamated twice within our timeframe, a second amalgamation dummy becomes 1 from that moment on, while the first amalgamation dummy becomes 0. $D_{\hat{\imath}}$ is a dummy variable for a municipality î that underwent or will undergo amalgamation, to take municipality-specific variation into account, compared to the region.

$$(1) \quad \ln(Pop) = \alpha_1 + \beta_1 \cdot year + \beta_2 \cdot year \cdot \Psi + \beta_3 \cdot \Psi + \beta_4 \cdot D_{\hat{\imath}} + \epsilon$$

$$(2) \quad Pop\ norm = \alpha_1 + \beta_1 \cdot year + \beta_2 \cdot year \cdot \Psi + \beta_3 \cdot \Psi + \beta_4 \cdot D_{\hat{\imath}} + \epsilon$$

Many things happened in the 188 years of our timeframe, and amalgamations occur in various ways in various regions. Therefore, it is also worth attempting to construct a model that takes much of this time-, as well as spatial variation into account. Throwing all our data onto one pile allows us to look at higher-order interactions, control for location fixed effects, but also for the type of amalgamation to an extent, by looking at population density in habitants per square kilometer (urbanisation) over time, and whether the municipality holds a central city or not (according to the G57 definition by Marlet & Van Woerkens (2014)). ς is a dummy that equals 1 when the municipality is a central city and 0 otherwise. We then construct our models in the following way:

$$(3) \quad \ln(Pop) = \alpha_1 + \beta_1 \cdot year + \beta_2 \cdot \Psi \cdot year^2 + \beta_3 \cdot \Psi \cdot year + \beta_4 \cdot \Psi \cdot + \beta_5 \cdot \varsigma \cdot \Psi \cdot year^2 + \beta_6 \cdot \varsigma \cdot \Psi \cdot year + \beta_7 \cdot \varsigma + \beta_8 \cdot \ln(Pop\ dens) \cdot \Psi \cdot year^2 + \beta_9 \cdot \ln(Pop\ dens) \cdot \Psi \cdot year + \beta_{10} \cdot \ln(Pop\ dens) + \beta_{11} \cdot D_{\hat{\imath}} + \epsilon$$

$$(4) \quad Pop\ norm = \alpha_1 + \beta_1 \cdot year + \beta_2 \cdot \Psi \cdot year^2 + \beta_3 \cdot \Psi \cdot year + \beta_4 \cdot \Psi \cdot + \beta_5 \cdot \varsigma \cdot \Psi \cdot year^2 + \beta_6 \cdot \varsigma \cdot \Psi \cdot year + \beta_7 \cdot \varsigma + \beta_8 \cdot \ln(Pop\ dens) \cdot \Psi \cdot year^2 + \beta_9 \cdot \ln(Pop\ dens) \cdot \Psi \cdot year + \beta_{10} \cdot \ln(Pop\ dens) + \beta_{11} \cdot D_{\hat{\imath}} + \epsilon$$

We can also construct similar Fixed-Effects models, where γ_j are regional fixed effects for each of the 10 regions $\boldsymbol{j}$ we are considering:

$$(5)\quad \ln(Pop) = \alpha_1 + \beta_1 \cdot year + \beta_2 \cdot \Psi \cdot year^2 + \beta_3 \cdot \Psi \cdot year + \beta_4 \cdot \Psi \cdot + \beta_5 \cdot \varsigma \cdot \Psi \cdot year^2 + \beta_6 \cdot \varsigma \cdot \Psi \cdot year + \beta_7 \cdot \varsigma + \beta_8 \cdot \ln(Pop\ dens) \cdot \Psi \cdot year^2 + \beta_9 \cdot \ln(Pop\ dens) \cdot \Psi \cdot year + \beta_{10} \cdot \ln(Pop\ dens) + \gamma_j + \epsilon$$

$$(6)\quad Pop\ norm = \alpha_1 + \beta_1 \cdot year + \beta_2 \cdot \Psi \cdot year^2 + \beta_3 \cdot \Psi \cdot year + \beta_4 \cdot \Psi \cdot + \beta_5 \cdot \varsigma \cdot \Psi \cdot year^2 + \beta_6 \cdot \varsigma \cdot \Psi \cdot year + \beta_7 \cdot \varsigma + \beta_8 \cdot \ln(Pop\ dens) \cdot \Psi \cdot year^2 + \beta_9 \cdot \ln(Pop\ dens) \cdot \Psi \cdot year + \beta_{10} \cdot \ln(Pop\ dens) + \gamma_j + \epsilon$$

In the next section, we present the results of estimating these models with our data, using all municipalities in our dataset that did not amalgamate as our control group.

4. Results

In appendix A., we can see the results of linearly regressing logarithmic population numbers of the individual regions against time, distinguishing before and after amalgamation for the relevant municipalities in municipality sets. Amalgamations are represented by vertical red lines. Green lines (triangles) represent municipalities that underwent substantial amalgamations, orange lines (diamonds) those that had less significant ones than another in the same region (the green municipality). Yellow lines (circles) represent municipalities that did not undergo any amalgamations in our timeframe. An * indicates that only 2 or fewer datapoints are available for post-amalgamation populations before the end of our timeframe or the next round of amalgamations.

In various cases there are clearly breaks in trends, although not always positive and/or statistically significant. From the first example, we can calculate, for instance, that the Doetinchem municipality would likely have had 28.232 inhabitants by 2018 (between 25,223 and 31,606 with 95% confidence), had its pre-amalgamation population trend continued after 1920. In 2018 it actually had 57,382 inhabitants. To say that this population increase was mainly due to amalgamation would be quite a statement, but throughout our dataset, there seems to be some evidence that in various cases, though not all, some relative growth-potential was unlocked in the post-amalgamation phase, that was not always detectable before.

In our growth charts, Appendix B., with normalised populations, we see better that growth was behind in many cases for municipalities that amalgamated later, whereas post-amalgamation, these began to catch up on their respective twins. Something appears to be happening, and the differences between municipalities in the normalised graphs even seem more pronounced, but one cannot draw a clear picture yet from the 20 graphs shown in Appendix A. and B., which is why it is useful to also look at the bigger picture, at spatial variation and (higher-order) interactions. On the next page in Table 1&2., we look at regressions with all data included, controlling for location specific effects where amalgamations happen, as well as regional fixed-effects. Results seem pointing to the side of amalgamation, although there are more things happening. For instance, amalgamation by itself, does not necessarily lead to immediate increases in population growth. According to our models with logarithmic populations, if we only look at amalgamation, it would take 150, 274, 83[2] or 139 years, post-amalgamation, for amalgamation to become beneficial for population development

[2]The FE model without controls is not significant.

Table 1&2. Regression results against logarithms of populations and normalised

1	***OLS***	***OLS with controls***	***Fixed Effects***	***Fixed Effects with controls***	**2**	***OLS***	***OLS with controls***	***Fixed Effects***	***Fixed Effects with controls***
Ln(Population)					***Norm. Population***				
Year	.0117***	.0061	.0109***	.0065***	**Year**	.0335***	.0264***	.0331***	.0262***
	(.00067)	(.00052)	(.0005)	(.00048)		(.0023)	(.00038)	(.0020)	(.0034)
Amalgamation· Year²	.000015	.000025**	.000012	.000057**	**Amalgamation · Year²**	.00017**	.00038**	.00015**	.00039**
	(.000010)	(.000012)	(.000011)	(.000023)		(.000069)	(.00015)	(.000069)	(.00016)
Amalgamation· Year	-.0045**	-.0137***	-.0020	-.0159**	**Amalgamation · Year**	-.0271**	-.1702***	-.0280*	-.1730***
	(.0022)	(.0037)	(.0024)	(.0070)		(.0136)	(.0452)	(.0146)	(.0489)
Amalgamation	.1818	-.0647	-.0336	-.0609	**Amalgamation**	-.1973	.4413	.5800	.5346
	(.1243)	(.0531)	(.1145)	(.0982)		(.6462)	(.6548)	(.6978)	(.6903)
Central city· Amalgamation· Year²		.0000061		.0000046	**Central city· Amalgamation· Year²**		.00017***		.00018***
		(.0000059)		(.0000057)			(.000035)		(.000040)
Central city· Amalgamation· Year		-.00031		.00037	**Central city· Amalgamation· Year**		-.0351***		-.0332***
		(.0012)		(.0012)			(.0073)		(.0083)
Central city		.6893***		.0214	**Central city**		-.4705		1.6026***
		(.0739)		(.0740)			(.4114)		(.5197)
Pop. Density· Amalgamation· Year²		-.0000012***		-.0000016**	**Pop. Density· Amalgamation· Year²**		-.000011***		-.000013***
		(.0005)		(.00000060)			(.0000039)		(.0000043)
Pop. Density· Amalgamation· Year		.0028****		.0029**	**Pop. Density· Amalgamation· Year**		.0283***		.0305***
		(.00068)		(.0012)			(.0076)		(.0082)
Pop. Density		.4008***		.2956***	**Pop. Density**		.8856***		.6212***
		(.0290)		(.0218)			(.1157)		(.1530)
	…	…	…	…		…	…	…	…

Table 1&2. Regression results against logarithms of populations and normalised (ctd.)

1` *Ln(Population)*	*OLS*	*OLS with controls*	*Fixed Effects*	*Fixed Effects with controls*
Doetinchem	.0787	-.1562***		
	(.0814)	(.0305)		
Zutphen	.3873***	-.1775***		
	(.0814)	(.0544)		
Alphen a/d Rijn	.2643***	.1811***		
	(.0886)	(.0378)		
Den Bosch	1.1537***	.6595***		
	(.0672)	(.0393)		
Heerenveen	.3173***	1.1332***		
	(.0735)	(.0519)		
Breukelen	-.8196***	-.3733***		
	(.0902)	(.0643)		
Waalwijk	.2663***	.6202***		
	(.0722)	(.0576)		
Geertruidenberg	-.5186***	-.1718***		
	(.0643)	(.0488)		
Ommen	-.5292***	.6291***		
	(.0890)	(.0716)		
Kampen	.5292***	1.0240***		
	(.0778)	(.0560)		
Zwolle	1.0530***	.7307***		
	(.0618)	(.0284)		
Driebergen-Rijsenburg	-1.0061***	-.5108***		
	(.1431)	(.0888)		
Terneuzen	.4432***	.6716***		
	(.0632)	(.0286)		
Bergen op Zoom	.4154***	.1448***		
	(.0632)	(.0292)		
Constant	8.6443***	6.4465***		
	(.0791)	(.1367)		

*significant at 10%; **significant at 5%; ***significant at < 1%
F(18, 372) = 308.70; F(24, 366) = 1148.80; F(4, 376) = 472.30; F(10, 370) = 314.51
R^2 = .7655; R^2 = .9573; ρ = .8412; ρ = .8457

2` *Norm. Population*	*OLS*	*OLS with controls*	*Fixed Effects*	*Fixed Effects with controls*
Doetinchem	.9711***	1.3983***		
	(.3688)	(.3913)		
Zutphen	-1.2628***	-1.4920***		
	(.0005)	(.3692)		
Alphen a/d Rijn	.5568	1.5120***		
	(.4533)	(.3929)		
Den Bosch	-.8592***	-.9655**		
	(.1998)	(.3910)		
Heerenveen	-.7991***	-.8569**		
	(.2318)	(.4127)		
Breukelen	-.4388	-1.9076***		
	(.3406)	(.4828)		
Waalwijk	-1.1256***	-2.6904***		
	(.2502)	(.4459)		
Geertruidenberg	-1.3889***	-2.6247***		
	(.2697)	(.4274)		
Ommen	-1.0359***	.03427		
	(.2586)	(.4607)		
Kampen	-.9026***	-1.9650***		
	(.2614)	(.4123)		
Zwolle	-.5687***	-.2698		
	(.1859)	(.3708)		
Driebergen-Rijsenburg	4.3563***	2.8808***		
	(1.1154)	(.5137)		
Terneuzen	-.8293***	1.0751**		
	(.2063)	(.4234)		
Bergen op Zoom	-.9186***	-.4336		
	(.1907)	(.3740)		
Constant	.3204**	-2.7277***		
	(.1234)	(.5343)		

*significant at 10%; **significant at 5%; ***significant at < 1%
F(18, 372) = 32.70; F(24, 366) = 52.19; F(4, 376) = 121.09; F(10, 370) = 63.39
R^2 = .6540; R^2 = .7401; ρ = .2055; ρ = .3047

of a municipality (for the OLS, OLS with controls, FE and FE with controls model respectively). Interestingly, containing a central city in 2014 has no significant effect on the effectiveness of an amalgamation in attracting population. This could be due to the fact that in the last two centuries, probably many villages that now rely on nearby cities once functioned as their own central city, maybe reducing the effectiveness of our variable.

Population density, however, is important, and the OLS with controls and FE with controls models with logarithmic population numbers predict that with population densities above around 131.5 or 232.6 habitants per square kilometre respectively, amalgamation is already beneficial. These thresholds exclude only 27 or 74 municipalities, respectively, out of all (342) Dutch municipalities in 2023, as the average population density is 508, though many of these municipalities include (parts of) natural reserves, islands or waterbodies, and have land make-ups that would not necessarily be considered 'average'. The logarithmic model with controls, leaving statistically insignificant coefficients (we do not expect a sudden jump in population at the moment of amalgamation, for instance), would indicate that a hypothetical average municipality with 10,000 inhabitants at a certain year and with the average population density of our dataset (398.3) held constant throughout all years, would have grown to 11,297[3] inhabitants in 20 years, though if it would have amalgamated in that year, it would have grown to 12,097 inhabitants in 20 years. Due to higher-order terms, the effect increases over time, and as population density increases, though very large population density numbers become inhibitory at a certain point. In 40 years, the municipality that did not amalgamate would have grown to 12,762[3'] inhabitants, while the one that did would have grown to 14,845, keeping population density constant. Our Fixed-Effects model with controls puts those numbers at 11,387 vs. 11,950 (for 20 years) and 12,969 vs. 14,834 (for 40 years), keeping population density constant.

Our OLS and FE models with normalised population numbers, without controls, similarly to the ones with logarithmic population numbers, point to this delayed effect of only amalgamation. Again, the models with controls have smaller errors than the ones without, and they predict the factor of growth of a municipality. Interestingly, the models with normalised population numbers indicate that it does matter significantly whether a municipality contains a central city or not in 2014, as this should increase growth rates due to amalgamation. The OLS model with controls predicts that a municipality that did not amalgamate would have grown by 1.528 times its size in 20 years, while if it did it would have grown by 1.6384 times its size. In forty years it would be 2.056 times its size, but in the case of amalgamation 2.6230. The Fixed-Effects model with controls puts these numbers at 1.524 vs. 1.8451 (for 20 years) and 2.048 vs. 2.3702 (for 40 years). Note that none of the amalgamation intercept-coefficients for the models with both logarithmic and normalised population numbers are statistically significant, indicating, intuitively, that there is no necessary sudden jump in population numbers at the moment of amalgamation. The OLS with controls and FE with controls model predict that amalgamation would be beneficial immediately if population densities exceed 404.5 or 285.6 habitants per square kilometre respectively.

[3]This particular number is not statistically significant but in line with other significant results.

5. Conclusion

Though fairly exploratory, the results seem to bring some evidence to support the idea that scale enlargement, here through amalgamation, could contribute to the success of local governance units in trying to increase their areas' attractiveness, compared to others, and could therefore be beneficial to a society of consumer/voters, and increase productivity of that region through attracting new people. The mechanisms at work here, are something many economists have theorised about for decades, namely, scale-effects, cost-effectiveness, internalisation of externalities etc.. There has not yet been abundant evidence to support these theories. Intuitively, one can imagine that some municipalities indeed are too small to be efficient, but plenty of arguments can be be made that efficiency should not be the higher goal of local governance, rather, effectiveness. People do not want to live far from a municipal office or school, and therefore have a natural resentment against scale enlargement, and prefer to have their business arranged nearby. One could claim, however, that the distance to a municipal office or school has more to do with policy and coordination of the relevant (sometimes austerian) authorities than the size of them. Distances have increased in the last 10 years in Dutch municipalities that amalgamated, but for many things also in those that did not. Meanwhile, disadvantages like inefficient land-use, regional frictions between municipalities, free-riding of wealthy municipalities on central city-municipalities that are struggling financially occur everywhere. Although to be taken with a grain of salt while making predictions and extrapolations, the estimation results nicely tell that once a certain (low threshold) population density is reached, which is in line with our hypothesis that cities tend to extend their municipal boundaries, and could benefit from larger scale local governance in serving consumer-voters.

Marlet en Woerkens (2014) looked to minimize cross-border commuting streams in the Netherlands and created a topographical map with 57 municipalities of which most populations exceed 100,000. De Groot et al. (2010) did not create a map, but looked at the geographical distribution of land value-surpluses in the Netherlands in order to identify the sizes of agglomerations and the spheres of influence of cities on their regions, which turned out to be one hour of traveling from the city centre (maybe not so coincidentally also the maximum amount of time Dutch people are willing to travel for their work). The Dutch government/EU handles 40 NUTS 3 regions that each have their own central kernel, taking into account home-work commuting and as such are very convenient for regional comparison and analysis. People have also looked at urban density, land-use, constraint commutability and other factors to identify what is a sensible way to divide the Netherlands into regions that are strongly interconnected and logical to look at for policy-related issues. The essence is that there is not one way to do it, but that, for lack of evidence for scale effects, we tried to find a method to be able to identify a positive, significant difference between municipalities that do amalgamate and municipalities that do not (manage to), without having to look at subjective criteria like happiness, service output and per capita spending while significant shares of this spending might be spent on people paying taxes in other municipalities. Likely, the ideal size is indeed an area around a central urban area until a certain low point in population density is reached, lower than is likely to be the case in the Netherlands before another metropolitan area starts causing the population density to grow again. One could imagine that by looking at population density, one would create a map very similar to the G57 map by Marlet & Van Woerkens (2014).

6. Discussion

A question one could have is what exactly the mechamism is: how is this amalgamation causing population increases? Is there not something else going on? The point of the method we chose was to see whether the amalgmation was succesful ***regardless*** the mechanism through which it took place, in order to see in general whether one should renounce or consider municipal amalgamation to tackle problems like shrinkage, or to try and attract population generally. Where financial, or survey data often lacks the timeframe, currently, to track the long term performance compared to before amalgamtion, population data is there. If our results do not necessarily prove that amalgamation makes a municipality more attractive, they do perhaps prove that at least they do not hinder attracting people, or encourage them to leave.

As amalgamtion is about the only instrument we have to investigate the effects of scale enlargment, one could ask whether we are talking about the effects of an (often logical) amalgamation or whether we could actually generalise the effects to scale enlargement. Our analysis brings evidence to support that in the current Dutch municipal landscape, scale enlargment should not be avoided. There are likely substantial benefits to be unlocked by the internalisation of externalities, and getting rid of municpalities that are inconsequentially small.

Although for international standards very well documented in the Netherlands, data availability is a limitation in this study, as there is not yet a database that combines amalgamations, border changes, splits and population numbers, that is reliable and up-to-date. One can find municipalities for which information is available and easy to access, though, finding two nearby twin-like municipalities of which only one had significant amalgamations and none misses essential information is not an easy task. Due to the Second World War, there is a 17 year gap in the gathering of data between 1930 and 1947, there is an 17 year gap between 1971 and 1988, and for many municipalities, missing values are not uncommom. We have, however, found statistically significant results regardless of this limitation, and this suggests that there is perhaps a lot more more for which this extensive but unorganised amount of data could be exploited.

It would be very interesting to investigate a municipality's ability to attract youth, and to see if amalgamation has any effect on this, as this group tends to be the most mobile, and is usually the first to move into new attractive areas. Simply looking at population data, leaves out valuable information about migration and natural population development, although it is not necessarily expected that amalgamation should have any influence on fertility rates. But, knowing more about migration levels could bring further evidence to support that amalgamated municipalities attract more people than they would if they would not have amalgamated. We could then also try to estimate the cost of not amalgamating, as every young person or migrant brings a level of productivity to the place that person moves to. Though, the main research recommendation would be to implement this model onto more municipalities in the Netherlands and abroad, as there is probably much to discover.

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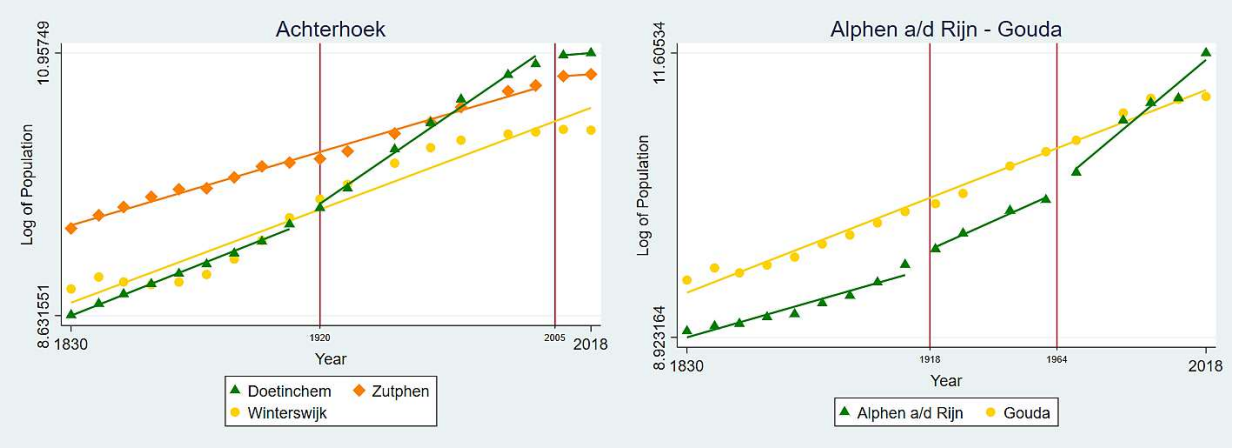
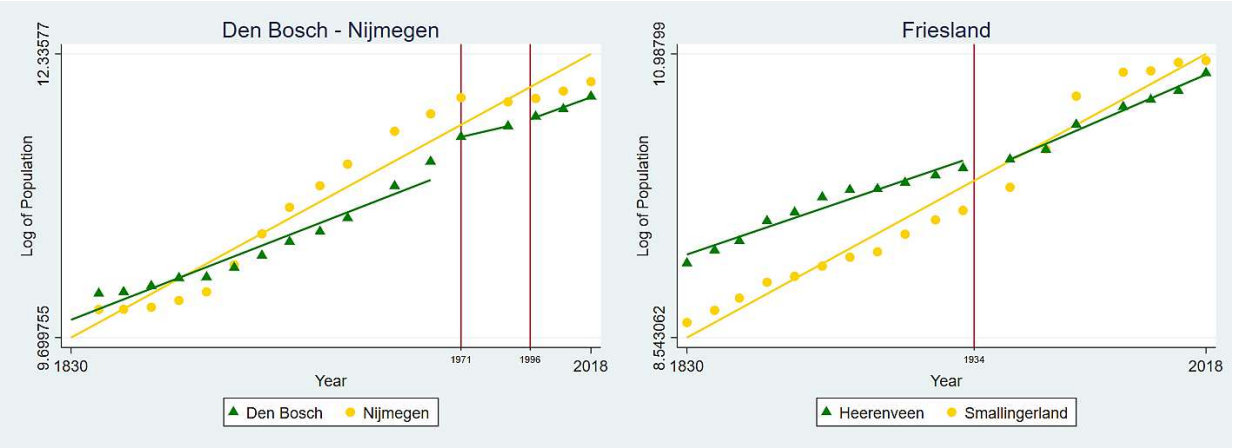
II. Appendix

A. Population developments of municipalities (logarithms of populations)



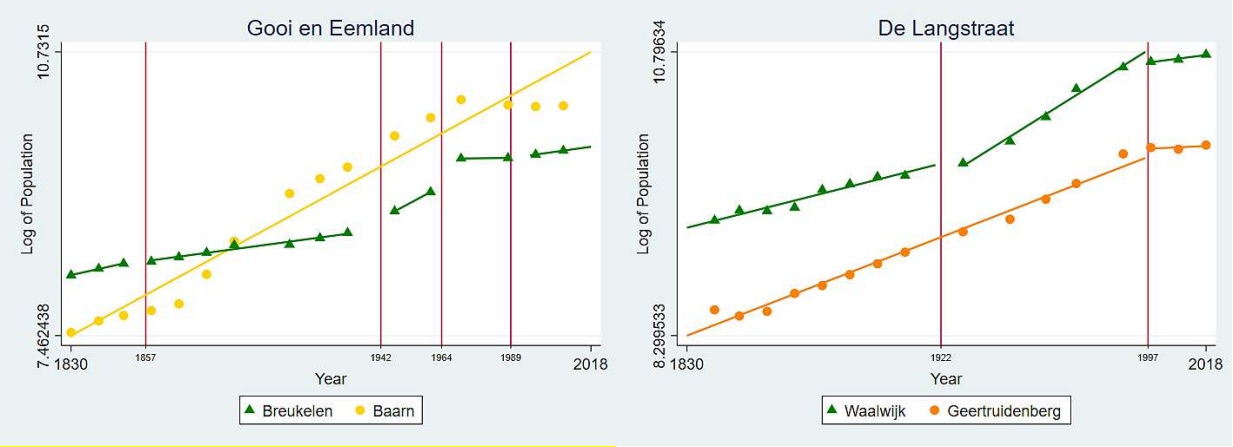
Achterhoek	*Coefficient*	*Sign.*
Year	.0083 (.00029)	< 1%
Amalg.1·Yr	.0085 (.00080)	< 1%
***Amalg.2·Yr**	-.0063 (.00029)	< 1%
Amalg.1	-16.1656 (1.552)	< 1%
***Amalg.2**	13.4082 (.5455)	< 1%
Doetinchem	-.1398 (.0428)	< 1%
Zutphen	.5092 (.0401)	< 1%
Constant	8.8277 (.0460)	< 1%

Alphen a/d Rijn - Gouda	*Coefficient*	*Sign.*
Year	.0099 (.00035)	< 1%
Amalg.1·Yr	.0017 (.00083)	5%
Amalg.1·Yr	.0119 (.0021)	< 1%
Amalg.1	-3.3012 (.1.586)	5%
Amalg.2	-23.153 (4.1516)	< 1%
Alphen/ Rijn	-.5405 (.0369)	< 1%
Constant	9.3660 (.0361)	< 1%



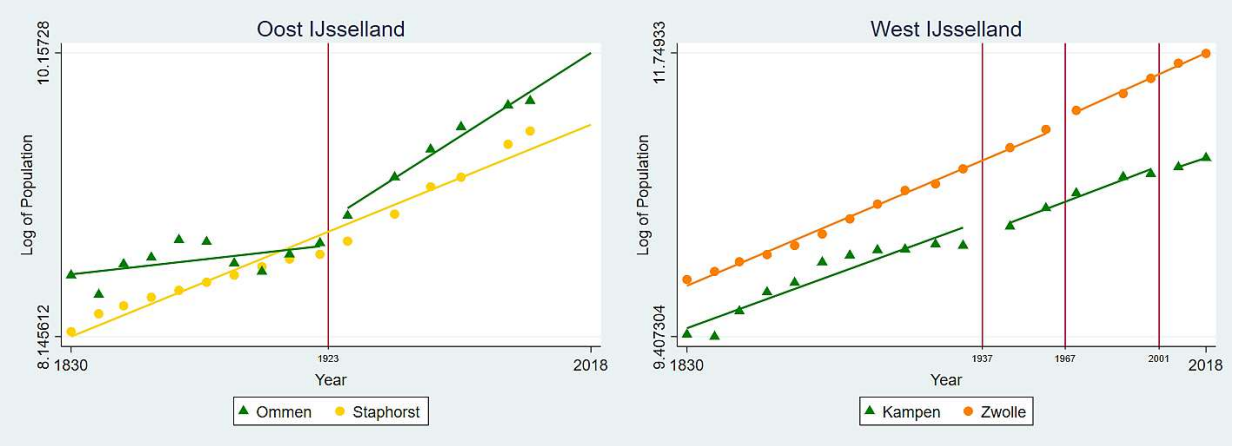
Den Bosch - Nijmegen	*Coefficient*	*Sign.*
Year	.0131 (.00070)	< 1%
***Amalg.1·Yr**	-.0072 (.00070)	< 1%
Amalg.2·Yr	-.0038 (.00094)	< 1%
***Amalg.1**	14.1819 (1.332)	< 1%
Amalg.2	7.4024 (1.8417)	< 1%
Den Bosch	-.1286 (.0687)	10%
Constant	9.7899 (.0831)	< 1%

Friesland	*Coefficient*	*Sign.*
Year	.0122 (.00055)	< 1%
Amalg.·Yr	-.0020 (.00071)	5%
Amalg.	3.4148 (1.3703)	5%
Heerenveen	.4438 (.0607)	< 1%
Constant	8.6096 (.0426)	< 1%

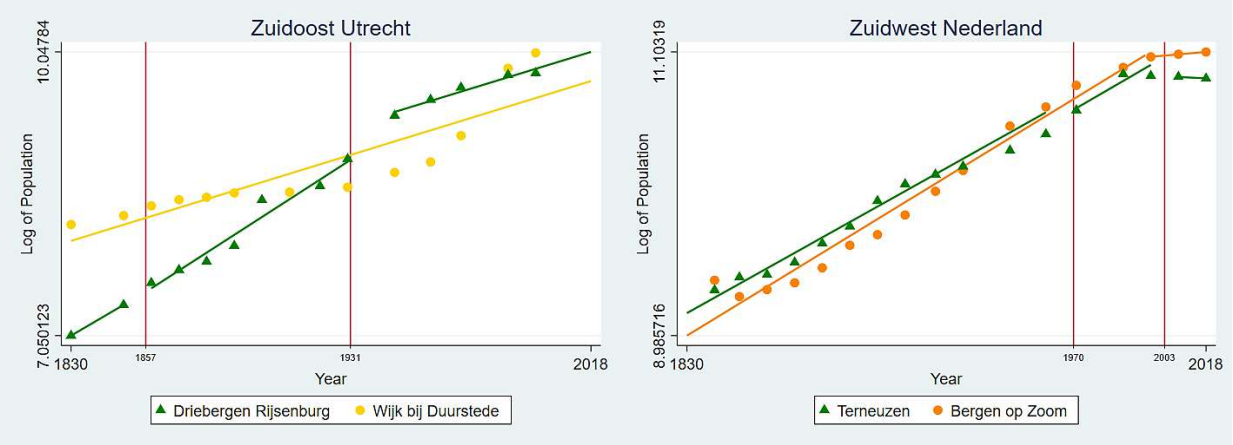


Gooi en Eemland	*Coefficient*	*Sign.*	*De Langstraat*	*Coefficient*	*Sign.*
Year	.0174 (.0013)	< 1%	**Year**	.0091 (.00035)	< 1%
Amalg.1·Yr	-.0130 (.0013)	< 1%	**Amalg.1·Yr**	.0061 (.00076)	< 1%
***Amalg.2·Yr**	-.00032 (.0013)	-	**Amalg.2·Yr**	-.0059 (.00050)	< 1%
***Amalg.3·Yr**	-.0170 (.0013)	< 1%			
***Amalg.4·Yr**	-.0129 (.0013)	< 1%			
Amalg.1	23.991 (2.493)	< 1%	**Amalg.1**	-12.0966 (1.474)	< 1%
***Amalg.2**	-.5714 (2.4489)	-	**Amalg.2**	11.9204 (.9696)	< 1%
***Amalg.3**	32.439 (2.449)	< 1%			
***Amalg.4**	24.319 (2.449)	< 1%			
Breukelen	.5953 (.1061)	< 1%	**Waalwijk**	.7906 (.0373)	< 1%
Constant	-4.4655 (.0992)	< 1%	**Constant**	8.3290 (.0349)	< 1%

In 1857 in Gooi en Eemland, De Vuursche amalgamated with Baarn because of a lack of voter population. This amalgamation was therefore not considered into account. In 1942 in Gooi en Eemland, Laagnieuwkoop amalgamated with Kockengen, this amalgamation was considered to be part of the same amalgamation wave as the amalgamation of Breukelen-Nijenrode and Breukelen-St. Pieter into Breukelen.

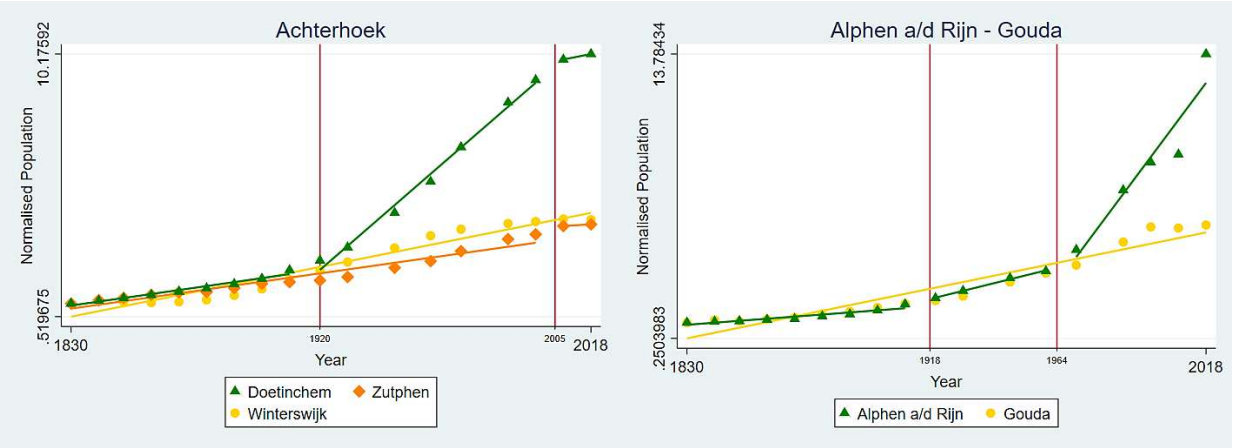


Oost IJsselland	*Coefficient*	*Sign.*	*West IJsselland*	*Coefficient*	*Sign.*
Year	.0071 (.00064)	< 1%	**Year**	.0099 (.00027)	< 1%
Amalg.·Yr	.0055 (.0639)	< 1%	**Amalg.1·Yr**	-.0013 (.00088)	-
			***Amalg.2·Yr**	-.0024 (.00027)	< 1%
Amalg.	-10.5465 (2.241)	< 1%	**Amalg.1**	2.2733 (1.7280)	-
			***Amalg.2**	4.4434 (.4822)	< 1%
Ommen	.1534 (.0639)	5%	**Kampen**	-.4309 (.0423)	< 1%
Constant	8.2191 (.0381)	< 1%	**Constant**	9.8269 (.0252)	< 1%

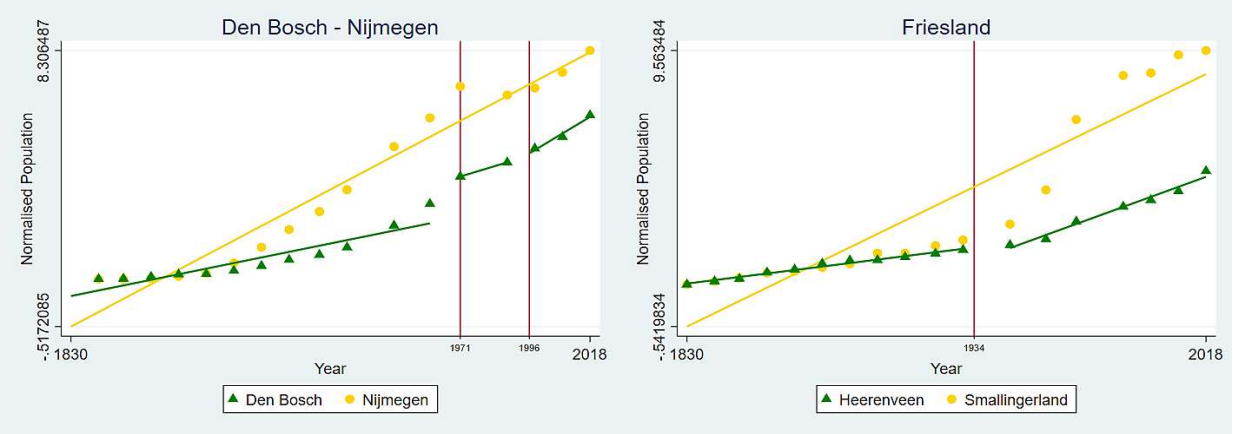


Zuidoost Utrecht	***Coefficient***	***Sign.***	***Zuidwest Nederland***	***Coefficient***	***Sign.***
Year	.0102 (.0011)	< 1%	**Year**	.0115 (.00049)	< 1%
Amalg.1·Yr	.0084 (.0015)	< 1%	**Amalg.1·Yr**	-.0013 (.0022)	-
Amalg.2·Yr	-.0012 (.0015)	-	***Amalg.2·Yr**	-.0128 (.00049)	< 1%
Amalg.1	-15.5301 (2.851)	< 1%	**Amalg.1**	2.5683 (4.2524)	-
Amalg.2	3.5025 (2.9024)	-	***Amalg.2**	25.5201 (.9270)	< 1%
Driebergen-Rijsenburg	-.8700 (.0011))	< 1%	**Terneuzen**	.0609 (.0436)	-
Constant	7.9861 (.0995)	< 1%	**Constant**	9.0627 (.0599)	< 1%

B. Population growth developments of municipalities (normalised populations)

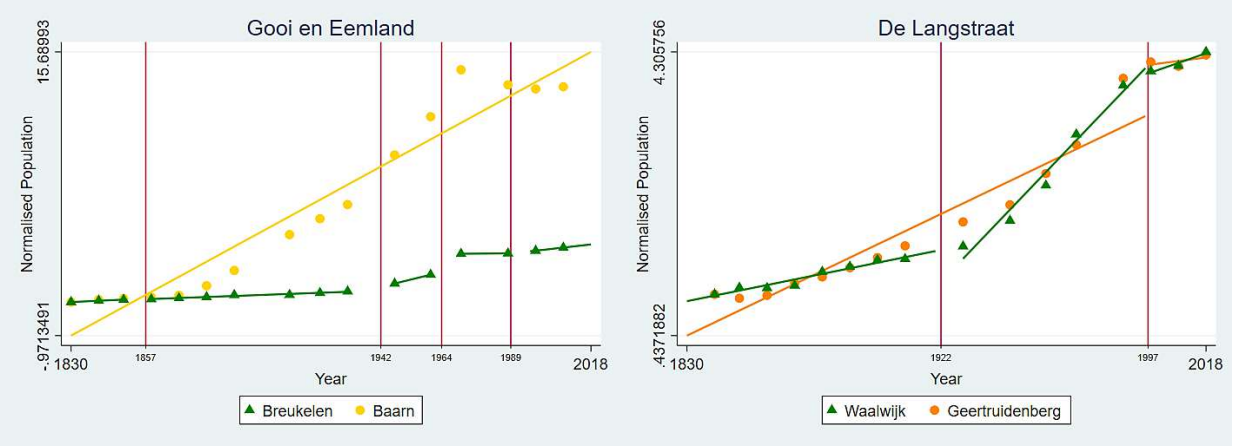


Achterhoek	***Coefficient***	***Sign.***	***Alphen a/d Rijn - Gouda***	***Coefficient***	***Sign.***
Year	.0178 (.00076)	< 1%	**Year**	.0253 (.0022)	< 1%
Amalg.1·Yr	.0704 (.0034)	< 1%	**Amalg.1·Yr**	.0071 (.0025)	< 1%
***Amalg.2·Yr**	.0022 (.00076)	< 1%	**Amalg.1·Yr**	.1509 (.0305)	< 1%
Amalg.1	-135.262 (6.632)	< 1%	**Amalg.1**	-13.9339 (4.676)	< 1%
***Amalg.2**	1.6209 (1.4223)	-	**Amalg.2**	-297.113 (60.38)	< 1%
Doetinchem	.0597 (.0968)	-	**Alphen/ Rijn**	-.0879 (.1998)	-
Zutphen	-.1885 (.1008)	10%			
Constant	.7416 (.1059)	< 1%	**Constant**	.3812 (.2018)	10%



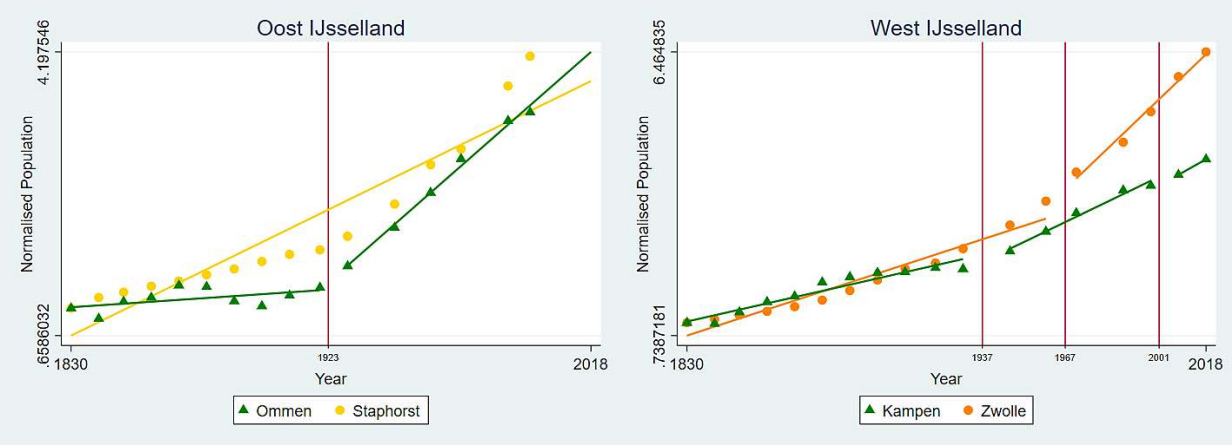
Den Bosch - Nijmegen	*Coefficient*	*Sign.*
Year	.0399 (.0031)	< 1%
***Amalg.1·Yr**	-.0133 (.0031)	< 1%
Amalg.2·Yr	-.0131 (.0052)	5%
***Amalg.1**	25.8273 (5.938)	< 1%
Amalg.2	-26.817 (10.325)	5%
Den Bosch	-1.1162 (.3274)	< 1%
Constant	.1260 (.3345)	-

Friesland	*Coefficient*	*Sign.*
Year	.0437 (.0049)	< 1%
Amalg.·Yr	-.0070 (.0055)	-
Amalg.	11.252 (10.533)	-
Heerenveen	-.4474 (.4222)	-
Constant	-.0480 (.3926)	-

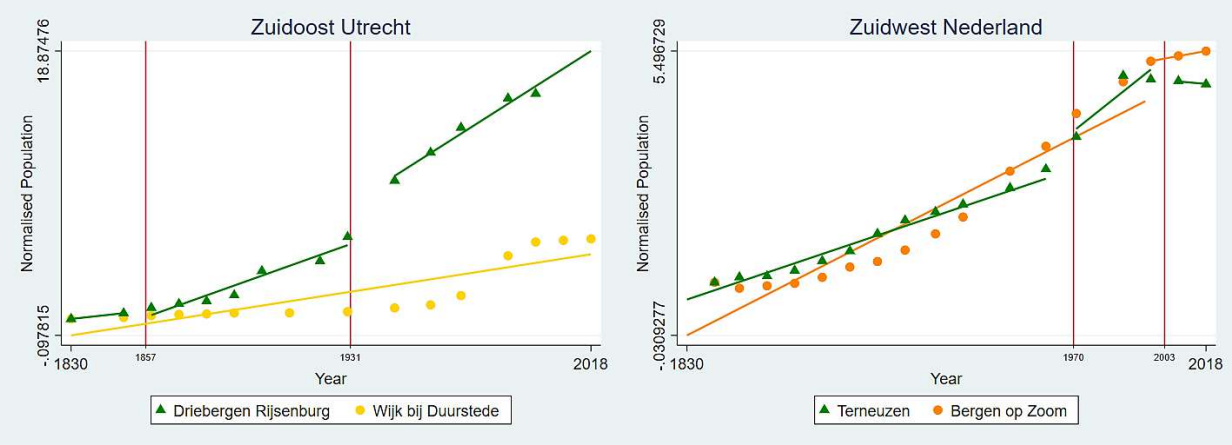


Gooi en Eemland	*Coefficient*	*Sign.*
Year	.0883 (.0073)	< 1%
Amalg.1·Yr	-.0824 (.0073)	< 1%
***Amalg.2·Yr**	-.0485 (.0073)	< 1%
***Amalg.3·Yr**	-.0869 (.0073)	< 1%
***Amalg.4·Yr**	-.0700 (.0073)	< 1%
Amalg.1	151.991 (13.39)	< 1%
***Amalg.2**	86.034 (13.37)	< 1%
***Amalg.3**	162.362 (13.37)	< 1%
***Amalg.4**	128.807 (13.37)	< 1%
Breukelen	1.1671 (.7871)	-
Constant	-.9473 (.7046)	-

De Langstraat	*Coefficient*	*Sign.*
Year	.0195 (.0014)	< 1%
Amalg.1·Yr	.0198 (.0036)	< 1%
Amalg.2·Yr	-.0064 (.0021)	< 1%
Amalg.1	-39.1149 (7.090)	< 1%
Amalg.2	13.2155 (4.051)	< 1%
Waalwijk	-.0137 (.1426)	-
Constant	.3943 (.1353)	< 1%



Oost IJsselland	*Coefficient*	*Sign.*	*West IJsselland*	*Coefficient*	*Sign.*
Year	.0145 (.0022)	< 1%	**Year**	.0258 (.0026)	< 1%
Amalg.·Yr	.0157 (.0025)	< 1%	**Amalg.1·Yr**	.0010 (.0032)	-
			***Amalg.2·Yr**	.0054 (.0026)	5%
Amalg.	-30.778 (4.683)	< 1%	**Amalg.1**	-2.9268 (6.1496)	-
			***Amalg.2**	-11.852 (4.7822	5%
Ommen	-.3689 (.1453)	5%	**Kampen**	-.0954 (.1962)	-
Constant	.8431 (.1257)	< 1%	**Constant**	.4652 (.1980)	5%



Zuidoost Utrecht	*Coefficient*	*Sign.*	*Zuidwest Nederland*	*Coefficient*	*Sign.*
Year	.0288 (.0048)	< 1%	**Year**	.0276 (.0019)	< 1%
Amalg.1·Yr	.0354 (.3968)	< 1%	**Amalg.1·Yr**	.0017 (.0096)	10%
Amalg.2·Yr	.0886 (.0117)	< 1%	***Amalg.2·Yr**	-.0337 (.0019)	< 1%
Amalg.1	-66.303 (18.890)	< 1%	**Amalg.1**	-33.920 (18.777)	10%
Amalg.2	-166.334 (22.84)	< 1%	***Amalg.2**	67.689 (3.521)	< 1%
Driebergen-Rijsenburg	1.0140 (.3968)	5%	**Terneuzen**	.0061 (.1626)	-
Constant	-.0951 (.4255)	-	**Constant**	.0723 (.2097)	-

Appendix C. G57 municipality map by Marlet & Van Woerkens (2014).