STOCKHOLM SCHOOL OF ECONOMICS
Department of Economics
659 Degree project in economics
Spring 2018

Redistribution and the Alignment Effect: Theory and Evidence

Axel Granström (23550) and Ludvig Holmér (23503)

Abstract: This paper studies the impact of political alignment on the redistribution of grants between central and local governments. A model, where the central government uses its discretionary power to further the prospects of its constituent parties at all levels of government, is constructed and used to make a prediction regarding the allocation of grants. Furthermore, the prediction is tested using a regression discontinuity design on a large data set from Swedish municipalities. In addition, to account for the formation of party coalitions at both the central and local level, the model features a novel conception of political alignment where alignment exist on a scale as opposed to the ordinary, binary view. These coalitions also force a novel construction of the running variable in the regression discontinuity design based on municipal mandates. These mandates are weighted depending on whether they are inside or outside the local ruling coalition. Among other things, this novel perception of the running variable of political alignment provides a connection between the core supporter hypothesis that has been widely discussed in the literature within the politics of redistribution field. Since the weight is exogenous to the empirical model, the empirical results depends upon the choice of weight. Ultimately, it is found that aligned municipalities receive more grants than unaligned conditioned on the choice of weight being approximately valid.

Keywords: Redistributive politics; Alignment; Political Economy; Electoral competition

JEL: C72; D72; H7

Supervisor: Karl Wärneryd
Date submitted: 15th of May 2018
Date examined: 29th of May 2018
Discussants: Erik Keanius and Sandra Alpstén
Examiner: Johanna Wallenius

Acknowledgements

First and foremost we would like to extend our deepest gratitude to our supervisor Karl Wärneryd for his invaluable guidance and advise at all stages of the process. In addition, we would like to thank Andrew Proctor for his helpful insights regarding the empirical method as well as Örjan Sjöberg for his enthusiastic introduction to the art of scientific writing.

Contents

1 Introduction

Political economy research suggests that political agents use redistribution systems in order to further the political power of governmental parties in targeted regions, as well as to improve their prospects in future elections. Accordingly, redistribution systems and grants are utilised for pork barrel politics[1], rather than solely being a governmental mean for providing equal public service to its citizens Shapiro (2009). The field of redistributive politics stems from the works of Cox and McCubbins (1986) and Lindbeck and Weibull (1987) who presented theories explaining the drivers of increased redistribution towards certain regions. Subsequently, there has been quite extensive work trying to determine the explanatory power of these theories empirically as well as refinements to the theoretical models (Dixit and Londregan, 1996). Evidence in support of the theories have been found in several studies across different countries and grant programs (Johansson, 2003) (Case, 2001)[2]. In addition, empirical work has found evidence for the *Swing Voter Hypothesis* first proposed by Lindbeck and Weibull (1987).

In recent years a new sub-field in this domain has emerged, namely the study of how political alignment[3] affects redistribution. Arulampalam et al. (2009) modify the work of Dixit and Londregan (1996) to include an alignment effect in the model and proceed to test it empirically using Indian data. While this type of research has been conducted in many places, there has yet to be a paper based in the Swedish setting. Furthermore, many studies have used the model presented by Arulampalam et al. (2009) in multiparty systems with coalitions, but have not incorporated the coalitions into the model. Also, the concept of alignment becomes ambiguous when more than one party is present and there are both local and central political coalitions. Therefore, by drawing upon the theoretical work of Arulampalam et al. (2009), this thesis presents a model of political alignment and swing voter prevalence which is modified to better fit a system in which coalitions are formed on all levels of government. The thesis provides a novel perception of alignment status in order to address the ambiguity of alignment due to coalitions on the local level. Further, the predicted effect of political alignment on redistribution is studied by using a regression discontinuity design and Swedish municipal data. Because Swedish municipalities are ruled by, often bipartisan, coalitions formed from a pool of elected officials, the usual running variable used in this context (the difference between vote shares of the winner and runner up in the election) is not appropriate. Thus, this paper provides a novel construction of the running variable based upon the entire pool of elected officials where a weight between one and zero is given to the officials outside the municipal coalition. In addition, a novel perception of alignment is introduced, which provides a connection between the core supporter proposed by Cox and McCubbins (1986).

Another governmental level exists in Sweden, namely counties, this thesis restricts its attention towards municipalities since counties both receive and distribute grants. Consequently, the thesis attempts to further the knowledge within the field of redistributive politics in general and political alignment effects in

[1] Pork barrel politics is the act of spending on constituents in order to secure their support in an upcoming election.
[2] For an extensive list of empirical studies see Shapiro (2009).
[3] Homogeneity of parties in the local and central governments

particular. This is done by proving a model with a modified conceptualisation of alignment, suitable for governments formed around coalitions and by investigating possible effects of alignment on redistribution systems. As previous studies have indicated a positive effect of political alignment on redistribution in other countries (Bracco et al., 2013) (Marco, 2013) (Solé-Ollé and Sorribas-Navarro, 2008), it is of interest to determine whether political alignment also affects the Swedish redistribution system. To our knowledge, no such study has been performed. In addition, the Swedish setting is suitable considering that coalitions are formed on both the national and local level, which provide ample opportunities for evaluating and evolving the concept of alignment. Furthermore, data regarding the exact shape of the coalitions on the local level is available and thus allows for proper coding of alignment. In addition, there has been both major and minor alterations to the redistribution system almost as often as there has been a shift in power on the governmental level which indicates governmental influence on the system (Sveriges Kommuner och Landsting, 2017).

Ultimately, this thesis finds that aligned municipalities receive more grants than unaligned and thus provides more evidence in support of the effect of political alignment on redistribution. However, there exists some ambiguity in the results stemming from the weight used in the construction of the running variable. Since the weight is exogenous and there is no obvious way of empirically determining it for the studied municipality rules, our results are conditioned on our argumentation regarding the choice of weight converging to the, approximately, correct answer.

The thesis is organised as follows: Section 2 presents the theoretical framework that lies at the foundation of the used model. This is also where the model is presented and solved. Section 3 presents a background to the Swedish redistribution system and the governmental organisation and elections. Section 4 presents the method, the explanatory variables and the linkage between the model, the method and the data. Section 5 presents and describes the data used in the empirical analysis. Section 6 presents and discusses the results and is followed by a conclusion in the subsequent section.

2 Theory

2.1 Theoretical foundations

While this thesis draws upon the model presented by Arulampalam et al. (2009), the model itself originates from the previous influential theoretical works of Cox and McCubbins (1986), Lindbeck and Weibull (1987) and Dixit and Londregan (1996). Their works share the assumption that politicians use redistribution policies to sway voters and maximise votes in upcoming elections. However, their theoretical models can quite easily be divided into two groups of hypotheses. The model by Cox and McCubbins (1986) emphasises the effect of support groups (groups that prefer candidate A over B is a support group to candidate A) as a driver of increased governmental grants to a region. While Lindbeck and Weibull

(1987) and Dixit and Londregan (1996) argue that the higher the prevalence of swing voters there are in a region, the higher the governmental grants will be, all else equal. Naturally, there has been several attempts to test these two branches of theory empirically with the works of Johansson (2003) and Dahlberg and Johansson (2002) being most prominent in the Swedish setting. The majority of their works have focused on the Swing voter hypothesis, and have to some extent tested and dismissed the Support Group hypothesis. However, their research has lacked a clear identification method and suffered from selection bias in the data, which suggests that further research is needed in order to identify the drivers of increased governmental grants to certain regions in Sweden. In a guest written chapter in Shapiro (2009), Cox argues that the grant programme that Dahlberg and Johansson (2002) used was not a policy-neutral programme but rather the result of environmental politics which further implies problems with their econometric approach.

Further empirical studies have evaluated different versions of the model in Arulampalam et al. (2009). Solé-Ollé and Sorribas-Navarro (2008) include another layer of government and use data from Spain while Bracco et al. (2013) makes larger changes, such as including a production function for public goods, and use data from Italy. These papers find evidence in favour of the predictions in their respective models but there has yet to be a paper testing the model in a Swedish setting. Apart from testing the model of political alignment in a new setting with new data, this thesis also presents a new conceptualisation of political alignment that functions in a multi-party democracy with coalitions.

2.2 Theoretical framework

In this section the theoretical model is derived, which results in predictions testable by econometric methods. The model is simple but accounts for the incentives that the central government has when distributing grants to aligned and unaligned municipalities. At first the setup of the model is described, which includes the two layers of government and the parties. Then the attention is turned towards voter behaviour and how alignment affect their decisions. This allows for the formalisation of the objective of the parties and the resulting electoral game.

2.2.1 Setup

As stated, the model includes two layers of government, the central government and municipalities. Furthermore there are two blocks at each level, the controlling coalition and the opposition block. Each municipality has a population N_i and there are n municipalities.

The controlling coalition is composed of the parties in control of the central government and the opposition block is composed of the other parties in parliament. The parties in the government also control mandates in the municipalities to varying degrees. The composition of party controlled mandates in a municipality

relative to the controlling coalition decide the level of alignment in that municipality. More on how the level of alignment and alignment status are related will come later.

We assume that the politicians at the central level have an interest winning election at both levels of government. This means that they care about advancing their party overall, not just in the central elections. This is because the performance of the party at the local level affects the electoral prospects of the party at the central level. We further assume that a ruling coalition, on each level, that has just been elected intend to run as a coalition in the next election. This means that their decisions regarding grants will be made to enhance the prospects of the coalition as a whole, not individual parties.

2.2.2 Voting behaviour

Following the models in Lindbeck and Weibull (1987) and Dixit and Londregan (1996), voting behaviour is based on two criteria. Namely the goodwill generated by grants as well as ideology. We formalise the goodwill criteria by introducing the goodwill generated by per capita grants, g_j, to a municipality j, $u(g_j)$. Where $u'(g_j) > 0$ and $u''(g_j) < 0$. In addition, the goodwill function is the same for all municipalities and individuals, this is a strong assumption but it does not create a loss in generality since only how other differences affect the grant distribution are looked at. Also, in the empirical section, municipality control variables are used to root out differences between municipalities leading to differences in the goodwill function. The ideology criteria is based on the ideological preference, X_i, associated with voter, i. Where X_i is a continuous variable denoting the innate preference a voter has against the controlling coalition. X_i is private information but the municipality specific distribution $\Phi_j(X)$ is common knowledge. Furthermore $\dfrac{\partial \Phi(X)}{\partial X} = \phi(X)$ is positive for all X since there cannot be a negative amount of voters holding a preference.

Now we have that voters make their decision based on the following inequality:

$$u(g_j) > X_i \tag{1}$$

The goodwill from the grants is on the left hand side of the equation since X_i is defined as the ideological preference for any party outside the controlling coalition over the controlling coalition and the controlling coalition is distributing the grants. Thus a voter i votes for the controlling coalition if the condition in Eqn. 1 is met.

Now we introduce the alignment effect described by Arulampalam et al. (2009). This is done by including θ, which is the proportion of utility from grants attributed to the central government. Conversely, $(1-\theta)$ is the proportion of utility attributed to the local government. The local government is also attributed goodwill from the grants for any $\theta < 1$. But the controlling coalition may be represented in the local government as well, which would lead some of the goodwill back to the controlling coalition. In earlier

models, the level of alignment has been binary, either 0 or 1, and determined by the partisanship of the highest office in the municipality (Arulampalam et al., 2009), (Bracco et al., 2013). However, in some municipality systems, political power is not that concentrated. Instead, voters elect officials from different parties, these officials represent on mandate in the municipal council. These officials then form a ruling coalition and the coalition elects one of their members to the highest local office. But all officials hold a degree of power, which of course varies between officials inside and outside the coalition. To account for this fact we introduce a novel view of alignment, namely that it is continuous on a scale between 0 and 1. This scale is defined by:

$$\alpha = \frac{\text{unaligned coalition mandates} + k \cdot \text{unaligned opposition mandates}}{\text{total coalition mandates} + k \cdot \text{total opposition mandates}} \tag{2}$$

Where $0 < k < 1$ is an exogenous weight representing the relative political power between mandates inside and outside the local ruling coalition. Since each municipality has its own α, a subscript is used to denote which municipality the α belongs to. Introducing this into the condition given by Eqn. 1 gives us:

$$\theta u(g_j) + (1 - \alpha_j)(1 - \theta)u(g_j) > X_i + \alpha_j(1 - \theta)u(g_j)$$

$$\theta u(g_j) + (1 - \alpha_j - \theta + \alpha_j\theta)u(g_j) > X_i + \alpha_j(1 - \theta)u(g_j)$$

$$(1 - \alpha_j + \alpha_j\theta)u(g_j) > X_i + \alpha_j(1 - \theta)u(g_j)$$

$$(1 + 2\alpha_j(\theta - 1))u(g_j) > X_i \tag{3}$$

The inequality in Eqn. 3 generate cut-points, $X(g_j, \theta, \alpha_j)$. People with values of X_i lower than the cut-point vote for the controlling coalition. The cut-points are given by:

$$X(g_j, \theta, \alpha_j) = (1 + 2\alpha_j(\theta - 1))u(g_j) \tag{4}$$

We see that if the coefficient in front of the utility function is below one, the utility of grants attributed to the central government is diminished. We further examine the coefficient at the extremes and midpoint of θ.

$$1 + 2\alpha_j(\theta - 1) = \begin{cases} 1 - 2\alpha_j \text{ if } \theta = 0 \\ 1 - \alpha_j \text{ if } \theta = \frac{1}{2} \\ 1 \text{ if } \theta = 1 \end{cases}$$

We recall that $\theta = 1$ means all goodwill from grants is attributed to the central government, $\theta = \frac{1}{2}$ half the goodwill and that $\theta = 0$ means that all goodwill is attributed to the local government. In the cases where $\theta < 1$, the question about how the goodwill is distributed between the local parties arise and is answered by α.

2.2.3 Party behaviour

We assume that the ruling coalition has two objectives, the first one is to maximise amount of votes and the second one is to maximise total amount of welfare. Note that there is an incumbency advantage in the model, since the incumbent in the central government is the one distributing the grants. These objectives are constrained by the budget of grants, given by $\sum_j^n N_j g_j = G$, where G is the total amount of grants from the central government. Note that negative grants are possible but the central government cannot extract money from the municipalities, thus $G \geq 0$. We introduce the average welfare per capita in municipality j, $W(g_j)$ and assume that this function is increasing and concave in g_j. We formalise this in the following objective function for the party in the central government:

$$F(\mathbf{g}, n, m, \theta, \boldsymbol{\alpha}) = \sum_j^n N_j \Phi_j(X(g_j, \theta, \alpha_j)) + N_j W(g_j) \tag{5}$$

Where $\mathbf{g}$ and $\boldsymbol{\alpha}$ are n dimensional vectors containing the grants given to the municipalities and the level of alignment for each municipality, respectively. The objective of the central government is to maximise this function subject to the budget constraint, mentioned earlier. Note that G is exogenous. We now turn to the solution of this model.

2.2.4 Solution

The solution is found using the method of Lagrange multipliers, below the Lagrangian is defined.

$$\mathcal{L}(\mathbf{g}, n, \theta, \boldsymbol{\alpha}, \lambda) = F(\mathbf{g}, n, \theta, \boldsymbol{\alpha}) - \lambda \left(\sum_j^n N_j g_j - G \right) \tag{6}$$

We are now in a position to give an expression for the Lagrange multiplier. In this expression we use the superscript * to denote optimal levels of grants, thus $\mathbf{g}^*$ is a n dimensional vector containing the grants to municipalities which maximise Eqn. 5.

$$\frac{\partial \mathcal{L}(\mathbf{g}^*, n, \theta, \boldsymbol{\alpha}, \lambda)}{\partial g_j^*} = N_j \phi_j(X(g_j^*, \theta, \alpha_j))(1 + 2\alpha_j(\theta - 1))u'(g_j^*) + N_j W'(g_j^*) - \lambda N_j = 0$$

The first order condition may now be stated as:

$$\phi_j(X(g_j^*, \theta, \alpha_i))(1 + 2\alpha_j(\theta - 1))u'(g_j^*) + W'(g_j^*) = \lambda \tag{7}$$

From this solution, a number of conclusions regarding grant allocation can be made.

2.2.5 Effect of alignment on grant allocation

We pick two arbitrary municipalities, p and q, such that $\alpha_p > \alpha_q$. This means that municipality p is more unaligned than municipality q. Taking the difference between the solutions of these municipalities yields:

$$\phi_q(X(g_q^*, \theta, \alpha_q))(1 + 2\alpha_q(\theta - 1))u_q'(g_q^*) + W'(g_q^*) - \phi_p(X(g_p^*, \theta, \alpha_p))(1 + 2\alpha_p(\theta - 1))u_p'(g_p^*) - W'(g_p^*) = 0$$

$$W'(g_q^*) - W'(g_p^*) = \phi_p(X(g_p^*, \theta, \alpha_p))(1 + 2\alpha_p(\theta - 1))u_p'(g_p^*) - \phi_q(X(g_q^*, \theta, \alpha_q))(1 + 2\alpha_q(\theta - 1))u_q'(g_q^*)$$

We introduce $2(1-\theta) = d$ and assume that $\theta < 1 \rightarrow d > 0$. This means that at least some of the goodwill of grants is attributed to the local government. We now have that:

$$W'(g_q^*) - W'(g_p^*) = \phi_p(X(g_p^*, \theta, \alpha_p))(1 - d\alpha_p)u_p'(g_p^*) - \phi_q(X(g_q^*, \theta, \alpha_q))(1 - d\alpha_q)u_q'(g_q^*)$$

Remember that we assumed that $\phi(X) > 0 \ \forall \ X$ and similarly that $u'(g) > 0 \ \forall \ g$. This means that the signs of the two terms is determined by their respective α. Now if $d\alpha_p > 1$, then the first term is negative, and if $d\alpha_q < 1$, then the second term is also negative. This means that we have:

$$W'(g_q^*) - W'(g_p^*) < 0 \rightarrow W'(g_q^*) < W'(g_p^*)$$

Now, since W is concave in g, which means that $W''(g) < 0 \ \forall \ g$ and that $W'(g) > 0 \ \forall \ g$, we have that $g_q^* > g_p^*$. This means that more aligned municipalities receive more grants from the central government. Note that we have assumed that the local government is attributed some of the goodwill from grants ($\theta < 1$). This assumption is very weak. In addition, we made the following assumptions regarding the αs:

$$d\alpha_q < 1 \rightarrow \alpha_q < \frac{1}{d}$$

$$d\alpha_p > 1 \rightarrow \alpha_p > \frac{1}{d}$$

We may express this as:

$$\alpha_q < \frac{1}{d} < \alpha_p$$

However, we defined α such that $0 \leq \alpha \leq 1$ while $d > 0 \rightarrow \frac{1}{d} < M$ where M is an arbitrarily large number bounded by infinity. Since we need $\frac{1}{d} < 1$ we need to impose the more stringent restriction $d > 1$. Which implies $2(1 - \theta) > 1 \rightarrow \theta < \frac{1}{2}$. Thus, the local government need to be attributed more than half the goodwill from grants in order for aligned municipalities to receive more grants. While this is a fairly strong assumption which would be beneficially relaxed, the result is still used to make the prediction.

We introduce the per capita contribution to the objective function from a municipality l, $V_l(g, \theta, P)$.

This is given by:

$$V_l(g,\theta,\alpha) = \Phi_l(X(g,\theta,\alpha) + W(g) \tag{8}$$

We may now restate the first order condition as:

$$\frac{\partial V_l(g,\theta,\alpha)}{\partial g_l} = \phi_l(X(g,\theta,\alpha))(1-d\alpha)u'(g) + W'(g) = \lambda \tag{9}$$

We assume that these functions are concave in $g \; \forall \; \alpha$. Now let us again consider two arbitrary municipalities, $\hat{p}$ and q, such that $\alpha_q = \alpha_{\hat{p}} = \alpha$. In addition, we make the following assumptions: $\phi_q(0) > \phi_{\hat{p}}(0)$ and $\theta > \frac{1}{2} \rightarrow d < 1$. Consider the closed interval $[0, a]$ where $a > 0$ is the point where $\phi_q = \phi_{\hat{p}}$. Within this interval we have that $\phi_q(X) \geq \phi_{\hat{p}}(X)$, which may be expressed mathematically as $\phi_q(X) > \phi_{\hat{p}}(X) \; \forall \; X < a$. The condition may be restated in terms of grants, where $\hat{g}$ is the grant level corresponding to $X = a$. Therefore, the following is true for all $X < a$ and similarly for all $g < \hat{g}$:

$$\frac{\partial V_q(g,\theta,\alpha)}{\partial g_q} = \phi_q(X(g,\theta,\alpha))(1-d\alpha)u'(g) + W'(g) > \phi_{\hat{p}}(X(g,\theta,\alpha))(1-d\alpha)u'(g) + W'(g) = \frac{\partial V_{\hat{p}}(g,\theta,\alpha)}{\partial g_{\hat{p}}}$$

Since this equation may be reduced to

$$\phi_q(X) > \phi_{\hat{p}}(X)$$

if $g_q = q_{\hat{p}}$. In order for the first order condition, given by Eqn. 9, to be satisfied we must have that $g_q > q_{\hat{p}}$ by the concavity of V in g. We have now shown that two municipalities with different density functions ϕ but with identical alignment levels should receive different amounts of grants, if grants are "small" (recall the condition $g < \hat{g}$). This is similar to the results that Cox and McCubbins (1986), Lindbeck and Weibull (1987) and Dixit and Londregan (1996) derived in their respective models.

We extend this result by introducing a third municipality p such that $\alpha_p > \alpha_{\hat{p}}$ (p is more unaligned than $\hat{p}$) and $\phi_p = \phi_{\hat{p}}$. In addition, we need to make another assumption regarding the behaviour of the density function on the interval in question. We prohibit the function from falling too quickly by imposing $b\phi_p(bx) \leq \phi_p(x) \; \forall \; x \in [0, a)$ where $0 < b < 1$. Comparing p and $\hat{p}$ now gives us:

$$\frac{\partial V_{\hat{p}}(g,\theta,\alpha_{\hat{p}})}{\partial g_{\hat{p}}} = \phi_{\hat{p}}(X(g,\theta,\alpha_{\hat{p}}))(1-d\alpha_{\hat{p}})u'(g)+W'(g) \geq \phi_p(X(g,\theta,\alpha_p))(1-d\alpha_p)u'(g)+W'(g) = \frac{\partial V_p(g,\theta,\alpha_p)}{\partial g_p}$$

To show this we reduce the equation to:

$$\phi_{\hat{p}}((1-d\alpha_{\hat{p}})u(g))(1-d\alpha_{\hat{q}}) \geq \phi_p((1-d\alpha_p)u(g))(1-d\alpha_p)$$

And note that:

$$0 < (1-d\alpha_p) < (1-d\alpha_{\hat{p}}) < 1$$

Using the assumption regarding the behaviour of ϕ and comparing p and q on the grant interval $[0, \hat{g})$

gives us:

$$\frac{\partial V_q(g,\theta,\alpha_q)}{\partial g_q} > \frac{\partial V_p(g,\theta,\alpha_p)}{\partial g_p}$$

for $g_q = g_p$. By the concavity of $V(g,\theta,\alpha)$ in g we now have that $g_q^* > g_p^*$ for $\theta > \frac{1}{2}$ and $g < \hat{g}$. We have now shown that there is a model which predicts that more aligned municipalities receive more grants than less aligned municipalities if grants are "small". Combining all results shown this far we get what Arulampalam et al. (2009) calls the *Aligned swing effect*. This effect states that a relatively more aligned and swing municipality will receive more grants than a less swing municipality, given that equilibrium grants are "small". However, this effect does not cover the case that compares a more swing municipality to a less swing, more aligned municipality. Consider three municipalities characterised by the following relations: $\alpha_p > \alpha_q = \alpha_{\hat{p}}$, $\phi_{\hat{p}}(0) = \phi_p(0) > \phi_q(0)$ and $\theta > .5 \rightarrow d < 1$. Using similar methods as above it is easy to show that:

$$\frac{\partial V_p(g,\theta,\alpha_p)}{\partial g_p} \leq \frac{\partial V_{\hat{p}}(g,\theta,\alpha_{\hat{p}})}{\partial g_{\hat{p}}}$$

and that:

$$\frac{\partial V_q(g,\theta,\alpha_q)}{\partial g_q} < \frac{\partial V_{\hat{p}}(g,\theta,\alpha_{\hat{p}})}{\partial g_{\hat{p}}}$$

Again using similar arguments to those above we see that the municipality $\hat{p}$ receives more grants than the other two municipalities, given that grants are "small". However, from these relations we are unable to reach a conclusion regarding the relation of grants between the municipalities p and q. We conclude that the effect in this case is ambiguous. Referring back to the prediction associated with the *Aligned swing effect*, the following sections of this paper focuses on providing and interpreting evidence for or against this prediction using data from Sweden.

3 Institutional background

3.1 Branches of government

The administrative divisions of Sweden can be divided into three parts. The state-level, county councils and municipalities. The central government and the parliament is operating at the state-level. The organisation of, and responsibilities of counties and municipalities has varied throughout the 1900s with the major change occurring between 1966 and 1980. Defining this change was the merger of municipalities which started in 1966 and culminated in 1974 where 800 municipalities where merged into 278. Through the merger the municipalities faced further responsibilities, one example being a drastic expansion of child care forced upon the municipalities by the government. This, among other things, lead to an increase in costs for municipalities of 7.1 percent annually between 1971 and 1977. Simultaneously, the revenues of the public sector became more dependent on labour taxes. Ultimately, the responsibilities of both counties and municipalities increased after the merger and in order to achieve a stricter definition

of the different responsibilities of the three branches, a new local government act was deemed necessary (Nilsson and Forsell, 2013).

The legislation known as the Swedish Local Government Act was implemented in 1992 and lead to further delegation of responsibilities to counties and municipalities. As a result, since the early 1990s counties are responsible for vast geographical areas and are bestowed with the responsibility of projects which require large economic resources such as health care and systems of public transport. Municipalities are instead responsible for the more local public services such as schools and elderly care (Government Offices of Sweden, 2015).

3.1.1 Municipal governing

The governing of municipalities is constituted by officials who through democratic elections are awarded a seat on the municipal council. After the election, the officials appoint a municipal board. All propositions must be voted through in the municipal council, but the municipal board is responsible for directing the work within the municipality. Apart from the council and municipal board there exists a number of different boards and committees within municipalities (Sveriges Kommuner och Landsting, 2017). A recent report from The Swedish Association of Local Authorities and Regions present three forms of, by them, deemed viable and historically prevalent forms of municipal organisation. The forms are depicted below and stem from the report by Sveriges Kommuner och Landsting (2006).

- Full majority rule: the political majority [controlling block] appoints all positions in all boards (including the municipal board) and committees.
- Restricted majority rule: the political majority appoints all positions within the municipal board.
- Collective majority rule: all parties with seats in the municipal council appoint the boards and committees, however some majority claim might still exist.

No data exist regarding which municipality has carried through which type of rule at which point in time or which form that has been the most prevalent. However, the report provides further understanding of the municipal rule in terms of the power of the local majority coalition. Full majority rule implies that parties outside of the coalition are negated any influence over local rule and positions within committees and boards. Assuming that this is true for all, or even an average of the municipalities is a rather stark assumption seeing as one third of all municipalities are ruled through minority coalitions. Further, the second vice chairman of the municipal board is often elected by the opposition (Sveriges Kommuner och Landsting, 2017). Accordingly, if one accepts the notion that non-majority coalition parties have at least some influence over municipal decisions and committees, one can conclude that the opposition block is an important agent on the local municipal level.

3.2 The Swedish election system

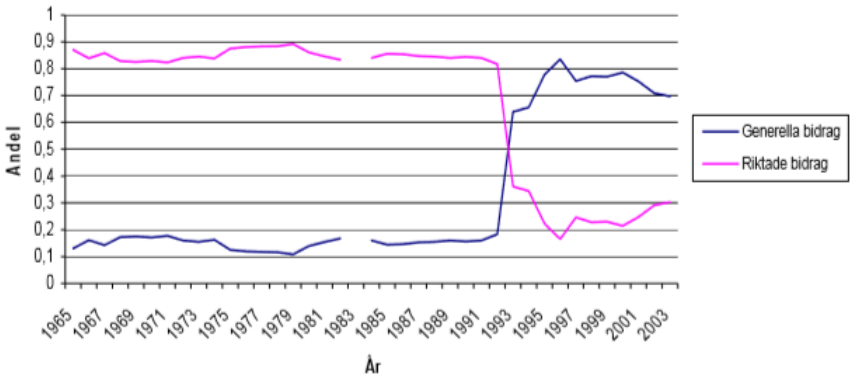
Between 1970 and 1993 the Swedish government was elected on a three year term basis, from 1994 and onward the Swedish government is elected on a four year term basis. Bicameralism was abandoned in 1971 and the sole chamber consisted of 350 members, later adjusted to 349 in 1976. Furthermore, since 1970 the three levels of government shares election day. The elections are however separate in that any individual can vote for different parties across the three levels and must not stick to the same party on all levels. While the formal power in the parliament is only a result of the votes with regards to the state-level the fact that the counties and municipalities have a high level of self-governing within certain areas, major as well as minor parties can be assumed to have a high interest in winning the local elections as well as the national one seeing as it furthers their influence across the entire nation (Government Offices of Sweden, 2015). Worth noting about the election campaigns is that local party affiliates are often responsible for furthering their respective parties' electoral prospects in that region, with regards to both local and national elections since they function as the local representatives of the national party. However, while local party affiliates represent the national party's interest they might differ somewhat in ideology and opinions on local issues (Sveriges Kommuner och Landsting, 2006).

3.3 The Swedish redistribution system

The Swedish smoothing system has changed throughout history. Before the implementation of a universal system in 1966, a system of selective grants to municipalities existed. When the responsibilities of municipalities increased during the mid 1900s, pressure rose to implement a universal system (Dahlberg and Rattsø, 2010). The implemented system consisted of two parts, the smoothing of incomes across regions and a specific grant that was distributed to counties and municipalities with a high imposition of taxes. However, the initial redistribution system was subject to a vast reform in 1993 (Dahlberg and Rattsø, 2010). The resulting smoothing system was constituted of three parts, smoothing of incomes, smoothing of costs and an additional grant towards municipalities whom had experienced a great reduction in population. Alongside this reform two additional changes where implemented. The municipality fee for high income municipalities was dropped and prior to the reform specified grants accounted for roughly 80 percent of all government grants towards municipalities, and after the reform almost 80 percent of the grants were unspecified as shown in Figure 1a (Dahlberg and Rattsø, 2010).

Between the reform in 1993 and the current system, the system has been subject to both minor and major alterations. In 1996 the smoothing of incomes and costs was reformed to be financed solely by redistribution transfers between municipalities. This meant that the smoothing system was neutral with regards to state finances and that a general grant existed outside of the system. However, in 2005 the grant was again incorporated into the main system, which brought it closer to the current system implemented in 2008.

Figure 1: Fraction of General and Specific Grants of total grants



(a) Source: Dahlberg and Rattsø (2010)
y-axis labelled Fraction, x-axis Year. Legend labelled General grants (top) and Specified grants (bottom)

The current system, which stems from 2008 is constituted by five parts. The smoothing of incomes, the smoothing of costs, a structural grant, an introductory grant and the adjustment item. The income smoothing is calculated with respect to tax power in the various municipalities and 95 percent of the smoothing is state financed. The remaining 5 percent is financed by the municipalities with a tax power over 115 percent of the nationwide average who instead of receiving grants pay a fee. The cost smoothing is meant to smooth costs with respect to differences in demographics, geography or socioeconomic outsets. The structural grant is implemented to capture structural differences that previously were, but no longer are, included in the cost smoothing, such as historical high unemployment. The introductory grant was implemented as a time limited grant, but due to minor continuous changes to the redistribution system it has to some extent been in place since the major reform in 2008 and is currently set to disappear in 2019. The adjustment item is a residual that captures the difference between the central government's budgeted cost of the redistribution system, and the actual cost. Alongside the redistribution system, there exist a vast number of grants, both general and specified. These, together with the redistribution system, account for roughly 25 percent of the income of Swedish municipalities (Sveriges Kommuner och Landsting, 2017).

Lastly, worth noting is that while there have been several major reforms during the last decades, minor alterations to the system have been conducted continuously and at least once during every shift of power on the governmental level which indicates a firm governmental control of the redistribution in Sweden (Dahlberg and Rattsø, 2010).

3.3.1 Governmental discretion

Several minority governments have ruled on the central level during the studied period. Accordingly, in order for these minority governments to rule, they must seek support from the rest of the parliament. Consequently, one could question whether the government has had discretionary power in altering the

redistribution system or if pivot parties[4] have had substantial influence over the reforms or policy in general. According to a report from SCB (2015), the impact of pivot parties in Sweden has been limited due to the fact that they have only been able to establish majority in favour of one coalition and not the opposing coalition at each election cycle. Thus, the pivot parties have not been able to directly impact which party or coalition that gets to carry through their rule and budget in the parliament (SCB, 2015). Ultimately, despite minority rules, the governments seem to have had control and discretionary power over their reforms and policies without influence from non-coalition parties considering the budget system of the Swedish parliament (SCB, 2015). While assuming full majority rule in municipalities was deemed a stark assumption, the impact of the government on the central level differs due to the budget process and the necessity of establishing a strictly ruling coalition in order to form a government makes a discretionary assumption less stark on the governmental level.

4 Method

4.1 Regression Discontinuity Design

The estimation strategy that will be used is the Regression Discontinuity Design (RDD). This method allows for the generation of unbiased estimates of the average treatment effect of political alignment on municipal grants. The possible bias associated with other strategies stems from the fact that municipal grants are most likely correlated with other unobserved municipal characteristics apart from political alignment, as well as a range of other factors. In order to deal with the potential bias the RDD exploits the fact that political alignment changes discontinuously. This is known as "sharp" RDD, where treatment status is determined by the location of the running variable relative to a specific threshold.

$$T_i = T(x_i) = \begin{cases} 0 \ \forall \ x_i < c \\ 1 \ \forall \ x_i \geq c \end{cases}$$

The equation above is an identicator function where x_i is a continuous running variable. Further, c is the treatment threshold which then separates observations into either treatment ($T = 1$) or control ($T = 0$). RDD estimates an unbiased effect by comparing the outcomes for observations "just below" and "just above" the treatment threshold, with the assumption that the only shift that occurs at the threshold is the shift in treatment status. This is known as the continuity assumption and allows for observations to "systematically differ from each other in many aspects" without invalidating the identification method of RDD (de la Cuesta and Imai, 2016). A closely related assumption is the local randomisation assumption. This assumption states that whether or not an observation within a close interval around the threshold

[4]Pivot parties are parties, often centrist, who balance the power in multiparty systems by sometimes having the possibility of pivoting either towards the left or the right and thus deciding which coalition becomes a majority and accordingly forms the government.

is assigned to treatment or control, is essentially randomised. In fact, this assumption implies the continuity assumption and is, therefore, a stronger assumption. These assumptions are violated when sorting at the threshold exists, which means that agents may actively influence the treatment status of observations close to the threshold. In their article de la Cuesta and Imai (2016) argue that while these two assumptions are similar, the choice of assumption alters the optimal estimation method and the way in which sorting invalidates the RDD. They ultimately argue that using differences-in-differences is ill-suited for close elections, and that one instead should use local-linear estimators[5] on either side of the threshold in an RDD analysis (de la Cuesta and Imai, 2016). Accordingly, this is the method used in this thesis.

There have been several applications of RDD to close elections and one of the most defining articles is Lee et al. (2004) which exploits close U.S house elections in which they conclude "among elections that turn out to be close, who wins is as good as randomly assigned". They revisit the RDD with close elections in a 2008 article and find further evidence of the applicability of RDD on U.S house elections (Lee, 2008). However, this only implies that the elections that Lee et.al. (2004, 2008) looked at were essentially as good as randomly assigned and says little about the setting that this study is conducted in. Furthermore, the RDD with respect to close elections has received critique by authors whom have returned to the U.S house elections in Lee's articles and found flaws in the data. They argue for an *ex ante* bias in favour incumbent campaigns due to their financial power providing a way to influence the election, resulting in sorting around the threshold (Caughey and Sekhon, 2011). Sorting around the threshold is indeed a potential problem with RDDs in general, which merits the upcoming discussion on the topic related to the situation in this article. This leaves the article by de la Cuesta and Imai (2016). They summarise the divided literature of RDD validity and argue that the most important aspect is to understand the difference between the continuity assumption and the local randomisation assumption in order to design the regression discontinuity approach accordingly. A very important difference is how the assumptions are violated, if the possibility of sorting exists then the local randomisation assumption is violated but the continuity assumption requires active sorting in order to be violated.

Ultimately, de la Cuesta and Imai (2016) conclude that violation of the continuity assumption requires a situation in which either post election fraud to push losers into the winner threshold is present, or a statistically unlikely scenario of pre-election sorting in which political campaigns are capable of predicting vote shares with extreme precision (de la Cuesta and Imai, 2016). With respect to voter fraud, the high democratic standard in Sweden must be believed to prevent any successful voter fraud, and the latter violation requires prediction precision of a quarter of one percentage point (de la Cuesta and Imai, 2016). Consequently, RDD is deemed to be the suitable method for identifying causal effects of political alignment on grants conditioned on the continuity assumption rather than the local randomisation assumption.

[5]This is often used in non-parametric regressions (Fan, 1993)

4.2 Econometric approach

4.2.1 Political alignment variable

The theoretical model is formed around the notion that parties in the parliament either belong to the controlling block or the opposition block. This is also true for the empirical model and the alignment of the municipalities change depending on the outcome of the parliamentary election. This is reasonable since the model considers one election cycle at a time, the idea is that when parties have formed central government they use available tools, reforms of the transfer system, to put themselves in a better position for the next election. As the model suggests, one of the ways to do this is to transfer more to aligned municipalities. Therefore, when testing the model, the alignment status of each municipality must be determined. Further, the actual margin of alignment is determined and used as the running variable in the regression discontinuity design. As mentioned before, inhabitants in a municipality elect officials to represent them in the local government. These officials always represent a political party and each party is awarded a certain number of mandates that represent the vote share the party received. Once officials are elected, they form a governing coalition. The coalitions are formed between parties if one party does not hold full majority. The margin of alignment variable is therefore based on how many municipal mandates each parliament party holds and which parties are part of the ruling coalition in the parliament and which are part of the ruling coalition in the municipality.

Municipal coalition parties that also belong to the central government increase the margin of alignment whereas municipal coalition parties that belong to the opposition in parliament decrease the margin of alignment. What changes discontinuously at the threshold is whether the controlling block in the parliament holds a majority of the mandates in the municipality. Thus, a margin of alignment variable could look like this:

$$MA = \frac{Coalition\ mandates\ controlling\ block - Coalition\ mandates\ opposition\ block}{Total\ coalition\ mandates}$$

However, this measure fails to consider the mandates that are not in the controlling coalition on the municipal level and consequently they do not affect the margin of alignment at all, the weight of these mandates are zero. As long as the opposition possess some influence and thus are accredited some of the received grants, their weight should increase from zero to $k > 0$. This leads to the following definition for the margin of alignment:

$$MA = \frac{cmcb + k * nmcb - cmob - k * nmob}{cmcb + k * nmcb + cmob + k * nmob}$$

Where *cmcb* is the local coalition mandates from the controlling block, *nmcb* the local non-coalition mandates from the controlling block, *cmob* the local coalition mandates from the opposition block and finally *nmob* the local non-coalition mandates from the opposition block. The numerator is included to normalise the domain of the margin of alignment between -1 and 1. This expression of the running

variable slightly changes the interpretation of it. Now, what changes at the threshold is whether the controlling block holds a majority of total mandates (unweighted mandates belonging to the municipal coalition and weighted mandates belonging to the municipal opposition).

The perception of alignment has considerable impact on the interpretation of the different weights and archetypes. Previous studies of political alignment have emphasised that direct political control determines alignment (Bracco et al., 2013). This perception may be modified to fit the situation at hand by letting the weights represent situations where the local coalition either has full control or shares control with the opposition and thus the alignment status depends on the extent to which governmental parties hold political control in the municipality. While it might seem arbitrary to simply assign random weights to the impact of mandates outside the coalition, the forms of municipal governing described in 3.1.1 allow for a better understanding of the impact of opposition parties. Assuming that the first form of full majority rule is implemented the weight on k should equal 0 due to the lack of influence opposition parties have. In the case of collective majority rule, the weight k should equal 1 since the rule in the municipality is collective across coalition boarders. With respect to the restricted majority rule, the weight k is not as straightforward as in the other scenarios since it is a situation with a relatively high emphasis on the ruling coalitions, but it is restricted by opposing mandates. Accordingly, this situation lies somewhere in between the other two, and while any weight $0 < k < 1$ could be deemed suitable, it is deemed less arbitrary to simply assign the weight $k = 0.5$ to represent this situation rather than arguing that $k = 0.3$ or $k = 0.7$ would be more suitable weight since $k = 0.5$ rests between 1 and 0.

Unfortunately, there is no data on which municipality that has followed which form at which point in time. Therefore, in order to conduct the analysis, a general weight must be used across the entire sample. Furthermore, these forms of municipal governing should be understood as abstractions and simplifications of reality rather than a perfect reflection of the rule in municipalities. While a weight $k = 0$ is an interesting possibility, it is perhaps not a very solid reflection of reality since opposition parties are likely to have influence over policy in at least some municipalities, especially since almost a third of all municipalities are ruled by a minority (Sveriges Kommuner och Landsting, 2017). Accordingly, assuming that all municipalities are ruled through full majority is a rather stark assumption. Similarly, assuming a weight $k = 1$ would imply that parties outside of the ruling coalition have a substantial amount of influence in all municipalities, an assumption that is rather stark as well. Thus, the restricted majority archetype seems like a suitable alternative since it allows for some opposition influence but accepts the notion that it might be limited. However, while the assumptions of full- and collective majority rule might be stark assumptions, it could be argued that there might exist a tendency towards one or the other. This would cause opposition influence to end up between the restricted majority rule and either one of the two other archetypes. Thus, in order to account for a possible tendency towards either archetype, weights of $k = 0.25$ and $k = 0.75$ are considered as well.

The above reasoning is conditioned on the traditional view of alignment. Namely that the parties composing the central government coalition only care about to what extent their parties are in control

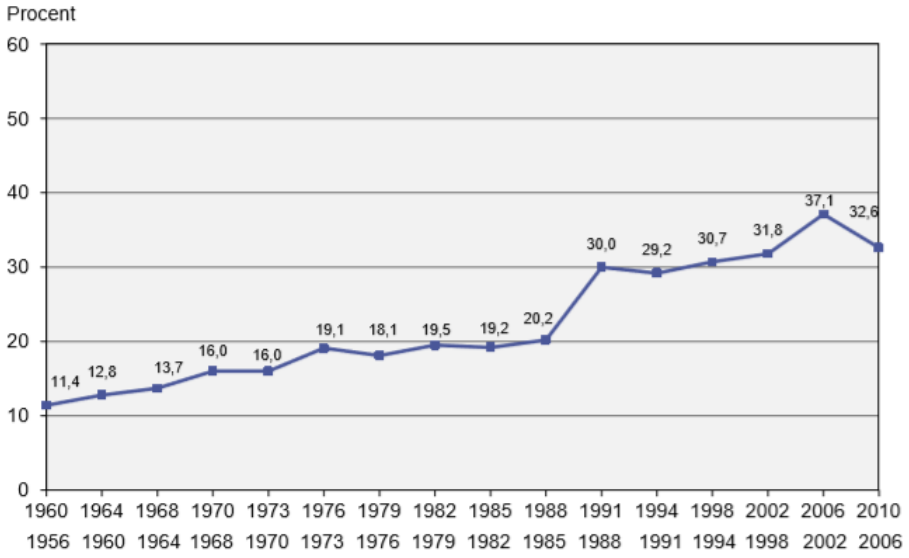
of the municipality. Either through controlling the local coalition or by a high influence through the opposition being considered pertinent (a high weight on k). However, this might not be the only thing that the central government cares about. In fact, the core supporter hypothesis proposed by Cox and McCubbins (1986) states that the central government should also care about the people organising the election campaigns throughout the country when distributing grants. As stated in Section 3.2 the local party affiliates are often the ones responsible for this task. Therefore, it is not unreasonable that the central government should consider municipalities in which their parties are prevalent important when distributing grants. Accordingly, this novel view of alignment may be achieved by considering the interpretation of the political alignment variable if the weight k is set above the actual influence of the opposition. In this situation the political alignment variable is interpreted as reflecting a situation where central governmental coalitions also care about the governmental parties' prevalence on the local level. This follows from the fact that a weight, above the actual influence of the opposition, implies that the presence of aligned parties in the municipal opposition affects the margin of alignment of that municipality by a greater extent than their influence alone. The same argument implies that a lower weight than the actual influence of the opposition would mean that governments are more concerned with controlling the coalition rather than the municipality as a whole.

4.2.2 Swing voter identification

Since the results from the theoretical model is subject to the swing voter prevalence distributions of municipalities, a suitable swing voter prevalence variable is required as a control when estimating the effect of political alignment on grants. A sound starting point is the measure suggested by Johansson (2003). Her approach is to use a factor analysis on survey data from Swedish election studies and exploit the fact that the answers in the survey depend on underlying party preferences. However, she only uses surveys from two elections making her estimate rather static. In order to allow for swing voter prevalence to shift over time, this thesis instead apply the approach of Case (2001). By using closeness of the last elections, Case presents a proxy for swing voter prevalence that shifts over time. While the approach rests on an assumption of a single-peaked voter preference distribution, the benefit of allowing the prevalence to shift overtime is a sound approximation of reality. The reason for allowing the prevalence to shift over time is best illustrated by statistics provided by Statistics Sweden.

As depicted in Figure 2a the fraction of voters who vote for different parties across elections has been steadily increasing over time. This can be argued to indicate an increase in swing voter prevalence, or at least that the swing voter prevalence shifts over time seeing as the trend is somewhat alternating between increased party shifts and decreasing party shifts. Accordingly, allowing for the swing voter prevalence variable to vary over time is not only sound from a logical point of view but also from a data driven point of view. Furthermore, this thesis develops the closeness proxy to better fit the setting in which this study takes place. Seeing as there have been different governmental coalitions during the period, the closeness proxy, or difference between the blocks, is coded to properly be the closeness between the

Figure 2: Fraction of voters who shift party between elections



(a) Source: (SCB, 2016)

government and the opposition in the last national election for each municipality.

4.2.3 Control variables

Vast structural and economic differences between municipalities makes it necessary to implement a number of control variables, such as population size, per capita income and age structure (Nilsson and Forsell, 2013). As a result of the theoretical model, the swing voter prevalence variable is included to incorporate for the distribution of ideological preference and used in order to research the effect of swing voter prevalence on the redistribution system. Also, Wärneryd (1998) proposes that smaller regions or municipalities have a greater possibility of receiving grants through coordinated efforts. Accordingly, controlling for population size becomes further motivated. However, the number of mandates is to a large extent decided by the population prior to elections (Valmyndigheten, 2018). Consequently, no direct control variable for the number of mandates is included seeing as this is covered by the population variables.

4.2.4 Regression model

The regression model is non-parametric and estimated using the Stata package created by Calonico et al. (2017). The inner workings of the software is outside the scope of this paper and is explained in full detail in the accompanying paper (Calonico et al., 2017). Unfortunately, the use of a non-parametric regression prohibits the estimation of the swing voter prevalence effect, which is of interest in this context. However, the benefits it provides by correcting for bias and providing robust results outweighs this drawback. In

addition, the swing voter prevalence effect is widely documented in empirical research that has been conducted both abroad and in Sweden (Johansson, 2003).

4.3 Model, method and data

The model is modified to better account for the characteristics of a system with many parties and a prevalence of coalitions, at both the central and local level of government, by considering the coalition rule in municipalities. However, it does not provide a perfect mapping of the Swedish system since it is still based on a two-party system. Multiparty systems, and thus multiparty models, might differ from the results derived from the two-party system above. Therefore, the model on its own does not provide evidence for or against the hypothesis that aligned municipalities are favoured by politicians in a multiparty system. However, the aim of this thesis is not to solely provide a fully fleshed out theoretical model of multiparty systems as proof of the effect of political alignment. Instead the thesis also aims to provide empirical evidence, guided by the theoretical model, of the potential effect of political alignment on the distribution of grants. Accordingly, the theoretical model serves the purpose of providing a prediction regarding the effect of political alignment on grants which in turn may be tested using the method outlined in this section.

In addition, the model includes a scale of alignment rather than the usual, binary view of alignment. In the empirical strategy employed in this paper, municipalities are divided up into a treatment group and a control group. While this implies a certain discrepancy between the theoretical model and the empirical approach, the aim is to identify a causal effect of political alignment between the municipal and governmental level rather than research the effect or correlation between increased alignment and grants at all parts of the scale. The model still provides guidance in how the effect of a binary alignment variable could impact grants seeing as being aligned rather than not-aligned can be deemed as an indicator variable that shifts at a certain value of the scale of alignment.

The treatment group is composed of municipalities where the margin of alignment is above a threshold and the control group is composed of municipalities where the margin of alignment is below that threshold. This is because the average treatment effect is estimated, rather than the exact treatment effect corresponding to a given alignment level.

4.3.1 The RDD assumptions

As previously mentioned, in order to establish an unbiased causal estimate with the regression discontinuity design there can be no sorting or manipulation at the threshold. Sorting at the threshold means that individuals who where meant to fall below the threshold may manipulate results or impact their positioning to receive the treatment. This would invalidate the key assumption that observations on either side of the threshold are similar in aspects other than treatment status (Gerritsen et al., 2017).

In the electoral context of this thesis, sorting would exist if municipalities could alter their alignment status with the government. If the prediction made by the model is correct, municipal politicians have an incentive to align their municipality with the government, since this would lead to an increased amount of grants. The possibility of sorting or manipulation does exist to some extent since elected municipal officials are tasked with creating a ruling coalition. It is therefore possible to include (exclude) parties in (from) the coalition in order to further align the municipal coalition with the central government coalition. However, municipal coalitions are usually formed simultaneously or before the central government coalition, which limits the possibility of sorting. But it should be noted that it is usually possible to tell which central government coalition is most likely from the election results, since parties usually make it clear who they are willing to form coalitions with before the election. Further, one could argue that due to the freedom of local party affiliates, coalitions on a local level are formed based on similarities in local issues rather than of consideration of the governmental coalition and rule. Nevertheless, sorting is a serious concern and therefore all available tools are employed to find evidence for or against sorting in a following section. In addition, the aforementioned weight, used in the construction of the Margin of Alignment variable, changes the possibilities of sorting. In fact, sorting becomes impossible if the weight is equal to one since excluding or including elected municipal officials from or in the municipal coalition no longer changes the alignment of that municipality. It is therefore expected that manipulation tests will find more evidence of sorting at lower weights and indications of manipulation at lower weights can be deemed more severe than at higher weights.

5 Data

5.1 Dependent variable

Considering that the aim of this thesis is to study the effect of political alignment and swing voter prevalence on the redistribution system between municipalities, the dependent variable is constituted by grants. However, there are several grants not only within the main redistribution system but also outside of the system[6]. This begs the question of which part of the grant system to look at, or if one perhaps should consider all of the various grants, either by running separate regressions or combining the total value of all grants from outside and inside the main redistribution system. Thankfully, the choice becomes less arbitrary when considering the background of the redistribution system, previous literature and the theoretical framework. The reason for including the formula based redistribution system is due to the economic importance of the system as well as the governmental discretionary power and the continuous alterations to the system mentioned in 3.3.1.

As mentioned by Cox in Shapiro (2009), all theoretical frameworks of political redistribution assume

[6]Here the main redistribution system is defined as the formula based smoothing between municipalities. While general and specified grants are part of the redistribution system as a whole, this distinction is used in order to easier conduct the following discussion regarding whether or not to include specified grants and/or general grants

completely policy-neutral grants. This is true for the model used in this thesis as well, since it stems from Dixit and Londregan (1996). To illustrate this, Cox brings up a grant used by Johansson (2003) that targets green investments and is thus skewed towards green-parties and can be deemed non-policy neutral(Shapiro, 2009). Furthermore, a clear distinction between policy-neutral specified grants and non-neutral specified grants is difficult to achieve. To some extent, all specified grants might be deemed non-neutral since one party is likely to have a stronger association with the targeted area of the economy than other parties. Accordingly, many of the grants outside the redistribution system fails the policy-neutrality assumption since roughly 20 percent of grants are specified grants with a pre-decided purpose (Dahlberg and Rattsø, 2010). Furthermore, in the theoretical model, the parameter θ could be argued to take the value of one with respect to specified grants. The reasoning being that through a specified grant, local municipal citizens attribute all the increased welfare from grants to the central government. Consequently, specified grants are excluded from the analysis, with the general grants and the redistribution system remaining in it.

During different periods of the redistribution system a general governmental grant has either been part of or not part of the system. For this reason, in order to make the data set comparable over time, this thesis considers the sum of the received grants from the formula based redistribution system as well as the general grants received. Since the data does not distinguish the general grant when it is part of the main redistribution system, the notion of making the data more comparable over time by excluding it is unfeasible. Ultimately, this results in a dependent variable that consists of the total value of general grants and the redistribution system expressed in thousand SEK and current prices.

5.2 Data description

The data set contains redistribution data, grants data and election-day data with respect to municipalities and the parliament. In addition, it includes census data and income from 1998 to 2016 which is used as control variables. All data is retrieved from Statistics Sweden. The data is restricted to post-1998, partly due to reforms in the redistribution system, partly in order to make the data more comparable over time, but also as a result of unified grant data not being available pre-1998. In addition, income data for 2017 is not yet available which results in estimations using control variables only including data from 1998 to 2016 while estimations without control variables use data from 1998 to 2017. One advantage of the data set is the fact that despite these limitations, it includes 18 years of data. This results in a large amount of observations as well as data for three different central government coalitions and five elections. In addition, the municipal coalition data allows for proper coding of the actual political alignment between the central government and the municipalities. This is especially important in the Swedish setting since approximately a third of all municipalities are run by parties from both the left-wing and right-wing blocks (Sveriges Kommuner och Landsting, 2017). To our knowledge it is the largest data set with respect to grants and municipal coalition data in Sweden to be used empirically. Furthermore, seeing as

data is available with respect to elections along with municipal mandate data allows for the usage of a RDD to identify a causal effect of political alignment on grants. The large sample of municipalities have remained fairly constant over the pertinent years with only a few mergers and splits of municipalities. In addition, as mentioned in 3.3 there was a drastic shift in the balance between general, and specified grants in 1993. Consequently, general grants accounts for 80 percent of grants post 1993. Seeing as specified grants can be deemed to be non-policy neutral, it becomes reasonable, not only due to limitations in data, to restrict the analysis to post 1993 due to the increased economic importance of policy-neutral grants (general grants).

The Regression Discontinuity Design that is used exploits close election and compares municipalities that are barely aligned and municipalities that are barely unaligned. Accordingly, the approach requires that some municipalities have experienced close elections, which in the multiparty context of Sweden is seen in terms of the margin of alignment. Figure 3 displays five separate histograms of the five proposed weights from 4.2.1.

Figure 3: Marginal Alignment

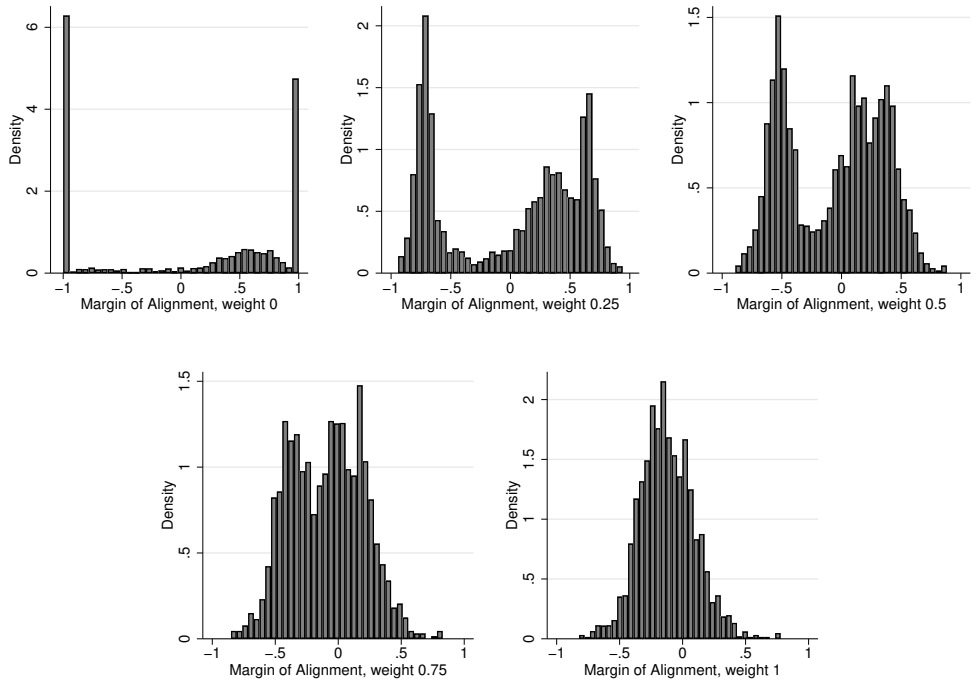


Figure generated by Granström, A. and Holmér, L.

At weight $k = 0$ there exists a high number of observations around -1 and 1. This is a result of this measure not considering mandates that are not part of the ruling coalition on the municipal level. Accordingly, the alignment becomes rather binary, either the ruling coalition is aligned with the government or not. As a result, the density at the threshold is very low. Turning to $k = 0.25$, the histogram displays two peaks away from the threshold, however there is a higher density at the threshold which is reflected in

lower peaks compared to the figure of $k = 0$. The same pattern is displayed in the third histogram where $k = 0.5$, while there still exists two peaks away from the threshold, the measure is less binary and the density has continued to increase around the threshold. Moving on to the weight at $k = 0.75$, the density distribution is close to being single peaked, and the density at the threshold is high. For $k = 1$, the density is single peaked and displays a high density at the threshold, although somewhat skewed to the left. The trend of higher density at the threshold is a result of the prevalence of multiple parties in Swedish municipalities. By increasing the weight of parties outside the municipal coalitions, the margin of alignment depends on the prevalence, rather than the control, of parties in a certain municipality. This effect reaches its apex when considering a weight equal to one.

The pattern of a higher density around the threshold with respect to higher weights is also mirrored in Table 1. Displayed is that a higher weight leads to a more narrow range as indicated by the different minimum and maximum values. While the mean slightly shifts away from the threshold with a higher weight k, the simultaneous reduction in standard error indicates a higher prevalence of observations close to the threshold than at lower weights.

Table 1: Margin of Alignment Descriptive Statistics

	mean	sd	min	max
Weight 0	.0570935	.8534686	-1	1
Weight 0.25	-.0104938	.5845094	-.9411765	.9393939
Weight 0.5	-.0589712	.409339	-.8888889	.8823529
Weight 0.75	-.0953111	.2916878	-.8518519	.8285714
Weight 1	-.1236046	.2182027	-.8222222	.7777778
Observations	5725			

Turning to the municipalities, Table 2 presents the mean, minimum and maximum held mandates by a party in a given municipality at a given point in time. It also displays the average amount of municipalities that each party has held each year during the studied period.

Table 2: Municipal Political Statistics

	Mandates			Municipal Control
	mean	min	max	mean
Centre Party	5	0	25	139
Liberals	3	0	18	124
Christian Democratic Party	3	0	17	115
Moderate Party	9	0	41	125
Social Democrats	17	3	44	168
Leftist Party	3	0	21	90
Green Party	2	0	17	76
Sweden Democrats	1	0	14	0
Total Mandates	43	15	101	
Observations	5725			

All parties have at least one municipality in which they have zero mandates except for the Social

Democrats. Notably, the Social Democrats have the highest maximum of mandates, and the Swedish Democrats has the lowest maximum alongside the Christian Democratic Party. The same pattern is noted in terms of the mean of mandates, the Social Democrats have the highest mean of 17, followed by the Moderate Party, and the lowest mean of mandates held is that of the Swedish Democrats. Worth noting is that the size of each municipal council ranges from 15 mandates to 101, however seeing as this is a result of the population distribution the difference in mandates between municipalities is covered by the population control variables. Also displayed is that the Social Democrats has a clear majority in the average number of municipalities in which they are part of the controlling coalition. The average municipalities each party controls mirrors the average number of mandates held by each party except for the fact that the Centre party has a higher controlling coalition participation relative to their average mandates. This demonstrates the prevalence of bipartisan coalitions on the municipal level and further emphasises the importance of controlling for the composition of the coalition rather than just calculating the vote share of a, somewhat, arbitrary left-wing or right-wing block. The bipartisan coalitions might indicate the type of sorting discussed in 4.3.1, however, this is likely a result of local affiliates to the Centre party being closer with either side of the political scale with respect to local political issues and ideology. Furthermore, the Liberals, Christian Democratic party and Leftist party, differ quite substantially in average municipal control but have the same average number of mandates held.

In Table 3 the number of observations for the dependent variable and the control variables are displayed alongside some descriptive statistics.

Table 3: Variable Descriptive Statistics

	count	mean	sd	min	max
Grants	5725	208419.5	343104.1	-3534486	5473229
Diff blocks	5725	.1953081	.1407436	0	.841314
Total Pop	5725	32315.19	63712.4	2421	949761
Pop 65+	5725	.2070615	.0416048	.077	.34
Pop 20-64	5725	.5565293	.0267935	.461	.665
Median Income	5436	238077.2	40923.34	154488	408351

The dependent variable, grants, exhibits a vast difference between the minimum and maximum especially considering that the variable is expressed in thousand SEK. The average grant is rather low compared to the maximum, however the standard deviation is large. Also displayed is the swing voter prevalence control variable. While the theoretical model suggests a swing voter effect, the aim of this thesis is to research the impact of political alignment rather than the swing voter effect alone which is the reason why the swing voter measure is a control variable. However, in testing the continuity assumptions some inference regarding swing voter effects is presented. Worth noting is the lower number of observations for the median income variable, which is a result of income data not being available for 2017. The median income variable displays the economic differences between municipalities where the minimum and maximum differ by roughly SEK 300 000. Further, the difference in size between municipalities is displayed by the total population variable where the population difference is over 900 000. The variables

population over the age of 65 and population between the ages 20–64 display the fraction of the population in these two age groups. The difference in fraction of population older than 65 showcases the potential cost differences between municipalities which might drive increased grants toward certain municipalities. Accordingly, this is the reason why the age group fraction is used as a control variable alongside the total population variable. In order to avoid perfect collinearity between the control variables the population fraction below 20 is not used.

Lastly, in order to research perfect collinearity the pairwise correlation of all variables are presented in Table 4.

Table 4: Correlation Matrix

	Grants	Diff blocks	Total Pop	Pop 65+	Pop 20-64	Median Income
Grants	1					
Diff blocks	-0.161***	1				
Total Pop	0.489***	0.0155	1			
Pop 65+	-0.0972***	-0.0824***	-0.303***	1		
Pop 20-64	0.268***	-0.0218	0.503***	-0.817***	1	
Median Income	0.0378**	0.123***	0.0464***	0.158***	-0.107***	1
MA weight 0	0.0203	-0.464***	0.0471***	-0.0181	0.0405**	0.0452***
MA weight 0.25	0.0176	-0.498***	0.0389**	-0.0105	0.0279*	0.0636***
MA weight 0.5	0.0144	-0.526***	0.0274*	0.000534	0.0112	0.0915***
MA weight 0.75	0.00988	-0.540***	0.0102	0.0175	-0.0136	0.130***
MA weight 1	0.00318	-0.515***	-0.0150	0.0413**	-0.0479***	0.176***
Observations	5725					

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results that deviate most from expectations are the correlations between the control variables and the dependent variable. While the redistribution system is partly constituted by income smoothing, median income does not seem to correlate much with grants, although the correlation is significant. Further, population over 65 also has a low correlation with grants, despite the fact that another part of the redistribution systems is constituted by a cost smoothing that is meant to smooth costs of elderly care, amongst other things. The high positive correlation between population and grants is rather expected since municipalities differ in size and accordingly their costs. Regarding the running variables, margin of alignment at different weights, the correlations with respect to grants are small and insignificant. One might think that this is a problem, however, a strong correlation would imply a linear relationship and the model does not predict a strictly linear relationship between grants and alignment. The significant, negative correlation between alignment and the swing voter measure (Diff blocks) means that voters tend

to vote similarly in the parliament elections and municipal elections. In addition, there is no reason to expect large correlations between the running variables and the other control variables since municipal election outcomes do not necessarily depend on these factors. The correlations between the running variables have been left out since they are never used in the same regression.

5.3 Data processing

Since the main data set was constructed by several separate data sets the unique data sets required reshaping and merging in order for the necessary variables to be created. Regarding exclusions of observations, mandates for parties that have no representation in the national parliament are excluded from the sample. In contrast to Johansson (2003), who drops the entire municipality if a local party is present. The reason they are kept here is that local parties have little to no impact on the national level but governments might still want to further their party's interest in that municipality. While the Swedish Democrats did not enter the national parliament until 2006, Statistics Sweden excluded them from the "Other Parties"-group in their election statistics post-1994 and included them in the party specific statistics (SCB, 2016). This thesis does not exclude them from the total mandate count prior to their entry into parliament, as is done with other non-parliament mandates. Seeing as they had influence and interests at the local level prior to their actual entry it is deemed reasonable to include them during the entire period.

Further exclusions consist of dropping the region "Malung" since mirroring data exists for "Malung-Sälen" which is a joint municipality of the two. In addition, while the region "Bara" existed in the data set, no data was available for the municipality since it merged with the municipality Svedala in 1976. Thus it is excluded from the data set. Also, observations for a few municipalities where unavailable prior to 2000, but overall the data set is extensive and able to fulfil the goal of the thesis.

Lastly, since the elections are held in the second half of the year and grant decisions are assumed to be made in the beginning of the year, grant decisions in election years are made with respect to the previous election outcome. Thus, local mandates and governmental rule shifts the year after an election.

6 Results

Initially, the analysis focuses on the five proposed weights that resulted from the discussion in 4.2.1. However, as opposition influence exists on a scale rather being represented by one of the five suggested archetypes, sensitivity analysis is presented for a vast number of weights $0 < k < 1$. The concluding analysis only considers the tendency towards collective majority rule. This follows from the fact that a third of all municipalities are ruled by minority coalitions, and that the second vice chairman of the municipal board is often appointed by the opposition (Sveriges Kommuner och Landsting, 2006).

Further, the theoretical model suggests that the local government is attributed a portion of the grants. Accordingly, if the opposition is considered to have influence on a municipal level it is deemed likely that they also receive credit from grants and allowing k to differ from zero allows this effect to be captured and studied.

6.1 Initial estimations

In Table 5, results without controls for the five archetypes of municipal rules are presented. The three different estimates for each archetype employs different methods when calculating the optimal bandwidths, where bandwidth is the chosen interval at the threshold that is used for examining the possible discontinuity effect. The conventional measure seeks to minimise the asymptotic mean of sum squares, while the other two impose stricter bandwidths better suited for RDD inference (Calonico et al., 2018). The Robust estimation method employs robust standard errors but is otherwise similar to the Bias-corrected estimation. Also, all results are to be interpreted as the average increased effect of being aligned compared to being unaligned.

Table 5: Treatment effect, without control variables

	weight 0	weight 0.25	weight 0.5	weight 0.75	weight 1
Conventional	14437.1	84350.1***	-15092.0	101460.7***	19491.5
	(31022.3)	(20705.3)	(27809.8)	(21541.0)	(18973.3)
Bias-corrected	9224.2	90377.3***	-23688.4	104549.7***	25766.3
	(31022.3)	(20705.3)	(27809.8)	(21541.0)	(18973.3)
Robust	9224.2	90377.3***	-23688.4	104549.7***	25766.3
	(38597.6)	(23656.6)	(32478.3)	(24946.8)	(22318.0)
Observations	5725	5725	5725	5725	5725

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All values expressed in thousand SEK

Results for the two tendency weights (0.25 & 0.75) are significant on a 0.01 level even for the robust estimate. The weight representing restricted majority rule shows a negative effect but it is not significant. No other effects are significant. Notable is that the significant effects also have an economic significance since the average effect implies increased grants of ninety thousand and hundred thousand respectively toward aligned municipalities. Since all figures are expressed in thousand SEK, this represents roughly hundred million SEK. To contrast this, one should consider that the average received grant is two hundred million SEK, although, the largest grant is five billion. The standard errors for the significant effects are rather large and thus, the exact economic effects are quite uncertain. Seeing as the effect is not significant across all archetypes and control variables not being present in the estimations, the initial results are inconclusive. The results presented in Table 6 use the same proposed archetypes as above but implements the control variables from 4.2.3.

Table 6: Treatment effect, with control variables

	weight 0	weight 0.25	weight 0.5	weight 0.75	weight 1
Conventional	5532.6	15880.9	13921.1	60935.8***	-22283.0
	(9567.9)	(16254.2)	(24092.8)	(18517.5)	(31837.7)
Bias-corrected	4366.2	18170.6	6302.0	56559.5***	-14854.3
	(9567.9)	(16254.2)	(24092.8)	(18517.5)	(31837.7)
Robust	4366.2	18170.6	6302.0	56559.5**	-14854.3
	(11893.7)	(18189.7)	(27710.1)	(22654.3)	(32840.0)
Observations	5436	5436	5436	5436	5436

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All values expressed in thousand SEK

The overall effect falls when adding control variables. This is expected considering the correlations presented in Table 4 and the formulaic nature of the smoothing system described in 3.3. The full majority rule weight ($k = 0$) displays a positive, insignificant, effect and estimates of the effect of tendency towards full majority rule ($k = 0.25$) are no longer significant. The weight representing restricted majority rule ($k = 0.5$) becomes positive, but remains insignificant. The weight reflecting tendency towards collective majority rule ($k = 0.75$) remains significant while the effect falls by 50 percent. The collective majority estimate ($k = 1$) becomes negative and remains non significant.

The discussion in 4.2.1 presents two perceptions of political alignment. The traditional perception where alignment is based on control and letting the weights represent the control of the local opposition relative to the local coalition. In addition, a novel perception is presented, where the concern of the central government regarding alignment is changed by imposing a larger weight than that which accurately represent the average form of municipal rule. This means that the interpretation of the political alignment variable is such that the central governmental coalition cares about the prevalence or presence of their parties at the local level, in addition to the extent of their local political control. If we consider the novel perception, this indicates something about the results in both Table 5 and Table 6. As mentioned, the result without controls using a weight of 0.75 is significant. Depending on which perception of alignment that is used when evaluating this, one reaches different conclusions when interpreting this result. Taking the traditional approach and assuming that the weight of 0.75 is correct, one concludes that aligned municipalities receive about 57 MSEK more grants, on average, than unaligned municipalities. It is important to note that this interpretation is conditioned upon the weight of 0.75 being representative of how control of municipalities is structured (tendency towards collective majority), if this is false then this interpretation is false. However, if we interpret the result from the perspective of the novel perception of alignment introduced in this paper, then we only need to assume that the weight representing the control structure of municipalities is below 0.75. This is because the novel perception of alignment provides an explanation for the consideration of the opposition that surpasses their political control. Namely, that any effect above the actual municipal control can be attributed to the prevalence effect that is based on the core supporter hypothesis (Cox and McCubbins, 1986). Accordingly, a weight above the actual influence

of the opposition allows for non-coalition parties on the local level to be more pertinent, than their direct influence, in determining alignment, since they might still affect election prospects. Consequently, conditioned on the actual weight of influence being below 0.75, the results indicate a causal effect of alignment on grants to the same degree as the one described above.

However, there is a certain ambiguity in whether the government cares about local control or local party prevalence when distributing grants. As mentioned, local control has in previous studies been the factor determining alignment and significant results in favour of this notion has been found (Bracco et al., 2013) (Arulampalam et al., 2009). At this point the conclusion that this paper is unable to determine what perception of alignment is correct must be drawn, this stems from the basic fact that the weight is exogenous and unmeasured. Nevertheless, this thesis provides a plausible connection between the core supporter hypothesis and political alignment and provides some evidence for this conjecture. In the coming sections, this topic is left out in favour of discussions regarding the continuity assumption and the connection between the theoretical model and the empirical strategy.

6.2 Sensitivity analysis and density tests

As discussed in 4.1, a crucial assumption for generating unbiased estimates with RDD is the continuity assumption. The assumption implies that there can be no sorting at the threshold and further, that the only thing that shifts at the threshold is treatment status. Unfortunately, the sorting assumption can only be partly tested through density tests, and must be completely ruled out through assumption and discussion (Gerritsen et al., 2017). 4.3.1 provides arguments for why no sorting is likely to be present in Swedish municipalities due to the simultaneous formation of coalitions on the central and local level and the difference between various local party affiliates. However, a major concern is whether or not there exists a disruption in the density around the threshold. The reason being that this might indicate sorting around the threshold (Calonico et al., 2017). Accordingly, density tests are provided below for the five archetypal weights that are used in the previous analysis.

Table 7: Density tests

	weight 0	weight 0.25	weight 0.5	weight 0.75	weight 1
Robust p-value	0.4795	0.6680	0.3852	0.5939	0.0009
T statistica	-0.7071	-0.4288	0.8683	0.5333	-3.3234
Observations	5725	5725	5725	5725	5725

The density tests in Table 7 considers the null hypothesis of no manipulation existing around the threshold. While a failure to reject indicates no direct manipulation, this does not fully rule out the risk of sorting. As displayed, four out five tests fail to reject the null, notably the weight that is archetypal for collective majority rule rejects the null with a low p-value. This is a major concern, since it indicates a possibility of manipulation. However, since alignment is determined by which party controls the

government and the collective majority weight implies that opposition parties on a municipal level are considered equally influential, alignment status for this weight is actually determined directly through elections. Accordingly, while there exists a discontinuity in the density for $k = 1$, this weight implies that sorting is not possible, since *ex ante* sorting is considered impossible de la Cuesta and Imai (2016). Consequently, while this test does not fully rule out the possibility of manipulation at the threshold, four out of five test shows no clear indication of manipulation and the one that indicates sorting can per definition not be subject to *ex ante* or *ex post* manipulation. This leaves us with the second concern of the continuity assumption, that treatment status is the only thing that shifts at the threshold. This is easier to test for and will be the considered in the subsequent section. First, however, sensitivity analysis regarding the five archetypal weights are presented.

In order to establish an overview of the impact of using different weights, Figure 4 presents a plot displaying the effects and standard errors of one hundred and one estimations using different weights without controls[7].

Figure 4: Average treatment effects for the weight interval without control variables

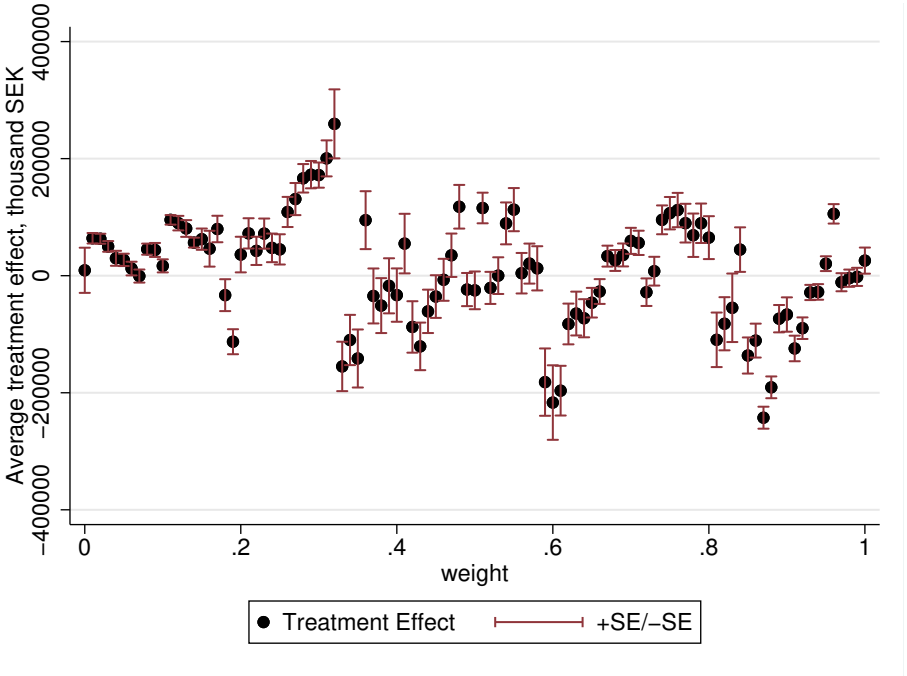


Figure generated by Granström, A. and Holmér, L.

To some extent Figure 4 mirrors the results provided in Table 5. While significant and large positive effects can be found across several weights, there is no clear result when considering the entire spectrum. In addition, the sensitivity analysis differs in that it displays positive, possibly significant results for tendencies towards full majority rule, especially between 0.26-0.3. The interval between 0.4 and 0.6 reflect the restricted majority weight used previously with few seemingly significant results. There seem

[7]While the standard error bars does not represent significant effects simply by not crossing over between negative and positive values, Figure 4 still gives a rough picture of where significant results can be identified.

to exist some significant negative effects just below 0.4, around 0.6 and above 0.8. Overall there are also quite dramatic drops in the pattern in the effects at the lower weights, such as around 0.2 and at 0.38. While similar drops occur at 0.6 and above 0.8 these shifts display a pattern of slowly falling and rising rather than dropping and immediately jumping back up. Ultimately, Figure 4 displays the sensitivity of which weight is used when estimating the effect which consequently makes the result less reliable. Nevertheless, there exist several areas of stable positive effects, such as above 0.2 and between 0.7 and 0.8. In addition, the negative effects are less stable with only a few observations around each negative effect such as around 0.6 and just above 0.8. Consequently, while the weight impacts the results, the negative effects are more sensitive to slight adjustments than the positive results.

In order to guide further analysis 3.1.1 yet again provides valuable insight. As mentioned, the second vice chairman in municipal boards often belong to the opposition rather than the controlling block. Further, the fact that the opposition tend to have remunerated elected officials also speak in favour of their influence. Foremost however, is the fact that one third of all municipalities in Sweden is currently ruled by minority coalitions and implies that in order to pursue their polity the ruling coalition must seek support from the opposition which furthers the opposition's influence. Consequently, on average, municipalities in Sweden can be argued to have a tendency toward collective majority rule rather than towards full majority rule. Accordingly, the following section focuses on sensitivity analysis of the stable region around 0.75 which represents the tendency towards collective majority rule.

6.3 Concluding results

As previously mentioned, the second part of the continuity assumptions is that no other variable than the dependent shift at the threshold. Accordingly, Figure 5 presents regression discontinuity plots over the running variable and the control variables. No plots except for the population fraction over 65 displays a discontinuity at the threshold. While this is a concern and might bias the results, some difference between the threshold can be expected and accepted, conditioned on the fact that the results without control variables display similar results as with the inclusion of said variables (Calonico et al., 2018). Nonetheless, the actual effect of the population fraction discontinuity is of interest since it indicates to what extent the variable shifts upward. Table 8 provides estimates of each variable in order to make sure that no less visible discontinuity is overlooked and to measure the effect of the discontinuity in the population over 65 variable.

Figure 5: Regression discontinuity plots for control variables

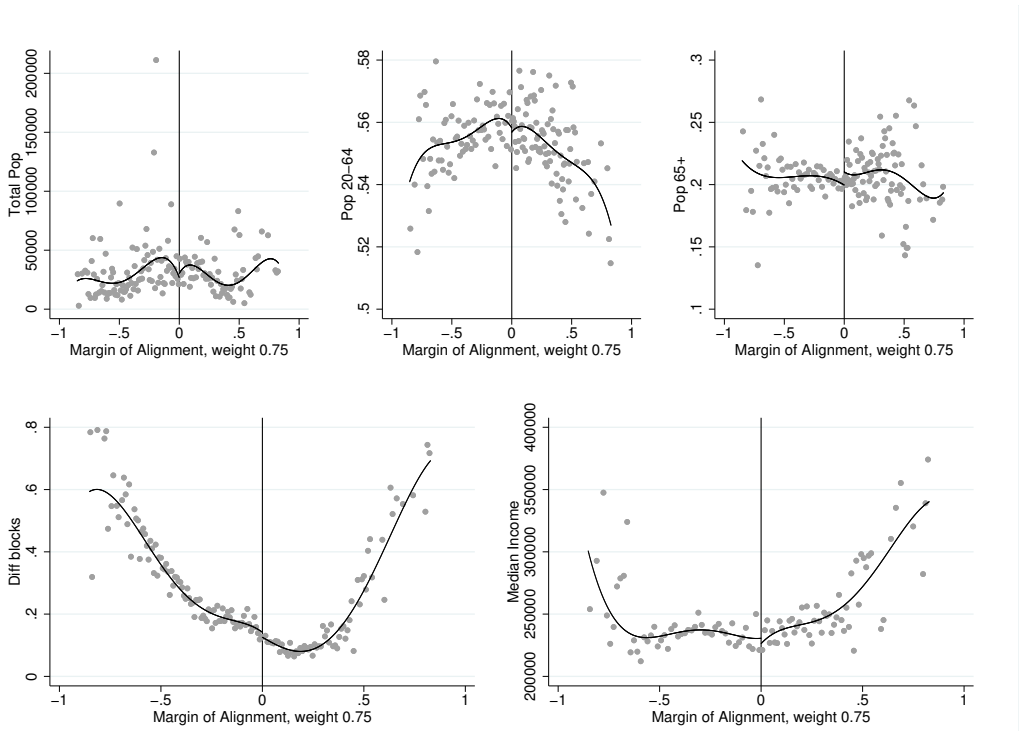


Figure generated by Granström, A. and Holmér, L.

As expected, the discontinuity for population fraction over 65 is robust, however the effect is rather small in that it only implies a less than one percent increase in population fraction at the threshold. While demographics is a driver in the smoothing of costs, this is only a small part of the total grants and a one percent difference in one demographic can be considered to have a small effect overall. Seeing as the effect falls between Table 5 and Table 6, the demographic difference might provide a possible explanation. However, since the results are robust to exclusion and inclusion of all control variables, the estimated effect can be argued to be considered unbiased regardless of the discontinuity in one of the control variables. In addition, another effect that is displayed in Figure 5 is the fact that the difference between blocks seems to be closest to zero just above the threshold. Seeing as the discontinuity is only significant on a 0.1 percent level this is no direct concern for invalidating the continuity assumption. Rather, this indicates a higher swing voter prevalence around, and above, the threshold. This will aid in the subsequentanalysis considering that the used method is non-parametric and thus provides no estimates of the control variables. The following results will continue to focus on the archetype representing tendency towards collective majority rule. In Table 9 estimations for five weights between 0.74 and 0.76 are presented.

Results for three weights between 0.745 and 0.755 are significant and of these, the two newly introduced weights suggest a smaller effect than the previously used 0.75. Further, the estimation with weight 0.76 is significant with the conventional estimate but only significant on a ten percent level for the

Table 8: Continuity assumption estimations

	Median Income	Pop 20-64	Pop 65+	Total Pop	Diff blocks
Conventional	-5341.5	-0.00235	0.00832***	55.06	0.0123
	(3371.0)	(0.00152)	(0.00262)	(2618.3)	(0.00982)
Bias-corrected	-6472.7*	-0.00260*	0.00878***	696.7	0.0179*
	(3371.0)	(0.00152)	(0.00262)	(2618.3)	(0.00982)
Robust	-6472.7*	-0.00260	0.00878***	696.7	0.0179*
	(3904.3)	(0.00180)	(0.00312)	(2865.3)	(0.0107)
Observations	5436	5725	5725	5725	5725

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Sensitivity analysis, with control variables

	weight 0.74	weight 0.745	weight 0.75	weight 0.755	weight 0.76
Conventional	14613.6	50995.1***	60935.8***	39223.3**	49181.4**
	(19596.9)	(18596.0)	(18517.5)	(19498.4)	(22382.3)
Bias-corrected	3822.8	44977.0**	56559.5***	36376.6*	45913.2**
	(19596.9)	(18596.0)	(18517.5)	(19498.4)	(22382.3)
Robust	3822.8	44977.0**	56559.5**	36376.6*	45913.2*
	(24726.5)	(22697.3)	(22654.3)	(21771.0)	(24734.0)
Observations	5436	5436	5436	5436	5436

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All values expressed in thousand SEK

robust estimate. While, the weight 0.76 indicates a significant effect, the conventional bandwidths are less suitable for RDD inference (Calonico et al., 2017). The estimation with weight 0.74 displays a small, insignificant effect. Despite variation in significance, these results still reflect a certain stability around the weight 0.75. While the insignificant results for the estimation with weight 0.74, and the less significant effect of the estimation with weight 0.76, reduce the perceived stability of the proposed measure, the three significant effects around 0.75 implies that the measure is at least robust to some alteration. Consequently, following from the discussion above with regards to the municipal tendency towards collective majority rule and the fact that the 0.75 weight displays a certain stability to alterations, a regression discontinuity plot of $k = 0.75$ is presented below.

Figure 6: Regression discontinuity plot without control variables

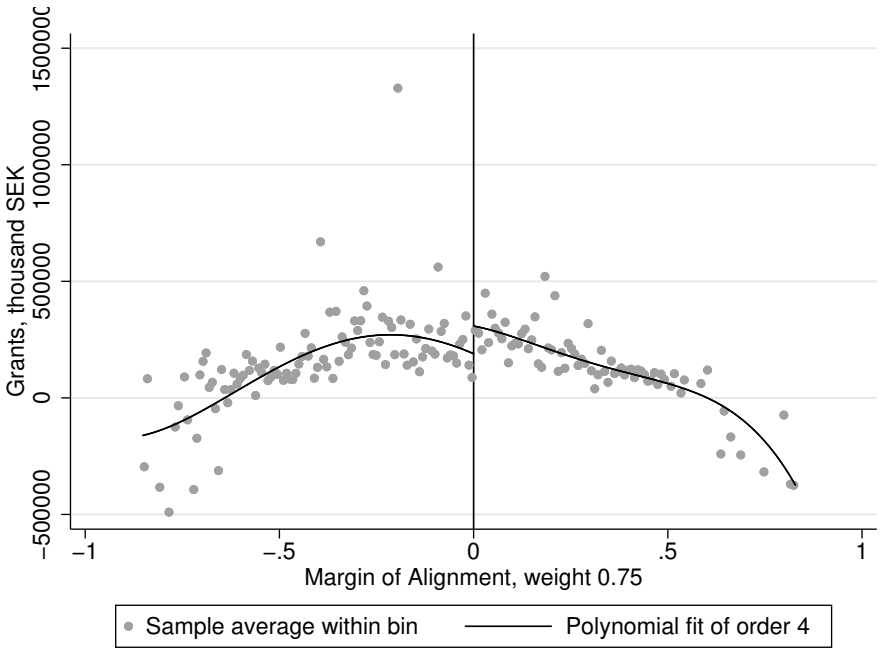


Figure generated by Granström, A. and Holmér, L.

Figure 6 displays the polynomial fit on the two sides of the threshold zero. There exists a clear discontinuity in that there is a clear upward shift at the threshold which is displayed both by the plotted data and the polynomial fitted lines. Considering that the estimated effect of the tendency weight 0.75 is highly significant in the previously presented results, the displayed discontinuity at the threshold is not unanticipated. Nevertheless, Figure 6 presents further information with regards to the estimated effect and the overall relationship between grants and margin of alignment. Most notably is the downward trend that exists on both sides of the threshold. It seems that the further away from the threshold a municipality is, the lower amount of grants it receives. This would imply that there are diminishing returns to the margin of alignment with respect to grants. Consequently, according to Figure 6, the government distributes higher grants towards aligned municipalities compared to unaligned municipalities but they also distribute more grants towards aligned municipalities that are closer to the alignment

threshold. Seemingly, this contradicts the results of the theoretical model which suggest that the more aligned a municipality is, the higher the grants towards that municipality will be, conditional on an equal prevalence of swing voters. However, it should be noted that the aligned swing effect that the model predicts only holds for "small" grants. In addition one should also bear in mind that the polynomial fits estimate the effect of alignment without the inclusion of control variables. Therefore, the downward trend can not be fully understood from Figure 6 alone and might be the result of a higher swing voter prevalence around the threshold compared to further away from the threshold. Thus, the hypothesis suggested by the model might be intact seeing as it is conditioned on swing voter prevalence.

This shifts the analysis towards the ambiguous result in the theoretical model. Apart from predicting the effect of being aligned, all else equal, the model was used in an attempt to conclude the relative distribution of grants to a municipality that was more aligned than another municipality, but exhibited a lower swing voter prevalence. Conditional on the assumption that municipalities closer to the threshold exhibits a higher swing voter prevalence, there exists a situation in which less aligned, yet more swing, municipalities receive more grants than their counterpart. In favour of this assumption are the results previously presented in Figure 5. Displayed is that the swing voter measure indicates the highest prevalence of swing voters just above the threshold, only to then fall drastically. This mirrors the effect in Figure 6 and to some extent resolves the ambiguity from the theoretical model since it suggests that a municipality that is less aligned might receive more grants than a more aligned municipality, if it has a higher prevalence of swing voters. Further, this might explain the three bin observations around 0.2 on the upper bound in Figure 6 that display an upward shift from the plotted line. These bins might very well be comprised of municipalities with a higher swing voter prevalence than those below.

Ultimately, the results indicate that political alignment, on average, increases grants. Further, the results are robust to control variables, and while the sensitivity analysis displays the impact of choice of weight on the results, weights which represents a tendency towards collective majority rule are stable. Concluding the results was a regression discontinuity plot which provided evidence of the theoretical model's hypothesis of increased grants toward aligned municipalities, conditioned on a higher swing voter prevalence at the threshold. Furthermore, the provided results might have resolved the ambiguous theoretical result of the case where a municipality is less aligned, but inherit a higher swing prevalence than its counterpart, seeing as municipalities closer to the threshold received increased grants and the municipalities closer to the threshold exhibited a higher prevalence of swing voters.

7 Conclusion

In this paper a model of redistributive politics is constructed. In the model, the central government use grants as tactical instruments to garner support at the local level. The model predict that redistribution is based on two factors, the level of alignment between the central government and the municipal government

and the ideological distribution (i.e. the extent of swing) of the municipality. The theoretical section results in an empirically testable prediction, namely that relatively more aligned and swing municipalities receive more grants in equilibrium. Furthermore, this prediction is tested using a newly constructed data set with Swedish municipality and parliament data from 1998 to 2016. It is found that the empirical result depend upon the exogenous parameter which describe the political influence of municipality council mandates outside the municipality coalition relative to those inside the coalition, the parameter is called the weight throughout the paper. The paper use this weight to provide a new perception of alignment by interpreting the political alignment variable for values of the weight above the value that accurately describes the influence differential between the local coalition and opposition. Using this new perception, a connection between the core supporter hypothesis provided by Cox and McCubbins (1986) is made resulting in a political alignment analysis based upon this hypothesis. Since this weight is, in principle, unknown, results for all weights are presented. In addition, the qualitative source Sveriges Kommuner och Landsting (2006) is used as a basis for discussion around which intervals of the weight are plausible. Based upon said discussion, the paper presents more in depth results and a sensitivity analysis for the weight 0.75, where the average treatment effect of being considered an aligned municipality is around 56 million SEK. This means that aligned municipalities, on average, receive an extra 56 million SEK in grants. Lastly, this thesis discussed the definition of alignment in terms of local control or local prevalence and while previous studies of alignment have found support of the local control definition, this thesis found results for the prevalence definition. This might be a result of the theoretical and empirical approach which sought to consider the constituents in the local coalitions.

7.1 Further studies

The foremost empirical study that is implied by this paper is that of the exogenous parameter described above. An example of a suitable research question for this study is: what are the measurable, either qualitative or quantitative, features of a municipality that imply the weight? In addition, seeing as this thesis proposed a novel way of conceptualising alignment, further political and economical research of the proper way of determining alignment is also a sound starting point for future studies within the field of redistributive politics. Especially, the connection between political alignment and the core supporter hypothesis merits further research. Furthermore, while this paper examines the decisions regarding grants made by the central government, the empirical question regarding the behaviour of voters is left unaddressed. An example research question here is: in what way is voter behaviour affected by central grants? There has already been some work in the U.S. addressing this question, Levitt and Snyder Jr (1997) shows that central spending in a House district increases the vote share of the incumbent member of Congress. Stein and Bickers (1994) takes a different approach by using survey data to establish that voters are more likely to support the incumbent House candidate when they are aware of new grants to their district. It would be interesting to know whether these effects would be replicated in the Swedish setting.

In addition, there are many possible extensions to the theoretical model, especially with regards to coalitions. The behaviour and dynamics of coalitions, at both the local and central level as well as internally and externally, could be endogenised. This would further ensure that predictions made by the model are based in reality and not just artefacts of the model.

References

Arulampalam, W., S. Dasgupta, A. Dhillon, and B. Dutta

2009. Electoral goals and center-state transfers: A theoretical model and empirical evidence from India. *Journal of Development Economics*, 88(1):103–119.

Bracco, E., F. Porcelli, and M. Redoano

2013. Incumbent effects and partisan alignment in local elections: A regression discontinuity analysis using Italian data.

Calonico, S., M. Cattaneo, M. Farrell, and R. Titiunik

2017. Rdrobust: Software for regression-discontinuity designs. *Stata Journal*, 17(2):372–404.

Calonico, S., M. D. Cattaneo, and M. H. Farrell

2018. On the effect of bias estimation on coverage accuracy in nonparametric inference. *Journal of the American Statistical Association*, Pp. 1–13.

Case, A.

2001. Election goals and income redistribution: Recent evidence from Albania. *European Economic Review*, 45(3):405–423.

Caughey, D. and J. S. Sekhon

2011. Elections and the regression discontinuity design: Lessons from close U.S. House races, 1942–2008. *Political Analysis*, 19(4):385–408.

Cox, G. W. and M. D. McCubbins

1986. Electoral politics as a redistributive game. *The Journal of Politics*, 48(2):370–389.

Dahlberg, M. and E. Johansson

2002. On the vote-purchasing behavior of incumbent governments. *American Political Science Review*, 96(1):27–40.

Dahlberg, M. and J. Rattsø

2010. Statliga bidrag till kommunerna – i princip och praktik.

de la Cuesta, B. and K. Imai

2016. Misunderstandings about the regression discontinuity design in the study of close elections. *Annual Review of Political Science*, 19:375–396.

Dixit, A. and J. Londregan

1996. The determinants of success of special interests in redistributive politics. *The Journal of Politics*, 58(4):1132–1155.

Fan, J.

1993. Local linear regression smoothers and their minimax efficiencies. *The Annals of Statistics*, Pp. 196–216.

Gerritsen, S., D. Webbink, and B. ter Weel

2017. Sorting around the discontinuity threshold: The case of a neighbourhood investment programme. *De Economist*, 165(1):101–128.

Government Offices of Sweden, G.

2015. The Swedish model of government administration.

Johansson, E.

2003. Intergovernmental grants as a tactical instrument: Empirical evidence from Swedish municipalities. *Journal of Public Economics*, 87(5-6):883–915.

Lee, D. S.

2008. Randomized experiments from non-random selection in us house elections. *Journal of Econometrics*, 142(2):675–697.

Lee, D. S., E. Moretti, and M. J. Butler

2004. Do voters affect or elect policies? Evidence from the U.S. House*. *The Quarterly Journal of Economics*, 119(3):807–859.

Levitt, S. D. and J. M. Snyder Jr

1997. The impact of federal spending on House election outcomes. *Journal of political Economy*, 105(1):30–53.

Lindbeck, A. and J. W. Weibull

1987. Balanced-budget redistribution as the outcome of political competition. *Public choice*, 52(3):273–297.

Marco, M.

2013. The effect of political alignment on transfers to Portuguese municipalities. *Economics & Politics*, 25(1):110–133.

Nilsson, L. h. and H. Forsell

2013. *150 år av självstyrelse : Kommuner och landsting i förändring*. Stockholm: Sveriges kommuner och landsting.

SCB, S. S.

2015. Vågmästare i svensk politik.

SCB, S. S.

2016. Demokratistatistik rapport 21, flytande väljare.

Shapiro, I.

2009. *Political Representation*. Cambridge University Press.

Solé-Ollé, A. and P. Sorribas-Navarro

2008. The effects of partisan alignment on the allocation of intergovernmental transfers: Differences-in-differences estimates for Spain. *Journal of Public Economics*, 92(12):2302–2319.

Stein, R. M. and K. N. Bickers

1994. Congressional elections and the pork barrel. *The Journal of Politics*, 56(2):377–399.

Sveriges Kommuner och Landsting, S.

2006. Politisk styrning och demokrati i kommunerna.

Sveriges Kommuner och Landsting, S.

2017. Vanliga frågor om utjämnningssystemet.

Valmyndigheten

2018. Mandatfördelning regler och räkneexempel 2018.

Wärneryd, K.

1998. Distributional conflict and jurisdictional organization. *Journal of Public Economics*, 69(3):435–450.

Appendices

A The continuity assumption for different weights

Figure 7: Regression discontinuity plots for control variables weight 0

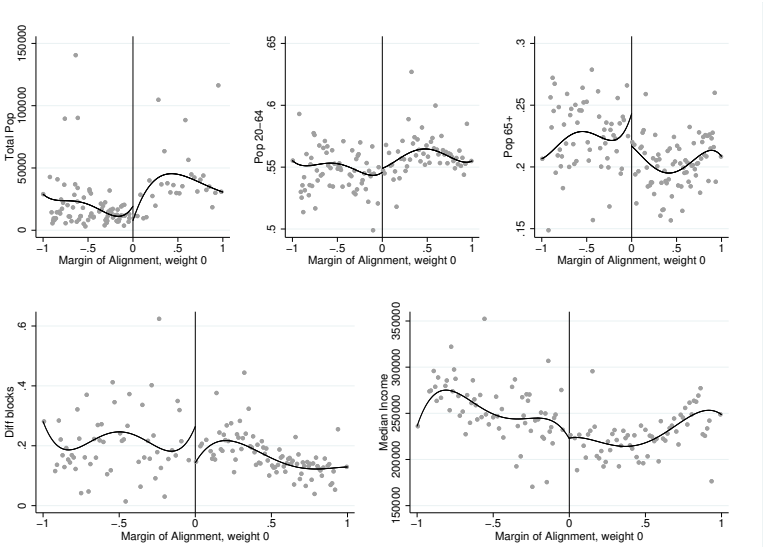


Figure generated by Granström, A. and Holmér, L.

Table 10: Continuity assumption test weight 0

	Median Income	Pop 20-64	Pop 65+	Total Pop	Diff blocks
Conventional	-12252.0	0.00617	-0.0206**	481.2	-0.0438
	(8904.6)	(0.00451)	(0.00846)	(2704.8)	(0.0279)
Bias-corrected	-12682.6	0.00621	-0.0224***	3283.2	-0.0416
	(8904.6)	(0.00451)	(0.00846)	(2704.8)	(0.0279)
Robust	-12682.6	0.00621	-0.0224**	3283.2	-0.0416
	(10527.2)	(0.00547)	(0.0104)	(3473.9)	(0.0337)
Observations	5436	5725	5725	5725	5725

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All values expressed in thousand SEK

Figure 8: Regression discontinuity plots for control variables weight 0.25

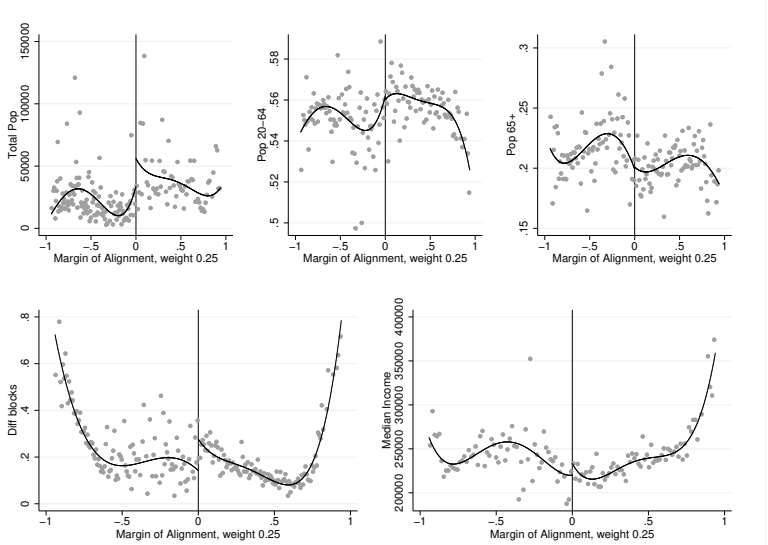


Figure generated by Granström, A. and Holmér, L.

Table 11: Continuity assumption test weight 0.25

	Median Income	Pop 20-64	Pop 65+	Total Pop	Diff blocks
Conventional	20438.4***	-0.00245	0.0266***	19065.8***	-0.0145
	(5026.1)	(0.00254)	(0.00429)	(3774.6)	(0.0296)
Bias-corrected	22562.3***	-0.00389	0.0292***	17249.0***	-0.0265
	(5026.1)	(0.00254)	(0.00429)	(3774.6)	(0.0296)
Robust	22562.3***	-0.00389	0.0292***	17249.0***	-0.0265
	(5613.1)	(0.00270)	(0.00445)	(4134.3)	(0.0315)
Observations	5436	5725	5725	5725	5725

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All values expressed in thousand SEK

Figure 9: Regression discontinuity plots for control variables weight 0.5

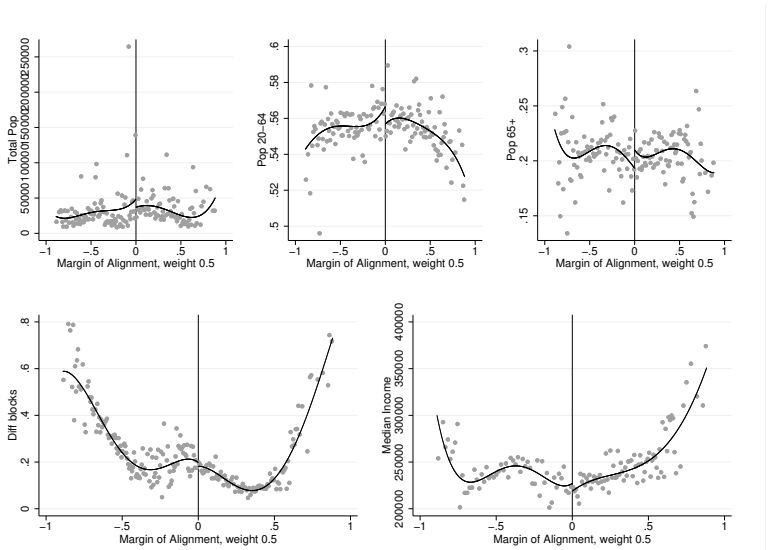


Figure generated by Granström, A. and Holmér, L.

Table 12: Continuity assumption test weight 0.5

	Median Income	Pop 20-64	Pop 65+	Total Pop	Diff blocks
Conventional	-3431.3	-0.00747**	0.0204***	-5327.0	-0.0105
	(4277.9)	(0.00305)	(0.00511)	(4163.6)	(0.0121)
Bias-corrected	-3153.0	-0.00851***	0.0222***	-4643.2	-0.00754
	(4277.9)	(0.00305)	(0.00511)	(4163.6)	(0.0121)
Robust	-3153.0	-0.00851**	0.0222***	-4643.2	-0.00754
	(5177.3)	(0.00356)	(0.00597)	(4511.0)	(0.0149)
Observations	5436	5725	5725	5725	5725

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All values expressed in thousand SEK

Figure 10: Regression discontinuity plots for control variables weight 1

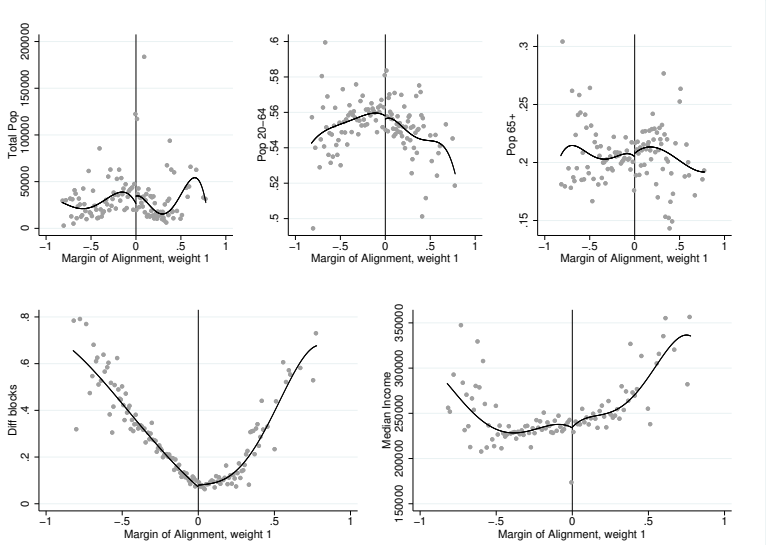


Figure generated by Granström, A. and Holmér, L.

Table 13: Continuity assumption test weight 1

	Median Income	Pop 20-64	Pop 65+	Total Pop	Diff blocks
Conventional	-10626.5**	-0.00271	0.00686	-11976.1***	0.00329
	(4221.2)	(0.00181)	(0.00429)	(3737.1)	(0.00843)
Bias-corrected	-12169.4***	-0.00316*	0.00871**	-12565.6***	0.000418
	(4221.2)	(0.00181)	(0.00429)	(3737.1)	(0.00843)
Robust	-12169.4**	-0.00316	0.00871*	-12565.6***	0.000418
	(4860.1)	(0.00211)	(0.00481)	(4285.7)	(0.00980)
Observations	5436	5725	5725	5725	5725

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All values expressed in thousand SEK