



BI Norwegian Business School - campus Oslo

# GRA 19502

Master Thesis

Component of continuous assessment: Forprosjekt, Thesis  
MSc

Preliminary Master Thesis

Navn: Mikal Andre Hageseter

Start: 01.01.2018 09.00

Finish: 15.01.2018 12.00

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## Introduction

The purpose of this master thesis is to investigate whether there is a causal relationship between shifts in municipal policy and bureaucratic turnover in Norwegian municipalities as agency theories predicts.

According to Norwegian legislation the agents of such employment should be neutral in terms of political ideology, and this should not affect the work of such agents. However, recent empirical research from Dahlström & Holmgren(2017) reveals that comparable bureaucrats in Sweden have turnover rates which increases with shifts of political ideology in the principals. This is evidence of that bureaucrats, such as CMOs, may have preferences over the political ideology of the principal they seek employment under.

These findings are in line with agency theories where different types of agents may be more motivated to perform some tasks than others (Prendergast 2003,2007), and that alignment between the identities of principals and agents is of importance as this can increase production of the agent (Besley & Ghatak, 2005; Akerlof & Kranton, 2005). A strong assumption is that this effect is stronger in the public sector, and thus alignment between principals and agents in this sector identities are of greater importance.

I have access to comprehensive panel datasets with information regarding all municipals, and detailed information of CMOs in each municipal at every time period. By using econometrics, I will create models from this data motivated by agency theory to investigate whether CMOs are politically neutral. A linear regression inferring the causal link between turnover rate of CMO in years with election is the simplest model, and serves as the starting model. Panel data analysis with a fixed effects model in both municipal and time dimension, allows for exploiting variations between municipalities and time periods for better inference. These models can be improved by including dummy variables indicating shifts in political ideology in the council.

If there is evidence of higher turnover rates in CMOs conditional on a change in municipal council, this is important findings for personnel policies for bureaucratic positions in Norway.

#### Principal-agent model.

Standard principal-agent models present two parties, an agent and principal which can contract for an arrangement of the agent doing tasks for the principal. A general assumption is that both are rational utility maximizers. I.e. when presented a set of choices, both the agent and principal will make the choice that makes them the happiest. Given that the expected net surplus of this arrangement is positive, the principal should offer the agent a contract, specifying a wage and effort expended by the agent, such that the agent is marginally better off accepting the offer than what the agent else would be. The model assumes that the agents decision to accept the offer given by the principal is whether the utility of the value of the transfer between the agent and the principal less the effort cost of the agent is greater than the utility of the outside option. Equivalently, the agent will accept the offer if he prefers the outcome of working for the principal over the outside option. If for example, the principal offers a wage contingent on an effort level by the agent, and this offers the agent less utility than the outside option, the agent will, according to the theory, choose to decline the offer.

The model has been developed further by Prendergast (2003, 2007) to account for an agent's intrinsic motivation. Prendergast (2007) argues that some individuals may require less extrinsic motivation for certain tasks. I.e. some tasks give motivation that increases effort that they else would require compensation for otherwise. In economic literature such agents are often referred to as motivated agents. Prendergast argues this intrinsic motivation is stronger in bureaucratic employment than it is in the private sector, and proposes that because of this, individuals that receive intrinsic motivation from bureaucratic work will self-select to apply for these jobs. The presence of motivated agents, may therefore be stronger in public sector. Following this line of thought in bureaucratic positions, such as the CMO, one would expect to find agents that has intrinsic utility from tasks related to this position.

Akerlof & Kranton(2005) develop a more advanced principal-agent model that includes the notion of agents identity. The concept of identity is motivated by a large literature of empirical research within social psychology and sociology, and can help create more realistic models that may better explain agents' behavior. According to their model, agents with an identity alignment with the principal, insider, will want to expend effort equal to what they expect others of the same identity. In comparison with the standard principal-agent model, outsider, it is straightforward to show that the agent with identity aligned with the principal will require less payments in order to induce the same amount of effort. These theories are interesting as it allows for organizations and firms a possibility to increase productivity of agents by other means than having to increase the payment to the agent. And secondly, as the principal's problem in selecting optimal agent increases in variables, it potentially allows for a more optimal solution than the standard case. \*Note, for the uneducated reader of economics, the utility of wealth is generally considered to be concave in form. I.e. it becomes increasingly more expensive to induce effort in agents by increasing the wage, and adding more alternatives in inducing effort in agents is considered an improvement for all parts. In more simpler terms, the more money I already have, makes me less happy to receive one additional unit of money. If the firm can use money to make me work more without becoming less happy, there can be combinations of this and wage that will make me work more than in the standard case, without me becoming less happy.

Theories of alignment of identities between agent and principal is examined more closely by Besley & Ghatak(2005). They propose that there are positive effects when principals and agents have similar group identities, that is, it reduces the agent's cost of effort in working towards a shared goal and thereby increases productivity of the agent all else equal. However, they further define group identity as not only preferences from working towards a certain outcome but also from mission preferences, that is the preferences in which working methods to employ. The principal's problem becomes more complex, as selecting the optimal agent to employ requires both information about preferences over outcome, and mission preferences. In other words, a doctor who enjoys treating sick people, may be happier, and therefore work harder, if he can treat a patient with medicine rather than surgery.

Politician and bureaucrat specific theories.

According to Dahlström and Holmgren(2017) composition of agency personnel of bureaucrats might depend on both political screening and bureaucratic selection. The first one depicts that principals with a political ideology both has incentive to uncover information about potential agents and their respective ideology, which influences the principal's decision on which agents to hire. And that the principal should define the contract of the employment in such a way that this will attract agents of the principals liking. Bureaucratic selection on the other hand is a theory regarding self-selection of bureaucrats in applying for employment for principals which share their ideological beliefs, and that they can achieve this by acquiring traits that they believe will increase their chances of gaining employment by their preferred group of principals.

Municipal organization.

Every four years the municipal council is elected by the inhabitants of the municipality who are entitled to vote pursuant to statutory provisions as according to the Local Government Act §8 first paragraph. The Local Government Act provides lawfully instructions for the municipal council and its agents, and will henceforth be simply referred to as LGA. For all purposes in this study, the municipal council can be thought of as the principal in the principal-agent problem.

The CMO is the top bureaucratic position in the Norwegian municipalities. Their tasks include implementation of public policies as given by the municipal council, budget proposals for the municipalities and is considered responsible that the budgets are indeed reached in a satisfactory manner. Gey, Heggedal & Sørensen(2017, 47) has studied the public available leadership contract of CMO and the relevant criteria for assessing the CMOs performance. They find that all contracts specify economic results as a major evaluation measure, and less frequently performance in other areas such as exercise of leadership, implementation of government goals, development of the municipal organization and user and employee satisfaction. According to agency theories, rational CMO would prioritize putting effort in achieving these goals.

According to the LGA §24 second paragraph, employment of CMOs can be contracted for a minimum of six years, the decision makers of this employment is the municipal council. The general rule is that if a contract between for employment of a CMO is made, the length of employment is not up for renegotiation until the end of the arrangement. Geys et al(2017) states that the council's ability of firing a CMO prior to the contracted time is limited, and requires gross misconduct by the CMO. CMO may however choose to resign, and this can either voluntary, retirement or moving to another form of employment, or forced by the council, in which the CMO is entitled to a severance package.

The municipal council-CMO relationship rivals that of an principal-agent problem, with an important difference; the principal is subject to replacement every four years.

The municipal council elects within a subgroup of the municipal council a mayor as according to LGA §9 first paragraph. The mayor is given responsibilities to lead the municipal council meetings, and is the legal representation of the municipal council. The relationship between CMO and mayor is interesting as both can according to LGA, §9 fifth paragraph §23 fourth paragraph and §24 first paragraph, be empowered by the council to have motion to do some of the same tasks. The role of a mayor is therefore divided, as the mayor is part of the municipal council and can be seen as the “chief principal” in the municipal council, but may also be empowered to do some of the same tasks as the CMO. Because of this, part of the problem of the municipal council can be interpreted as an agent-agent problem, which potentially allows for both harmful and beneficial dynamics between the two agents.

### Empirical research

There is a vast literature about the changes in political leaders and the effect this has on bureaucratic employment. However, this is mainly based on empirical evidence in America, where there is less enforcement on bureaucrats and their influence on political policies is greater than comparable ones in Europe. It is generally thought that European bureaucrats are not directly comparable to the American ones, and the empirical findings from the latter regarding personnel policies might be of little use in implementing policies in Europe. However,

recent findings by Dahlström & Holmgren(2017) provides evidence that this hypothesis might be false.

Research by Willumsen et al(2014) indicates that 31% of the CMOs in “Rådmannsundersøkelsen 2013”, where roughly half of the CMOs employed at the time participated, believes that the most important task of the CMO is connected to vision and planning of strategies. In this survey, it is also revealed that half of the employed CMO had political experience prior to employment as CMO(4). These findings indicate that at least some of the CMOs considers that this employment to be of political nature.

Applying agency theories on CMO-municipal council relationship.

As formerly mentioned, some of the tasks related to the work as a CMO is implementation of political policies given by the municipal council, this hypothesis is further strengthened by empirical research indicates that some of the tasks of CMO may be political motivated. This is in line with Prendergast’s (2003,2007) theories about bureaucrat’s intrinsic motivation. According to principal-agent theories regarding group identity (Prendergast, 2007; Besley & Ghatak, 2005; Akerlof & Kranton, 2005) the municipal council and the CMO group identities, most notably political identity, matters in CMOs productivity in implementing the council’s changes to policy. Given a choice of similar CMOs with different political identity, the one that is best aligned with the political identity will be the optimal for employment, as can increase the CMO’s effort in implementing the council’s policies. Rational municipal councils are expected to hire CMOs that are motivated agents and aligned with the councils political identity.

The municipal election provides for interesting natural experiments. In each municipal there is potentially a change in municipal councils, and their political ideology. As the employment for CMO is contracted for a minimum of six years at a time, the “leftover” CMO in each municipal should not be likely to have his contract up for renewal at election year. If there is change in municipal council, the former might have contracted a CMO that shares political alignment but not with the newly elected. If the contract is up for renewal, the council may wish to hire someone else. Assuming there is changes of municipal council in at least



some municipals at election years, this should result in an increase in turnover ratio of CMOs.

However as the municipal council has motion according to the law of Local Government Act to empower the CMO and the mayor as they see fit, according to the Local Government Act §9 fifth paragraph, §23 fourth paragraph §24 first paragraph. In line with Prendergast's theory of bureaucratic motivation(2003, 2007), this empowerment might provide the CMOs with additional intrinsic motivation, a change in how much empowerment the CMO is granted might have an effect on whether or not to stay in the job. The municipal council might disempower a CMO for two reasons, the mayor can according to the Law of Local Government act be empowered to do the same tasks as the CMO. As the mayor is part of and appointed by the municipal council, he will in most cases be more political aligned with the council than the leftover CMO and be more productive doing these tasks. Second, disempowering a CMO who has intrinsic motivation in these tasks may lead to a voluntary resignation from the CMO. In addition to this, the municipal council can propose a deal where the CMO voluntary steps down from his position in exchange for a severance package, which may include a transfer equal to the expected wages had the CMO not resigned.

There is reason to believe that CMOs have intrinsic motivation from this employment, and may self-select to apply for these jobs. Municipal council's decision on which CMO to hire may be influenced by the political alignment between the municipal council and CMO candidates. Because of this, changes in municipal council and political ideology, may affect the CMOs intrinsic motivation from the job and increase pressure from the municipal council, as they prefer other candidates. If the municipal council wishes, they also have the option of paying the CMO to resign. If the change in municipal council leads to a decrease in utility of being employed as CMO, and this utility falls below that of the outside option, a rational CMO should according to agency theories resign from post.

Formulating a, very, simple agency model, we have that a rational agent will seek and accept employment as CMO if:

$$w + i > d$$

, where  $w$  is the wage offered by the CMO employment,  $i$  is the total intrinsic motivation provided by the job under the current municipal council, and  $d$  is the value of the agents outside offer.

If there is a change in municipal council this may alter the intrinsic motivation the agent gets from his employment, from the many reasons listed above. Note  $i_1$  as the intrinsic motivation provided by the CMO position under the new municipal council. In the cases where  $w + i > d$ , but  $w + i_1 < d$ , agency theories expect a rational agent to resign from employment as CMO.

However, there may be situations where  $w + i \sim w + i_1$ , and following the election there is an increase in the outside option,  $d_1$ , which causes  $w + i \sim w + j < d_1$ , and the rational agent resigns from employment. This is a valid concern for this thesis, because if estimation of  $d_1$  is not possible, it will no be way to differentiate the reason of CMO turnover.

Econometric theories

Linear regression with one regressor

Given a hypothesis that  $X$  causes  $Y$ , linear regression can be performed on a data set consisting of sets of  $X$ s and  $Y$ s to infer the relationship between  $X$  and  $Y$  (Stock & Watson, 2015, 158). The linear regression with one regressor has the form:

$$Y_i = \alpha + \beta X_i + u_i$$

Where  $Y_i$  indicates the  $Y$  value in set  $i$ ,  $\alpha$  is a constant shared by all sets,  $\beta$  is the coefficient of increase in  $Y_i$  given  $X_i$ ,  $X_i$  is the  $X$  value in set  $i$ , and  $u_i$  is an error term allowing for variation in each set.  $\alpha + \beta X_i$  is the population regression line, and is the relationship that holds on average between  $X$  and  $Y$

There are many ways of determining the optimal linear regression with one regressor, and each of the estimators have strength and weaknesses. I will in this study use the most commonly used estimator, the ordinary least squares estimator.

Ordinary least squares estimator

According to Stock & Watson(2015) the Ordinary least squares estimator, OLS for short, chooses the regression coefficients,  $\hat{\alpha}$  and  $\hat{\beta}$ , such that the regressions squared mistakes in predicting Y given X is as small as possible.

Using the OLS estimator, it will return the coefficients that allows the best approximation to infer this causal relationship between Y and X. These estimated variables are named  $\hat{\alpha}$  and  $\hat{\beta}$ , and is the OLS estimator's best approximation of the linear regression function.

### OLS assumptions

As according to Stock & Watson(2015, 170-175) there are several assumptions in order for OLS to be an useful estimator.

1)“The conditional distribution of  $u_i$  given  $X_i$  has a mean of zero.”

This is a mathematical statement about the omitted variables contained in  $u_i$ . As correlation between  $X_i$  and omitted variables may bias the inference of the relationship between X and Y, this is a condition that must not be violated. If however, if  $X_i$  and the omitted variables contained in  $u_i$  are correlated, the conditional distribution of  $u_i$  given  $X_i$  might be have a mean unlike 0. Which might bias the estimation of the population regression line, assuming this is the conditional mean of  $Y_i$  given  $X_i$ .

This assumption is of importance, as testing for if  $X_i$  is correlated with  $u_i$  indicates whether there is omitted variable bias in the regression model.

2)“ $X_i, Y_i, i= 1, \dots, n$ , are independently and identically distributed.”

As the data set includes the information of the whole population, violation of this assumption does not cause concern.

3) “Large outliers are unlikely”

This assumption is of no concern for the planned regression models. As it is impossible to get large outliers using dummy variables.

### Panel data.

Stock & Watson(2015, 398-402) defines panel data as observations in the same nentities over at least two periods of time.. Having the linear regression example

fresh in mind, where each set of  $i$  includes a value of  $X$  and  $Y$  and  $i$  indicates entity  $i$ . A form of panel data is having information of all the entities over multiple time periods. In other words, the former used example of linear regression may be seen as a panel data, where the time dimension is limited to one set of observations.

With panel data it is useful to describe if there are any missing observations. If there is no missing observation, that is, the observed entities have observations in all time periods, the panel data is balanced. On the other hand, if there are some missing observations, you have unbalanced panel data. This is relevant for my data set, as there has been merges of municipals over the time period of which there are observations. Hence at first glance, the data set may appear to be unbalanced, but this may simply be due to merges of municipals. Further investigation is needed to uncover if my dataset is indeed balanced.

With panel data, it allows for more technical models for inferring a causal relationship between the variables of interest. More technically, it allows for exploiting variation in between each of the two dimensions of observations, this can reduce the omitted variable bias. One of the most used models within panel data analysis is the fixed effects model.

#### Fixed effects regression

Stock & Watson(2015) states that fixed effects regression is a method for controlling for omitted variables when the omitted variables vary between entities but not over time. The fixed effects regression model takes the form of:

$$Y_{it} = \beta X_{it} + \alpha_i + u_{it}, i = 1, \dots, n, t = 1, \dots, T$$

Where  $\alpha_i$  are unknown intercepts to be estimated for entity  $i = 1, \dots, n$ , the slope coefficient  $\beta$  is the same for all  $X_{it}$ . Hence the population regression line can be different for all entities  $i$  as, the slope,  $\beta$ , is equal but the intercept  $\alpha_i$  can be different for each entity. The terms  $\alpha_i$  are therefore known as entity fixed effects, and the variation in these terms is because of omitted variables, that vary across entities. The fixed effects regression therefore has methods of dealing with the omitted variable problem, that is not possible with only timeseries or cross-sectional data.

The fixed effects regression model can be improved to include a time fixed effects term. As with the entity fixed effects, where it controlled for variations between entities that is constant over time, the time fixed effects allows for controlling for variations that vary over time but not over entities.

$$Y_{it} = \beta X_{it} + \alpha_i + \lambda_t + u_{it}, i = 1, \dots, n, t = 1, \dots, T$$

Where  $\lambda_t$  is the time fixed effects term.

#### Fixed effects assumptions

As with the OLS estimator, the fixed effects estimator has assumptions needed to be fulfilled for the estimated coefficients to be useful in predicting the population regression function. As it shares the same assumptions as in OLS, with minor differences reflecting that the regression is now based on panel data, I will not discuss assumptions 2 and 3 as they are not relevant.

1) “ $u_{it}$  has a conditional mean zero :  $E(u_{it}|x_{i1}, x_{i2}, \dots, x_{iT}, \alpha_i, \lambda_t) = 0$ , for  $t=1, \dots, T$ ”

As with the analogous OLS assumption, this requires special attention.

Calculation of the distribution of the error term conditional on  $X_{it}$ ,  $\alpha_i$  and  $\lambda_t$  for  $i = 1, \dots, n, t = 1, \dots, T$ , may reveal if there is an omitted variable problem.

4) “There is no perfect multicollinearity”

The assumption requires that none of the regressors is a perfect linear function of the other regressors (Stock & Watson, 2015, 246). This assumption is of minor importance as such violations are easily noticed and corrected.

#### Objectives of the thesis

Having sufficiently motivated the research question from economic theory and laid out the foundation of causal inference using econometrics. The objective of the thesis is to causally infer whether CMO turnover increases given shifts in political ideology of the municipal council. Such effect can be interpreted as the CMO having intrinsic motivation that influences his or her willingness to stay in the job of CMO and how this is influenced by changes in political power. If there is evidence that the CMO has intrinsic motivation, this might indicate that this is a result of preferences over policy outcomes. To answer this question, I will investigate the causal inference between bureaucratic turnover and changes in political ideology of the municipal council, by constructing several econometric

models and interpret the findings. The a priori hypothesis is that CMOs will have additional intrinsic motivation from their employment when there is alignment between the political ideology of the CMO and the council board. This is motivated by agency theories, and the fact the council board, have ability to empower both the mayors' and CMOs' decision ability on behalf of the council.

#### Description of data

A quick description of the most important data sets that I currently have available, the PAI-registry and dataset Local Government Dataset from Fiva, Halse & Natvig(2017). PAI-registry includes information about the CMOs such, education level, yearly wage at each year, name of CMO, which municipal of employment. The dataset Local Government Dataset from Fiva et al(2017) includes information on municipal level, most relevant for my research question includes information about changes of mayor and municipal council with comprehensive information regarding their party affiliation, indicating politic identity.

By combining data from the PAI-registry of CMO relevant data and information regarding municipal from Fiva, Halse & Natvig(2017)I will construct models that can be used to causally infer whether changes in political ideology in the principals, will induce an increase in turnover rate in CMOs. However, in order to do so, I will have to create variables in the data sets.

#### CMO turnover

I will construct a dummy variable indicating change in CMO in municipality  $i$  at time period  $t$ , where value of 1 indicating a switch and 0 otherwise. However, as a CMO may leave position from a multitude of reasons, and the variable of interest is only resignation caused by a change of municipal council. This dummy variable has potential for improvement to properly indicate if the CMO leaves position because of a newly elected municipal council, and mayor.

#### Election years

Creating a dummy variable taking the value of 1 in election years and 0 otherwise.  
Switch in mayor

Creating a dummy variable that indicates a switch in mayor in municipal  $i$  in time period  $t$ .

Equations of interest

A, preliminary, motivated research question is that the turnover ratio of the average Norwegian CMOs should increase in election years. Given this, we can formulate a simple linear regression model:

$$(1) Y_{it} = \alpha + \beta \text{Electionyear} + u_{it}$$

Where in (1)  $Y_{it}$  is a dummy variable indicating a switch of CMO at municipal  $i$  time  $t$ ,  $\alpha$  is a constant probably between 0,10-0,15. Electionyear is a dummy variable indicating if the year at time period  $t$  is an election year or not, and  $u_{it}$  is an error term at municipality  $i$  at time  $t$ . The coefficient of interest is the  $\beta$ , and a hypothesis, motivated by agency theories, is that this coefficient should be positive. Meaning, in election years there is an increase in CMO turnover rates.

A more advanced model for additional analysis is a fixed effect regression exploiting variations between municipalities and between time periods.

$$(2) Y_{it} = \alpha_i + \lambda_t + \beta \text{Switch}_{it} + u_{it}$$

As in (1) the variable  $Y_{it}$  is a dummy variable indicating a switch in CMO in municipal  $i$  at time period  $t$ . However, the  $\alpha_i$  term is a vector constant effects for each municipality in comparison to the term  $\alpha$  in equation (1) that was equal for all municipalities. The  $\alpha_i$  is potentially more powerful as it allows for inference of omitted variables on municipal levels. E.g. in some municipalities the employment options for CMOs are better, and allows for municipalities have higher turnover rates than others.  $\lambda_t$  is a vector of constant effects in all time periods, and allows for inference of omitted variables between time periods. E.g. presence of a recession at some time periods may make the CMO less inclined to resign. The variable  $\text{Switch}_{it}$  as a dummy variable indicating switch in mayor, the variable of interest is  $\beta$ , the coefficient indicating the expected increase in turnover ratio in CMO given a shift in mayor in the same municipal. A preliminary hypothesis is that value of  $\beta$  in model (2) will be positive, and greater than  $\beta$  in model (1). A simple interpretation of these two coefficients is that the effect in turnover rates in CMO should be greater in municipalities where there is a shift in mayor, compared to the effect of it simply being an election year.

## Thesis progression

With access to all data sets, I will start by combining the PAI-registry with the Local Government Dataset from Fiva, Halse & Natvig(2017). This allows for matching municipal information with CMO information.

I will then do more thorough descriptive analysis. Such analysis may motivate other econometric models that may be used for causal inferring the effect of changes in political ideology in municipal level. Reading additional theory about econometric models with a binary dependent variable, for example chapter 11 in Stock & Watson(2015) may motivate other econometric models.

Doing regressions as specified as under equations of interest, and interpret the results. Adding additional control variables to equation (2), and or swapping Switchit, is of interest as it allows for sensitivity analysis of the findings.

Future work includes improving the data set as by collecting publicly available data regarding electives can be matched up against CMOs named from the PAI-registry, to extract CMOs group identities in terms of political ideology. With more data on CMOs political ideology preferences, more advanced econometric models can be created to control for CMOs political alignment with either mayor or city council. A possible hypothesis is that the distance in political identity between the elected municipal council and former council should have a causal effect in turnover rates in CMOs.

Combining the PAI-registry with register data from SSB Norway, to follow CMOs careers before and after entering the CMO-positions. Such data allows for better information whether CMOs resigns because of changes in municipality or if the CMO would have resigned from employment regardless of this.

By creating control variables of the CMOs and mayors group identity in other aspects than political ideology, it will be possible to control for this effect. Which could allow for models that allows for better inference if CMO is politically neutral or not.



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