Norwegian School of Economics

Bergen, Autumn 2022

Wealth mobility in Norway

An event study of wealth tax change in Bø

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Master thesis, Strategy and Management

NORWEGIAN SCHOOL OF ECONOMICS

Acknowledgements

This master thesis is a big step towards the completion of our Master of Science at the Norwegian School of Economics. Our years in Bergen have been both interesting and enjoyable. Certainly, a time to look back at with great pleasure.

We would like to express our sincerest gratitude to both our supervisor Maximilian Todtenhaupt and co-supervisor Carlo Birkholz for inspiration, guidance, and feedback.

In addition, we would like to thank our families and friends for their support during this process and for providing helpful guidance.

Norwegian School of Economics

Bergen, December 2022

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Abstract

In this thesis we examine the effect of a wealth tax on mobility. The lower wealth tax rate in Bø, implemented January 2021, presents an opportunity to add an empirical study to the scarce literature on wealth taxation.

The thesis has been written, using data on individual's income, wealth, and tax from Statistics Norway (SSB). We have approached the research question from multiple angels: First running an event study for the period of 2016-2021, followed by estimating the elasticity. We supplemented the results, by running a linear probability model, examining the change in likelihood that an individual moved to Bø.

Our findings suggest that there is an effect of the lower tax rate in Bø. On the aggregate level, we see a slight increase of wealthy individuals, and a larger increase in the amount of wealth. We further calculate high wealth- and mobility-elasticities. Lastly, the LP-model shows an increased likelihood of individuals moving to Bø if they are in the upper bound of the wealth distribution.

Concluding, that the lower tax rate seems to have an effect, whereby the main influx of capital is because the new residents have substantial wealth.

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1. Introduction

The wealth tax has for years been politically contested in Norway. Even recent media headlines highlight a perceived exodus among wealthy individuals, moving to Switzerland due to taxation (Bach et al., 2022, Nilsen & Fjellanger, 2022). At the same time in history, Piketty (2014) published "*Capital in the Twenty-First Century*", examining rising wealth inequality due to higher return on capital than labour. The gap is rising to levels not registered since the 19th century (Piketty, 2014).

A policy response to inequality has been a tax on wealth (NOU 2022:20, 23). Yet, most OECD countries have lowered or removed the taxation (Perret, 2021). Norway is one of few remaining OECD members maintaining a form of wealth taxation. The wealth tax is politically contentious due to perceived harm to businesses. For example, the Confederation of Norwegian Enterprise (NHO) warned the current Labour-Center government not to raise the tax rate, since owners often must take out dividends to pay for the increased tax burden (Jensen, 2022). The organization recommends abolishing the tax. (NHO, N.Y).

Despite the public debate on the effect of a wealth tax, the literature on the implications of such a policy lacks empirical studies. We found few academic articles that examine the topic. Therefore, our motivation behind this thesis is to add an empirical analysis of how individuals respond to wealth taxation in Norway. The main focus will be on mobility after the municipality of Bø voted to lower the wealth tax rate. The rate was reduced by 0.5 percentage points, making the local rate 0,35 percent, compared to 0.85 for all other municipalities. The decision marked the only time in recent history that a municipality had a lower rate than the maximum allowed by the central government (NOU, 2022:10). The vote spurred a host of wealthy individuals to express publicly that they were moving north to settle down in Bø (Feratovic et al. 2020).

Thus, the research question is:

What is the effect of the lower wealth tax rate in Bø on mobility among wealth taxpayers in Norway?

In recent decades, only a couple of tax-policy changes in Scandinavia (Jakobsen et al., 2020, Ring, 2020, Seim, 2017) have made it possible to examine the effects of wealth taxes on behaviour among wealthy individuals. Studying mobility among taxpayers can provide valuable insight, to help policymakers design suitable policies that function as intended. Further, limiting potential negative effects due to specific policy design. The common risk when designing a tax policy is that taxes can reduce efficiency and lead to socio-economic loss (NOU 2022:20, 11). For instance, as discussed in chapter two, the argument that investors take less innovative risk due to a tax on wealth.

We utilize a natural experiment, based on the event of lower wealth tax in Bø. The data has been accessed through Microdata.no. We assembled a dataset for the period of 2016-2021, consisting of high-income earners and wealth taxpayers.

In the first analysis, we construct a Difference-in-difference event study using the imported panel data. First, we examine the data at an aggregate level. Looking at the number of people, amount of wealth and amount of wealth tax paid in Bø. We then construct a DiDiD-model looking at the same variables, adding a control group of high-income earners that do not pay wealth taxes. We conducted the analysis on both the full sample and a restricted sample consisting of people moving in the period. We conclude the event study with a semi-elastic model on the effect that a change in the net-of-tax rate has on both wealth and mobility. We follow up the event study with a simple linear probability model, to examine the change in likelihood of a person living in and moving to Bø before and after the tax-change.

The thesis is structured with a theoretical overview of wealth taxation and the institutional context in Norway. We summarize the data collection and methodology, before presenting some descriptive data on the tax change in Bø. Afterwards, the results are discussed, and we conclude some key points in the final chapter.

Our main finding is that there is a statistically significant increase in wealth in Bø after the tax-change. The number of wealth-taxpayers has slightly increased, and the main influx of capital is because the new residents have substantial wealth. Running a linear probability model, we found that if a person had above 50 million NOK in wealth and moved in 2021, there was a 22,5 % higher likelihood that the person moved to Bø.

Another interesting find is a relatively high mobility elasticity of 16,26. The elasticity is an outlier compared to previous studies, such as the study by Brülhart et al. (2022) on Wealth tax in Switzerland, and a study by Agrawal et al. (2022) on wealth tax in Spain. The elasticity indicates an effect, but these magnitudes might be closely connected to the particularity of the tax change in Bø.

The combined results indicate that the lowering of a tax in Bø led to an influx of wealthy individuals that are bringing substantial wealth. These results are only examining short-term mobility, and it would be interesting to examine the long-term effect of a lower wealth tax in Bø in future studies.

2. Theoretical framework

This chapter presents the framework for the thesis question—the effect of wealth tax on mobility among wealthy individuals. First, we examine common issues when implementing such a tax from a theoretical perspective on wealth taxes. Further, the chapter describes the institutional setting in Norway and the decision to lower the wealth tax in the municipality of Bø. The purpose is to give a contextual framework for the analysis of this empirical examination of the tax-event.

2.1 Tax implementation and motivation

The influential neo-liberal economist Milton Friedman commented in *"Capitalism and Freedom"* that government intervention should be minimal, and wealth taxes do not work to reduce long-term wealth inequality. Capitalism has increased living standards for everyone, and capitalist societies are comparatively less unequal than alternatives, such as the Soviet Union *(Friedman, 2002).* In recent years, the neo-liberal narrative, presented by Friedman, has come under fire due to increased wealth concentration. As stated in the New York Times;

"*Since the economist wrote his influential essay on capitalism, the "haves" have gained much — and everyone else has missed out."* Strine, L. E., & Zwillinger, J. (2020)

Economist Thomas Piketty calls for a progressive global tax on capital to reduce the concentration of wealth. He studied economic growth in France, Great Britain, the United States and Sweden. Piketty shows that before the second world war, capital holders earned more interest than the return on labour. This ratio changed after 1945 when countries entered a period of higher economic growth rates. A wealth-holding middle class grew, lowering wealth inequality (Piketty, 2014). In recent decades, capital rent is again higher than the return on labour. The unequal return on wealth compared to labour has increased wealth inequality. For example, in the US, one percent of the population holds nearly 90 percent of the wealth (Smith et al., 2021).

In the same period, governments abandoned wealth taxation as a progressive tax instrument. In 2020, Norway is among the few OECD countries that still have a form of individual net wealth tax. The other countries are Spain and Switzerland (Perret, 2021 & OECD, 2018). The Norwegian wealth tax has been argued for as a progressive tax to reduce wealth inequality (NOU, 2022:20, 253). The Gini coefficient, which can measure wealth or income inequality in a country, shows that the Scandinavian countries have relatively low-income inequality but comparatively a higher wealth inequality. In Norway the Gini-index for wealth inequality is 79.4. The report states that 79 is the average in Scandinavia, up from 76.1 in 2000 (Credit Suisse, 2022,53).

The renewed debate on wealth tax highlights the importance of examining how wealthy individuals respond to wealth taxation. One economic interpretation of capital taxes is that the mechanism is a substitute for capital income taxation (Perret, 2021, Saez & Zucman 2019, Kopczuk, 2019). In effect, a fixed tax is imposed on the Return of capital (r) that wealthy individuals earn on the given capital (W).

$$r * W - wealth\ tax$$

Kopczuk (2019) states therefore that a wealth tax in theory moves the tax burden from rents and risk toward the normal rate of return on capital (Kopczuk, 2019). The same nominal amount of tax is imposed regardless of the return on the underlying assets. In effect, wealthy individuals are punished for investing in risky assets since the effective tax will be the same no matter the actual return on underlying capital. A survey in Norway of 128 wealthy individuals (wealth above 100 million NOK) found that 84 percent of the wealth tax was covered through the company's return on investment (NHHS, 2020). This mechanism predicts that wealth taxpayers want to reduce exposure to such a tax, or levy of assets deemed risky.

This leads to another common concern when designing a wealth tax policy: The tax is fragile (Saez & Zucman, 2019). The taxation base is narrow, and several valuable assets are difficult to evaluate accurately. This issue has been central throughout the history of taxation. In ancient Athens, the citizens had to swear under oath the value of their wealth (Lyttkens, 1992). In more recent times, we have the tax authorities examining taxable wealth, and estimating the amount that should be taxed. Imposing wealth taxation would

create economic incentive to changes the underlying assets the wealthy individual holds, to reduce exposure to the tax (Perret, 2021). In short: Estimations of wealth can create differences in the tax burden between wealthy citizens based on what assets they hold.

There is the issue of information transfer across borders. Possessions in other countries, such as real estate, not-tangible assets, and artwork, are challenging to evaluate for tax authorities (Kopczuk, 2019, Perret, 2021). At the same time, there can be natural barriers for wealthy individuals that consider moving abroad. Hypothetically, a wealthy individual might be a business leader, and the wealth is tied to the firm that she or he is managing in Norway. Consequently, it is interesting to examine how wealthy individuals respond to changes in the tax system from a centralized to a more regionalized form: Where there are different tax rates between regions, such that it is possible to reduce exposure to taxes without migrating out of the country.

2.2 The wealth tax in Norway

The Norwegian wealth tax is regulated through the law on tax and income (Skatteloven, 2000, § 1-1). The tax covers all natural and juridical persons in Norway. It is based on the principle that a resident is liable to a wealth tax on the net wealth domestically and abroad. The government annually decides the overall tax rate during the national budgetary deliberations (Lilleholt, 2014).

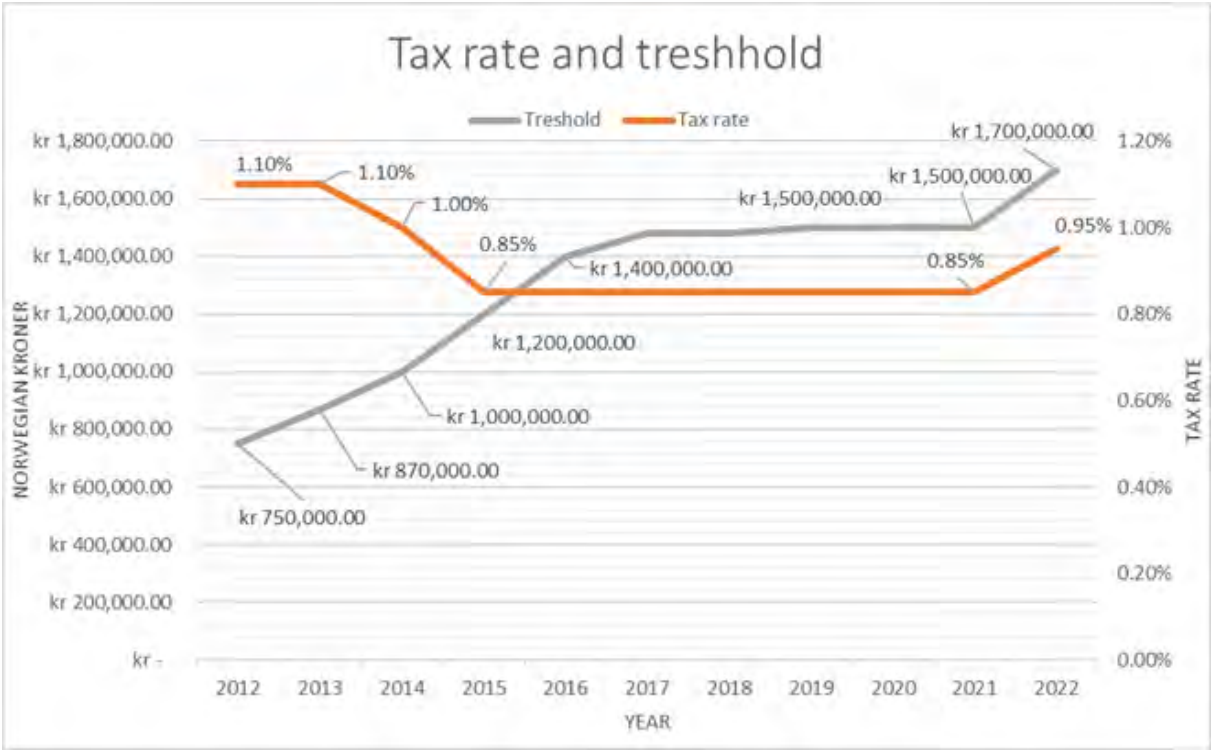
Norway has had a form of taxation on wealth since 1892 and is one of the few countries that has kept wealth taxation through the early 2000. Neighbouring countries like Denmark and Sweden abolished their taxation schemes in 1997 and 2007 (OECD, 2018). As presented previously, some main arguments against wealth tax are the efficiency loss and the difficulty in assessing what is taxable. The wealth tax is fiscally a minor part of state revenue but is politically controversial: It is a progressive tax that increases based on a person's net wealth (Lilleholt, 2014). As shown in figure 2.1, the threshold has increased in later years.

In Norway, the tax is calculated on the net value of all taxable assets that a person possesses. The evaluation is calculated on a set day, which historically has been the first of January every year (Skatteloven, 2000, § 4-1). The municipality in which the individual resides on

that day, is the municipality one pays taxes to. The Norwegian tax system is based on transparency and each year Skatteetaten (The Norwegian Tax Administration) publishes numbers for income, tax, and wealth for each inhabitant. These numbers are collected through the Egenmelding (Tax return). This form states the persons' income, wealth and other tax-related details. Most of the numbers are pre-filled from third parties. For example, income data is usually collected from the employer (Skatteetaten1&2, n.y).

The wealth tax has a stated individual threshold before a taxpayer must pay. This threshold as shown in figure 2.1, is set at 1,5 million Norwegian kroner in 2021. This is a low threshold compared to other OECD countries (OECD, 2018, 81). Nevertheless, many taxpayers fall outside of the taxable bracket since their primary residence is only evaluated at one-fourth of the market value (Skatteloven, 2000, § 4-10).

Graph 2.1: The tax rate and threshold for individuals in Norway.



Source: created based on numbers from The Norwegian tax authorities (Skatteetaten3, n.y)

The question of what should be taxed is contested in academia and political institutions. The former governing party Høyre has been advocating for removing the wealth tax on working capital due to its perceived negative impact on value creation (Høyre, 2022). The tax was

during the right-wing coalition lowered from 1.1 % before 2013 to 0,85 % in 2015 (OECD, 2018, 87). In 2022 the tax rate was again increased by the current government (Figure 2.1), led by the Norwegian Labour party. On top of this, what constitutes taxable wealth has been broadened to include fish farming rights (Endringslov til skatteloven, 2021, § 4-54).

2.2.1 The wealth tax and municipalities

The Norwegian governing structure is divided between municipalities, counties, and the central government/state. The wealth tax is only divided between the municipalities, and the central government, whereby the council in municipalities decide the tax rate that is paid to the municipality (Skatteloven, 2000, § 1-1, & Lilleholt, 2014).

Even if municipalities are democratic institutions, they also work in accordance with the central government as a primary service provider to the inhabitants. The state influences municipalities on the principle of equity, whereby set income and public services should be normatively the same across Norway (Fiva et al., 2014). The tax law has delegated decisions on specific tax rate to the municipality council, but the central government sets a maximum rate (Lilleholt, 2014, 562). In practical terms the maximum rate is always chosen: Of 356 municipalities in Norway, BØ is the only council that has voted to implement a lower rate than the maximum allowed by the central government (NOU, 2022:10).

The total wealth tax paid in Norway was 13,6 billion Norwegian kroner (NOU, 2022:10). In the period of 2015-2021, the wealth tax rate was divided up between 0,15 percent to the state and 0,7 percent to the municipalities, for a combined tax rate of 0,85 percent *(Skatteetaten[3], n.y)*.

This amount is paid by the inhabitants of each municipality, which creates an uneven distribution of the yearly tax income for municipalities across Norway. In short: Some municipalities have a lot more people in the higher income bracket, that accordingly pay more taxes. Municipalities such as Asker have in previous years earned 150 percent of the average municipality tax income. While municipalities like Gamvik earned 73 percent of the national average tax-income (Fiva et Al., 2014). The Norwegian tax system has a built-in equalizing calculation to reduce the income imbalance. The municipalities with tax revenue above the average amount must transfer 60 percent of the excess income to the central tax authorities. These funds are then redistributed to other municipalities (NOU, 2022:10, 25).

2.2.2 Wealth tax reduction in Bø

This thesis examines the lowering of the wealth tax rate in Bø as a treatment effect on the mobility of wealthy individuals. The municipality is situated in the northern region of Norway, in Nordland. It is a relatively small municipality with a total population of 2532 inhabitants. The municipality had in recent years experienced a gradual decline in inhabitants *(See figure 6.5).*

In the council meeting on the 12 of December 2019, the majority (against one council vote) voted to lower the wealth tax. The new rate for residents in Bø, starting 2021, would be 0,35 percent (Bø kommune, 2019). The council vote was an unprecedented decision. Even if municipalities in principle are allowed to lower the tax rate below the maximum rate, no municipality has had a lower rate than the maximum tax rate since 1978 (NOU, 2022:10, 27). The decision by the council was made on the argument of attracting more innovative inhabitants to the northern municipality, which would lead to more activity, and turn around the gradual decline in population estimates (Bø kommune, 2020). The outcome led to national headlines across Norway about the wealth tax, and Bø becoming the "Norwegian Monaco" (Skjelvig, 2022).

The "Rådman"/Chief Executive in the annual economic period plan for 2022-2024, writes about an increased actual revenue for the municipality after the tax-change:

"Based on actual received tax/income equalizing for september 2021, it looks like the combined tax income for Bø municipality increases with approximately 50 % compared to previous years, even with reduced wealth tax"

Translated from Bø økonomiplan (2022-2025) (Bø kommune, 2021)

The Chief Executive further states that this jump in revenue is due to the increase in people paying abnormally high-income tax plus the remaining wealth tax paid to the municipality (*BØ kommune,* 2021). Since the central tax authority estimates income for municipalities in Norway using the full tax rate, Bø must pay into the equalisation scheme for tax returns as if it used the nationally set maximum rate. There is a difference between how much the tax authorities state Bø should tax wealth and how much Bø actually tax the wealth. For instance, in 2021 Bø earned 96 million NOK in combined income and wealth tax (Bø kommune, 2022). Yet, the tax authorities calculated an estimated revenue of 111 million,

which is 119 % percent of the national average. This was the amount the municipality would earn using 0.85 p.p. The estimated income used by the tax authorities results in Bø having to pay 11 million NOK to the central tax authorities (Regjeringen, 2022).

The previous government stepped in and covered the shortfall caused by the lower wealth tax. This raised questions about the fairness of such a system, where other taxpayers must pay for the tax reduction in Bø (NOU 2022:10, 131). The response also shows how unprepared the tax authorities were for a different tax policy among the municipalities, even if this was formally allowed. The government has signalled that it will not cover the budgetary shortfall in future years (Bø kommune, 2021). In the yearly presented budget, the "rådmann"/Chief Executive writes that he expects the municipality to reintroduce the maximum taxation of wealth for 2023, since the government will not fund the budgetary shortfalls caused by a lowering of the wealth tax (Bø kommune, 2021).

2.3 summary

We see that wealth taxation is a core issue of dispute in developed economies. The tax change in Bø seems to have created structural issues in the Norwegian tax policy. BØ must pay millions to the central government since the equalizing calculation estimates how much the municipality should tax based on the maximum rate. At the same time, we see an effect on the budget, whereby wealthy individuals are moving to Bø, which has increased the amount of wealth in the northern region.

For us, such a policy implementation is interesting since the council decision in Bø gives us a rare opportunity to examine the induced mobility caused by a lower wealth tax.

3. Empirical overview of wealth tax mobility

In the previous chapter we have examined the implementation of the wealth tax in Bø and the economic theoretical motivation behind lowering or implementing such a tax. The goal of the empirical overview in this chapter is to show how the results (chapter 7) compared to previous studies, giving context to explain the effects found in Bø. Wealth tax is an intricate policy instrument which seems to be differently implemented across countries. Previous studies use a wealth-elasticity to measure and compare the impact of wealth taxation.

In this paper, we focus on mobility. Advani & Tarrant (2021) highlight that inter-regional mobility has an impact on the elasticity of wealth. There have been few empirical studies on the mobility of wealthy individuals due to wealth taxes. We will highlight some relevant literature. The studies have been conducted in Switzerland, Spain, and Denmark.

3.1 Behavioral response

The question, how wealthy individuals respond to wealth taxation, is dependent on the policy design, context, and study design. There is a large variance in wealth elasticities. Advani & Tarrant (2021) shows that the elasticities vary by a factor of 800 between different studies.

In simple terms, wealthy individuals can respond in different ways to taxation. We have identified: (1) moving or (2) purchasing non-taxable assets, or (3) underreporting (Advani & Tarrant, 2021, Alstadsæther et al., 2018). Context matter in terms of how people respond. For instance, Jakobsen et al (2021) have found a wealth-elasticity of 0.5 among moderately wealthy in Denmark. Stating that there is no evidence on a response to wealth taxes by migration (Jakobsen et al., 2021).

Alstadsæter et al. (2019) examines the difference between formal tax returns and information about wealth in tax havens through the Panama papers. They find an increase in the probability of individuals hiding wealth abroad if the person is very wealthy. In countries

like Switzerland or Spain where there is no third reporting of wealth, making it easier to underreport (Advani & Tarrant, 2021).

Thereby, some forms of assets are more difficult to hide, based on the type of tax system and reporting standards. Thus, real action (such as moving or reinvesting) by wealthy individuals is a plausible behavioral response. Still, the empirical studies on wealth mobility are relatively new and scarce. Something that can be explained by lack of suitable data and tax variation for identification of causal effects (Kleven et al, 2020, 121).

In this paper, the tax-change in Bø provides empirical data on mobility in a country that temporarily has moved to a more regional tax system, whereby municipalities implement different tax rates. We base the analysis on previous studies in Switzerland and Spain. They can be regarded as tax changes in a differentiated regional tax system.

3.2 Mobility and wealth

The upper bounds of the wealth-elasticities presented in Advania & Tarrant (2021) are Difference-in-difference studies on a regional tax system. These are policy-changes in countries such as Spain and Switzerland (Brülhart et al. 2022, Agrawal et al. 2022). The ease of mobility impacts the elasticity (Advani & Tarrant 2021, 531).

The study by Brülhart et al. (2022) used a different-in-different model to look at the effect of lower wealth taxes in Swiss cantons. The study found that the rate-differences between the cantons led to an increase in reported wealth in the lower taxed cantons. The wealth elasticity was calculated at 43 percent after six years of cumulated differences in wealth (Brülhart et al. 2022). In effect, internal migration accounted for 17 percent of the overall wealth elasticity. Further, the paper examined the effect of the rate-difference between Lucerne and Bern. The tax was 0,18 p.p lower in Lucerne. Conducting a DiD-study on the difference amount of wealth accumulated in the two cantons post reform, they calculated a semi-elasticity of 187 percent (Brülhart et al., 2022).

The study by Agrawal et al. (2022) examines the effect of a differentiated wealth tax in Spain. The results show a twice as rapid growth of reported wealth among top wealth holders

in zero-tax regions (Madrid) after the reintroduction of wealth taxes. They calculated a high mobility elasticity of 20.169. The elasticity is skewed upwards when including Madrid and using a mean average tax rate. The mobility elasticity is much lower (2.455) when using a weighted average without Madrid (Agrawal et al., 2022, 16). They also calculate a wealth elasticity with respect to net of tax rate. This was calculated at 21.422- 2.294, depending on the model specifications (Agrawal et al., 2022, 50).

3.3 Summary

We see that wealth-elasticity is a key indicator used in previous studies to assess how wealthy individuals respond to changes in the tax rate. We further identify a split in the response to wealth tax depending on tax systems. We note that the upper bounds of the elasticities are in countries such as Switzerland and Spain where the tax rate is different between regions/cantons inside the borders of the state. The higher elasticity in these studies indicate that domestic mobility has an impact on the response among wealth taxpayers to changes in the tax rate.

4. Data

The data is primarily collected through the Norwegian statistics bureau (SSB). In this chapter we will discuss data-selection and coding of variables.

4.1 Data availability & defining sample

The panel data consists of data on Norwegian taxpayers for 01.01.2016-31.12.2021. Since we are dealing with sensitive tax data, the master thesis would not be possible without access through Microdata.no: A web-based analysis program provided by SSB. We had access through a secure interface that protects the anonymity of the persons in the dataset (Statistics Norway[1], n.y).

The dataset includes three years before the tax change in Bø, and all years after the implementation. The reason for including three years in advance is to identify a plausible trend in the data. Our starting dataset consisted of 28,352,425 observations.

We first removed all individuals younger than 18 years, assuming that they move because of decisions their parents make.

4.1.1 Treatment group

We define the treatment group as individuals that pay wealth taxes in Norway. The wealth taxpayers that reside in other municipalities can act on a lower rate in Bø. They have the option of moving to Bø, to pay less taxes.

The total amount of individuals paying wealth taxes in 2021, was 572.240. See graph 6.1 in the chapter on descriptive data, for a complete overview of the number of wealth taxpayers.

4.1.2 Control group

For our control group we define individuals as having high income if they earn more than 600,000 NOK. This threshold was chosen based on the average yearly income in Norway, which is 610,000 NOK (Fløtre & Tuv, 2022). Since the income level is arbitrarily chosen,

we run a robustness test with a higher amount (800,000 NOK) of income and a lower amount of income (400,000 NOK).

We are restricting the sample to people with high income (control group) or paying wealth tax (treatment group). This leaves us with 9,309,528 observations in the full sample for the stated period.

4.1.3 Summarizing statistics for the Target and Control Group.

After defining the Target (TG) and Control (CG6) group that is used in the analysis, we present some summarizing statistics for both samples. In table 4.1 the statistics for the total groups are presented. While Table 4.2 is narrowed down to the parts of the groups living in Bø.

Table 4.1: Summarizing statistics of the Target and Control Group.

Treatment group

	2016	2017	2018	2019	2020	2021*
Wealth (mean)	3 818 511	3 992 248	3 923 221	4 075 912	4 006 759	4 006 759
Income (mean)	591 716	610 901	628 161	644 211	650 214	650 214
Men in %	50,2	50,3	50,1	50,2	50,0	50,0
Age (mean)	68,8	67,7	67,1	66,4	65,5	65,5
Observations	484 746	498 070	511 560	534 320	572 234	572 234

Control group

	2016	2017	2018	2019	2020	2021*
Wealth (mean)	-556 127	-575 910	-645 474	-589 905	-619 624	-619 624
Income (mean)	898 933	900 522	905 606	906 697	909 968	909 968
Men in %	77,1	76,2	75,5	74,5	73,5	73,5
Age (mean)	54,	53,1	52,1	50,9	49,7	49,7
Observations	321 924	339 200	376 570	411 798	443 593	443 593

*: Numbers for 2021 are estimated by using the 2020 wealth and income numbers. Therefore, there is no change in Wealth, income and number of observations.

Table 4.2: Summarizing statistics of the Target and Control Group in Bø.

Treatment group in Bø

	2016	2017	2018	2019	2020	2021**
Wealth (mean)	3 586 894	3 721 927	3 530 230	3 618 167	3 867 616	25 406 301
Income (mean)	441 756	500 680	496 857	500 615	600 028	1 105 416
Men in %	58,8	58,2	57,6	57,1	51,1	53,3
Age (mean)	70.3	69,4	68,6	68,6	67,4	66,8
Observations	154	143	162	165	188	208

Control group in Bø

	2016	2017	2018	2019	2020	2021**
Wealth (mean)	-352 579	-310 196	-290 386	-287 963	-134 988	-151 895
Income (mean)	806 090	824 528	799 246	830 099	852 608	848 453
Men in %	93,4	94,5	92,5	90,3	89,5	89,2
Age (mean)	57,6	56,6	54,3	53,4	53,2	52,9
Observations	71	91	105	121	137	140

**: Numbers for 2021 are estimated by using the 2020 wealth and income numbers. The change from 2020 to 2021 is therefore because of migration.

4.1.4 Defining movers

The person is defined as a mover, in year t, if he or she is registered in a different municipality in the previous year, t - 1. We code so that people moving internally in the municipality are not included in the restricted sample. There were 282,983 observations when only looking at people that moved in the period 2016-2021.

In the Individual analysis, we also restrict the sample to the movers. When only looking at those who pay wealth taxes and move in the period, the dataset consists of 40,223 observations.

4.2 Control Variables

See the appendix 9.1 for an overview of the different control variables selected in Microdata. In short, we have variables on the individual level for education level, age and gender.

On the municipal level, we control for public spending. This control variable accounts for changes in the public supply of services in the municipality. If the public spending increases from one year to another (per inhabitant) we assume that the services provided to the inhabitants of that municipality have increased in quantity or quality, which could make it more attractive to move there.

Age and gender are included in controls that account for the municipality demographics. We also, on the individual level use education level as a control.

On the municipality level, we do not have any variables available in Microdata, so these variables had to be manually coded into the software. We will go through how we coded these variables in the following subchapters.

4.2.1 Public spending

Variable name: spend_per

This variable is gathered from SSB and contains information on how much money each municipality has spent per individual in the municipality (Statistics Norway[3], N.Y.). First, we downloaded the information as an excel file, then we adjusted the file so that it matched the municipality structure of 2020. This means that we had the information for each municipality and year. To get this into microdata we created a variable containing the same information muni_year. Example for oslo in 2016: 930116. The first 4 numbers identify Oslo and the last 2 identify the year. After having done this, we reorganized this information by specifying that (930116 = 77934). this would change the value of the variable from the identifier to the correct value for Oslo, in this example 77934.

4.2.2 Male percent and mean age in the municipality

Name: Agem, contains the mean age in the municipality, calculated from the ones in the dataset. Which is everyone above 17.

Name: Malepct, is a decimal value between 0 and 1 representing the ratio of men in the municipality, calculated from the ones in the dataset.

The variables are calculated in a dataset in the script. But to include it on the individual level we first tabulated the variable in combination with the identifier muni_year. Then copied the muni_year on an individual level and we did the same thing that we did for variable spend_per by recoding it to get accurate data.

4.3 Estimations in the data

4.3.1 Using tax-numbers from 2020 for 2021

The tax change in Bø was implemented 01.01.2021. And at the time of writing this thesis the tax returns for 2021 are not yet accessible. They will be published in the first half of 2023. To have an estimate for the income and tax numbers for different individuals for 2021 we use the numbers from 2020. The assumption is that individuals will have approximately the same income, wealth, and tax in 2021 as they had in 2020.

This assumption is essential for us to examine the research topic. We must make one adjustment when using the 2020 numbers for 2021. The change in wealth tax for Bø in 2021 must be coded so the new amount of actual tax paid is adjusted to the new rate. The adjustment is manually coded using the 2020 tax-numbers.

$$Tax_{21} = \left(\frac{Tax_{20}}{0{,}85}\right) * 0{,}35$$

We divide the wealth tax that people registered in Bø in 2021 paid in 2020 on the rate they paid in 2020 (0,85 percent). We then multiply the tax with the new rate for Bø in 2021 (0,35 percent).

4.3.2 Municipality structure in Norway

In the later years the municipality structure in Norway has changed. A reform in 2020 reduced the number of municipalities. Since a part of the analysis is on an aggregate (municipality) level we need to have a common structure for the whole period of 2016-2021. We use the 2020 structure since this was in place when Bø changed the wealth tax. (Statistics Norway[4], 2020)

We adjusted the structure for the previous years to match this structure. SSB has an overview of the municipality structure for the earlier years (Statistics Norway[5], N.Y.) For 2016 we restructured the data to match the 2017 structure. Then we coded the changes that affected 2016 and 2017, so that the municipality have the structure of 2018. This until the 2020-structure is applied to all the different years.

From the 2019 to 2020 structure, we discovered a set of municipalities not transferred into a new municipality as a complete unit. There were 2 of these cases. In the first one the municipality of Tysfjord was supposed to be split into Narvik and Hamarøy. In the second one the municipality of Snillfjord was supposed to be split and merged with Heim, Hitra and Orkland. We decided upon the solution to group these municipality's together into “9991 Group: Tysfjord, Narvik, Hamarøy” and “9992 Group: Snillfjord, Heim, Hitra, Orkland”.

5. Methodology

The research examines wealth taxation's effect on mobility among wealthy individuals. To achieve this, we first use a difference-in-difference event study on aggregate data for each municipality in the timespan of 2016-2021. Thereby we can estimate the effect that the tax change in Bø has on the mobility post "treatment". We examine the elasticity to measure the responsiveness among wealth taxpayers to the change in Bø.

Further, we add to the results, by constructing a linear probability model (LPM) on the individual level. This model gives an additional perspective on the mobility among wealthy individuals caused by a wealth tax-change in Bø.

5.1 Difference in difference event study

Difference-in-difference has a before-and-after design. The model shows how the dependent variable is changed from the pre-treatment to the post treatment, looking at the same population (Imai 2018, 61). In this thesis, we use the event study DiD-model to conduct a natural experiment on the aggregate level. An important assumption when using this design, is that both the treatment group and the non-treatment group have a similar trend before treatment. This follows the parallel trend assumption (Imai 2018, 62). The event study design can be useful to visually show that two groups have a similar trend before treatment (Cunningham, 2021).

Equation 5.1: Event study of tax-change in Bø.

$$\ln(N_{rt}) = B_r * \left[\sum_{y=-3}^{-2} \theta_y * 1(y = t - 2020) + \sum_{y=1}^{0} \beta_y * 1(y = t - 2020) \right] + \alpha x_{rt} + d_r + s_t + v_{rt}$$

The dependent variable is the total amount of wealth taxpayers in the municipality for a given year (N_{rt}). The _r represents the region while _t is the time (Equation 5.1). We assume there is no meaningful trend difference between Bø and other municipalities before the tax-change. This allows us to use the DiD-design for a natural experiment (Wooldrige, 2012). We expect that the wealth taxpayers are the only group affected by a lower wealth tax.

The event (vote on a lower rate in Bø) happened on 12.12.2019, so we use 2019 as the baseline year. Using 2016-2018 as the pre-period and 2020-2021 as the post-period for when the effect of the tax change in Bø was present (Equation 5.1). Bø (B_r) is a dummy that equals 1, and all else is zero. We log-transform N_{rt} to secure linearity and more easily interpret the results as percentages (Wooldridge, 2012, 37). y is for the years before the change in 2019, and y is the coefficient for the years following the change. The control variables (x_{rt}) are 1) spending per inhabitant in the municipality and 2) the average age of the municipality inhabitants. We further control for unobserved fixed effects on both regions (d_r) and years (S_t).

We change the dependent variable and examine the effect of lower taxes on the 1) amount of wealth, 2) tax paid and 3) number of wealth taxpayers in Bø.

5.1.1 Adding the control group: DiDiD

The perceived increase of wealthy individuals in Bø could be because of external shocks or the general growth of residents. When adding a control group, we are singling out the effect of the tax change on individuals paying wealth taxes in Bø (Cunningham, 2021). The control group are people with high income that do not pay wealth tax. We construct the control group by taking everyone that earns more than 600.000 NOK not paying wealth tax. Adding a control group expands the model, turning it into a DiDiD design: The first difference is Bø and the other municipalities, while the second difference is wealth taxpayers versus high-income earners.

Equation 5.2: DiDiD with control and treatment group.

$$\ln(N_{frt}) = B_r * w_f * \left[\sum_{y=-3}^{-2} \theta_y * 1\,(y = t - 2020) + \sum_{y=1}^{0} \beta_y * 1\,(y = t - 2020)\right] + \alpha x_{rt} + d_r + s_t + v_{frt}$$

We index _f as a dummy variable, indicating 1 for the treated group and 0 for the untreated. The dependent variable (N_{rft}) is thereby the amount of wealthy taxpayers or high-income individuals in a municipality in a given year.

5.1.2 Robustness test

When constructing the model, we had to make a set of assumptions for both the treatment and control groups. We use a robustness test for the regression to test the limits of these assumptions. The test explores different thresholds for which (wealth) taxpayers are included in the treatment group. This allows us to test if the regressions are robust to plausible changes in the assumptions when making causal inferences (Neumayer & Plümper 2017, 109).

First, the tax returns are not available for 2021. We constructed a treatment group for 2021. This assumed that people in the treatment group in 2020 are paying approximately the same wealth taxes in 2021.

To test the robustness of the analysis, we introduce different sample restrictions: The full sample consists of all taxpayers, while TG1 drops 1 % of the taxpayers closest to the tax-threshold. The next sample restrictions are based on quantiles: TG25 are all taxpayers in the top 75 percent, having more than 1,69 million NOK in taxable wealth. The TG50 are wealth taxpayers with more than 2,48 million NOK in taxable wealth.

Second, when adding the control group, we arbitrarily choose the amount 600.000 NOK as the threshold. Therefrom, we run a robustness test on the control group. This test let us check how changing the threshold for high income impact the results. By moderating the different parameters as shown in Table 5.1, we test that the results are robust to changes in the control group (See appendix 9.2). We conclude that the discovered level of uncertainty is appropriate since the results are not heavily changed (Gerring 2011, 319-320).

All the treatment groups are combined with all the control groups, giving 15 different regressions.

Table 5.1: Treatment & control groups in the robustness test.

Treatment groups 1-5	Control groups 1-3
b) base everyone that pays wealth tax.	4) Individuals that do not pay wealth tax but have an income above 400k NOK.
2) but without the lowest 25% based on wealth.	6) Individuals that do not pay wealth tax but have an income above 600k NOK.
5) but without the lowest 50% based on wealth.	8) Individuals that do not pay wealth tax but have an income above 800k NOK.
10) wealth taxpayers with a wealth over 10M NOK.	
50) wealth taxpayers with a wealth over 50M NOK.	

5.1.3 Concentrating on movers in the given period

We conduct the same regression on movers in the period 2016-2021. Movers, include all individuals that are registered in different municipalities in year t compared to t - 1.

The change is more evident in a relatively smaller sample that only records movers that year compared to counting the inhabitants of a municipality. In short: When only looking at the movers the effect of the tax policy is easier to observe due to it being a comparatively smaller and dynamic group.

5.1.4 Methodological Concerns

The issue of zero when using log in the regression is a common obstacle and forces us to either remove the missing data or adjust the data. The first form will remove a large part of the observations while adjusting the data can be argued to be a form of data manipulation. Both approaches create issues when examining the results (Bellégo et al, 2022). We thus include models with and without the adjusted zero-values.

For the regressions where Y = 0 we added a constant of 1. These regressions are now on ln(Y+1). In the regressions where we add the constant if the value is 0, we also add a dummy variable that controls for values that are null. We have coded the ln(Y+1) on both the full sample and on movers, (Results in subchapter 7.2.1 and 7.2.3).

The second way is to proceed without the constant and run the regressions with the missing data. When doing this we must be aware that we are only comparing against the other municipalities that have observations (Results in subchapter 7.2.2 and 7.2.4).

5.2 Elasticity on individual response to taxes

When measuring the elasticity on the individual response to the wealth tax change in Bø, we use the net of tax rate. The net of tax rate is the remaining share of wealth, after the wealth tax rate has been subtracted. The wealth tax is 0,85%, which makes the net of tax rate almost equal to 1. The coefficient can be interpreted as an approximate semi-elasticity corresponding to the percentage change in mobility for 1 percentage point change in the net of tax rate. (Wooldridge, 2012, 40).

Note that the semi-elasticity is measuring percentage points and not a relative 1 % change of the tax. The entire tax is only 0.85 percentage points, so in effect the semi-elasticity would account for more than the tax itself.

Equation 5.3: Elasticity of net of tax rate change on wealth and number of wealth taxpayers.

$$\ln(N_{rt}) = e * \ln(1 - t_{rt}) + \alpha x_{rt} + d_r + s_t + v_{rt}$$

The $\ln(N_{rt})$ is either wealth or the number of wealth taxpayers. The (t_{rt}) is the wealth tax rate for the region for each year, we take the $\ln(1-t_{rt})$ to get the net of tax rate. The (x_{rt}) are the control variables for spending per inhabitant and the average age in the municipality. Finally, we have the control variables for region (d_r) and year (s_t).

5.3 Individual probability linearity model

The LP-model let us examine the individual probability that a person moves to Bø in a given year. We restrict the sample using four different criteria. The LP-model allows us to control for individual-specific effects impacting the probability of a person's choice to move or live in the municipality (Aldrich & Nelson, 1984).

Table 5.2: The four samples of LP-model.

		Non wealth taxpayers	
		yes	no
Non movers	yes	1	3
	no	2	4

The full sample consists of people that pay wealth tax or have an income above 600.000 NOK (Sample 1). The Move-sample are people that change residence between the different years in the timeframe (sample 2). The “wealth taxpayer”-sample are all wealth taxpayers (sample 3). The final sample consists of wealth tax paying movers (sample 4).

For sample 1 and sample 3 the model is:

Equation 5.4: Linear probability model.

$$d_{irt} = WG_i * \left[\sum_{y=-3}^{-2} \theta_y * 1\,(y = t - 2020) + \sum_{y=1}^{0} \beta_y * 1\,(y = t - 2020) \right] + x_i + s_{rt} + v_{irt}$$

The dependent variable d_{irt} is a dummy that is equal to one if the individual at the specified year lives in Bø. WG is a categorical variable that describes in which range of the amount of wealth you have. Group 0 are the high-income earners not paying wealth tax. These high-income earners will be the comparison group in sample 1 and 2, for sample 3 and 4 they are dropped from the dataset. In these samples the comparison group is the least wealthy group remaining, group 1. x_i is individual fixed effects. s_{rt} is the region level control variables such as the average age in the municipality, the gender distribution, and the amount of public spending per inhabitant.

For sample 2 and sample 4 we have a municipality of origin and included some additional control variables.

Equation 5.5: Linear probability model on movers.

$$d_{irt} = WG_i * \left[\sum_{y=-2}^{-2} \theta_y * 1\,(y = t - 2020) + \sum_{1}^{0} \beta_y * 1\,(y = t - 2020) \right] + x_i + s_{rt} + o_{r(t-1)} + f_{r(5)} + v_{irt}$$

The dependent variable (d_{irt}) in the movers' samples is one if the individual i, in year t moves to Bø. We are looking at sample 2 and 4 (movers), controlling for the municipality of origin ($O_{r(t-1)}$). We include a dummy that is 1 if the origin is from one of the 5 biggest cities (f_{rt}). These cities have been picked by using the definition from Statistics Norway (Statistics Norway$_6$, 2021). This was to control for the fact that most people live and move to and from these urban areas. We also include a dummy that is 1 if the origin is from the neighboring AB-region of Sortland (A_{rt}). Using this as a control was to control for the short distance between the municipalities, enabling a potential bias in the likelihood that a person moved to Bø, simply cause he or she already work and live in the region.

5.3.1 Concerns of estimations

Due to anonymity-concerns, statistical programming options afforded to researchers through Microdata are severely limited in scope. The models had to balance complexity with access to panel data from Microdata.no. For instance, the LP-model is not the optimal fit. We are using it due to the constraints in Microdata.

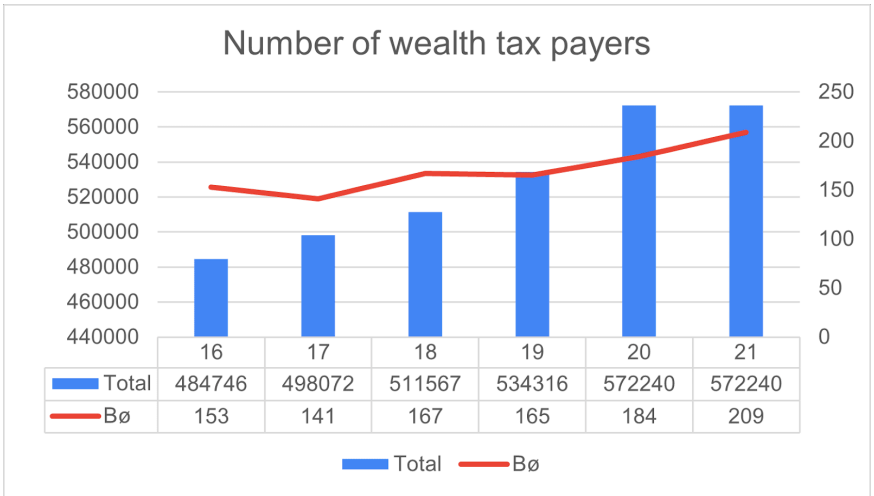
Wooldridge describes that heteroscedasticity is a problem when using a linear probability model (Wooldridge, 2012, 205). We ran a Studentized Breusch-Pagan test in Microdata and found that we had to correct for the heteroscedasticity in our model. We correct using the "robust" option in Microdata.

6. Descriptive statistics

In this part we present descriptive statistics about the wealth tax change in Bø. Based on the theoretical and institutional setting, we searched for initial evidence that could indicate if there might be an effect after the policy announcement in 2019.

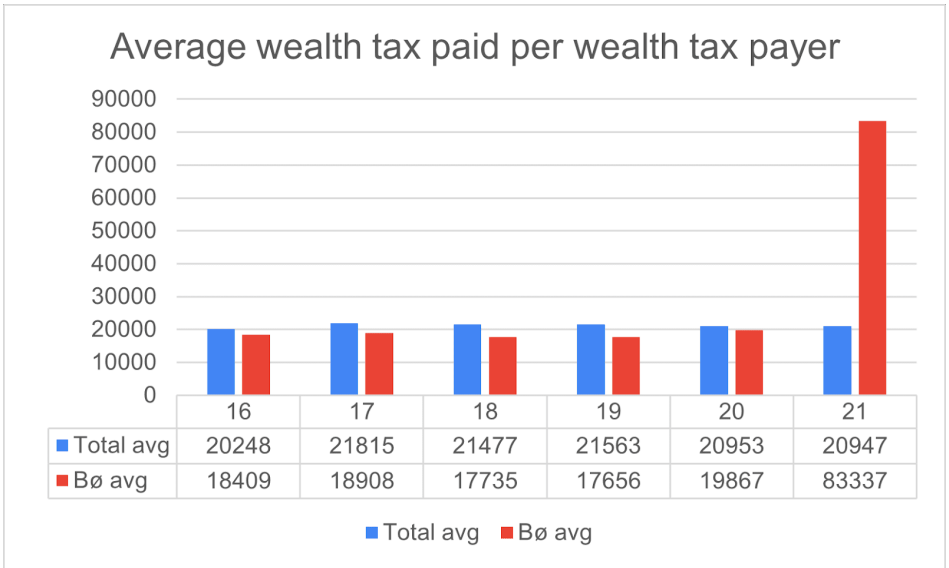
The descriptive statistics are imported from Microdata.com. The data shows a slight increase of wealth-taxpayers in Bø during the last couple years. Still, there does not seem to be a major accumulation of individuals. The number of wealth taxpayers seems to have gradually climbed from 153 in 2016, to 209 in 2021. The number of taxpayers seems to follow a slight trend in the total amount of wealth taxpayers in Norway.

Graph 6.1: Number of Wealth taxpayers.



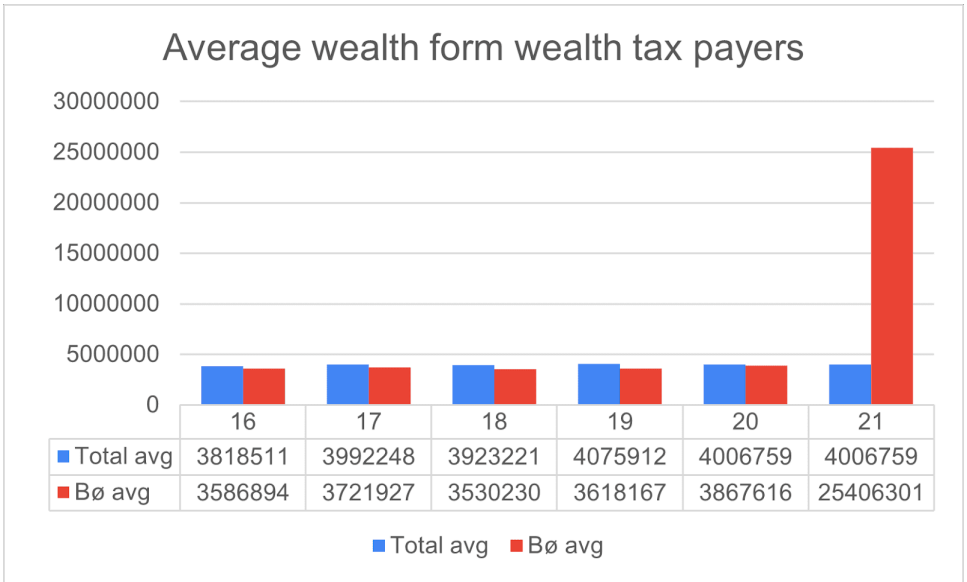
We then check if the average amount of wealth tax paid per taxpayer had changed in Bø after 2019. One can see a spike, from 19.867 NOK in 2020 to 83.337 NOK in 2021. This is a break with previous years, where the tax paid has been on an interval between 18.000 NOK and 22.000 NOK.

Graph 6.2: Average wealth tax paid per wealth taxpayer.



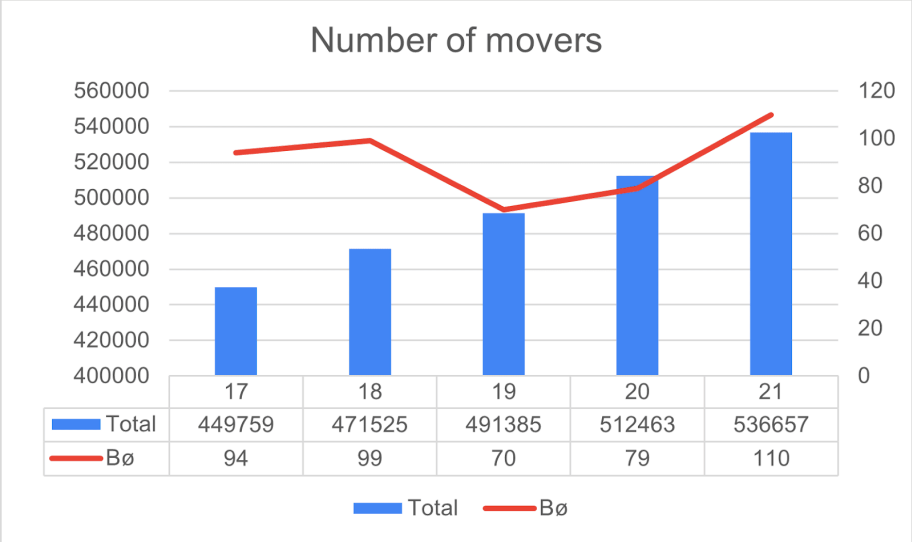
Since we must estimate the tax paid in Bø for 2021, we decided to examine the underlying wealth among the individuals in the municipality for the period. Naturally the increased wealth tax paid is reflected in the acreage wealth among the wealth taxpayers, as we can see in graph 6.3. The average wealth among the wealth taxpayers rises from 3,8 million Norwegian kroner to 25,4 million Norwegian kroner in 2021. We don't see a change in 2020, even if the council decided on the 12th of December 2019 to implement a lower rate.

Graph 6.3: Average wealth from wealth taxpayers.



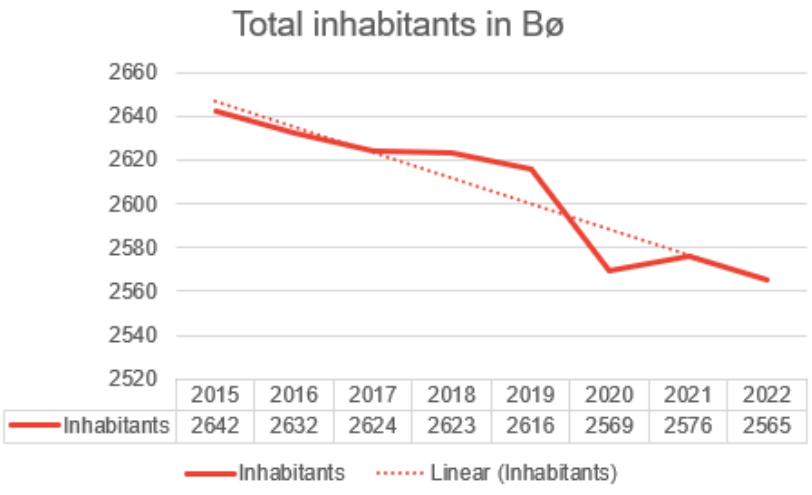
The total numbers of movers to Bø does not reflect a spike in the amount of people that live in the municipality in the previous years, both before and after the tax-rate change. In fact, the number of inhabitants in Bø has declined in the last couple years, as shown in 6.5. We see a steady growth in the number of people that have moved to Bø at the same time, shown in graph 6.4.

Graph 6.4: Number of movers.



The amount of people that live in Bø has experienced a slow decline from 2616 inhabitants in 2019 to 2565 inhabitants in 2022. The graph indicates that the large growth of wealth in Bø is not due to a large influx of people to the region.

Graph 6.5: Number of inhabitants in Bø.



6.1 Summary

The descriptive statistics highlight that something has happened in Bø. This makes it interesting to analyze the actual effect the reduction of wealth tax has on the mobility of wealthy individuals, moving to Bø. And examine closer, the differences among the wealthy that decide to move to the northern parts of Norway due to lower taxes.

7. Results

In this part we present and discuss the results. The chapter opens with the aggregate analysis, estimating if the tax change in Bø has an impact on the amount of wealth, wealth taxpayers and the amount of wealth tax income. Further, we add the high-income earners as a control group, and finally, run the regression on only movers. To examine the response among wealthy individuals, we also conduct a semi-elastic estimation. We conclude the chapter by presenting the individual probability effect on moving to Bø, due to a lower tax rate, compared to other municipalities.

7.1 aggregate analysis

The DiD-study on the aggregate level is an estimation indicating the response by wealthy taxpayers in Bø after the tax-rate change. As shown in equation 5.1, we control for time trends and differences between Bø and other municipalities in Norway. There are 353 municipalities in our dataset, for the period of 2016-2021.

To test the robustness of the analysis, we introduce different sample restrictions: The full sample consists of all taxpayers followed by the different sample restrictions.

7.1.1 Amount of wealth taxpayers in Bø.

The event study shows a general non-significant change in the amount of wealth taxpayers in Bø in the period 2016-2019, indicating that the assumption of a parallel trend between Bø and all other municipalities in the pre-treatment period holds (Graph 7.1).

After the implementation of a lower tax at the end of 2019, there is an increase in the number of wealth taxpayers in Bø compared to all other municipalities in 2021. The delayed effect is probably since one must move municipality-residence before the first of January for the change to be registered. Therefore, people moving in 2020 would show up in the 2021 tax numbers. The results are in line with the decision that the council in Bø made on the twelfth of December 2019. The event study plot is shown in graph 7.1.

Table 7.1: Results amount of Wealth taxpayers in BØ, 2016-2021.

	TG	TG1	TG25	TG50
16	-0,061	-0,044	0,060	-0,044
	(0,065)	(0,065)	(0,075)	(0,099)
17	-0,082	-0,045	0,001	-0,081
	(0,065)	(0,065)	(0,075)	(0,099)
18	0,005	0,004	0,029	-0,112
	(0,065)	(0,065)	(0,075)	(0,099)
19				
20	0,032	0,043	0,074	-0,035
	(0,065)	(0,065)	(0,075)	(0,099)
21	0,136**	0,118*	0,179**	0,133-
	(0,065)	(0,065)	(0,075)	(0,099)
Controls	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0,998	0,998	0,998	0,997
Adj R^2	0,998	0,998	0,998	0,997
Obs	2118	2118	2118	2118

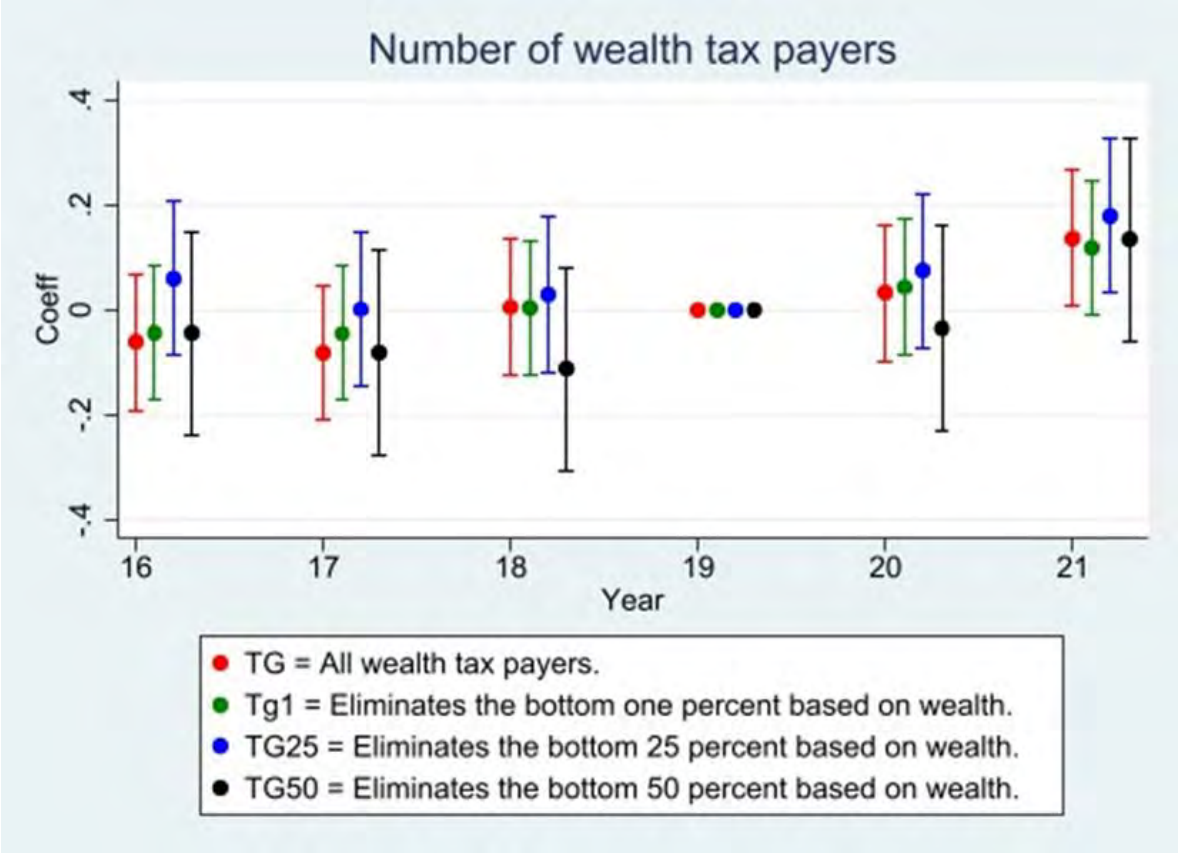
Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

TG = All wealth taxpayers.
TG1 = Same as Tg but eliminates the bottom one percent based on wealth.
TG25 = Same as Tg but eliminates the bottom 25 percent based on wealth.
TG50 = Same as Tg but eliminates the bottom 50 percent based on wealth.

The results are statistically significant for the full sample (P-value < 0.05) in the year 2021. The different sample restrictions all indicate that the amount of people paying wealth tax to Bø increased compared to pre-treatment. However, the robustness test reveals that when excluding the lower 50 % of the full sample, the increase in 2021 is no longer significant (see TG50, table 6.1). This is due to larger standard errors (0,099) compared to (0,065) for the full sample. The errors can be explained by a larger spread around the average amount of wealthy individuals living in the different municipalities. A reason for this might be that most of the upper bracket of people with wealth are more concentrated in certain

municipalities compared to the full sample. For example, half of the 500 richest people in Norway live in or close to Oslo (Kalajdzic, 2020).

Graph 7.1: Amount of Wealth taxpayers in Bø, 2016-2021.



7.1.2 Amount of wealth in Bø compared to other municipalities.

Examining the total amount of wealth in Bø after the tax change shows us a statistically significant increase in the year 2021. Looking at both table 7.1 and table 7.2, it seems that the wealthy individuals moving to the municipality are bringing with them a larger amount of wealth than before the policy change. For example, in year 21 for the TG, we can note a 159,1 % increase in the amount of wealth in Bø compared to other municipalities.

Table 7.2: Results amount of Wealth in Bø, 2016-2021.

	TG	TG1	TG25	TG50
16	-0,247*	-0,233*	-0,140	-0,243-
	(0,127)	(0,127)	(0,134)	(0,161)
17	0,024	0,060	0,058	0,019
	(0,127)	(0,127)	(0,134)	(0,161)
18	0,017	0,020	0,042	-0,049
	(0,127)	(0,127)	(0,134)	(0,161)
19				
20	0,064	0,075	0,116	0,032
	(0,127)	(0,127)	(0,134)	(0,161)
21	1,591***	1,573***	1,657***	1,630***
	(0,127)	(0,127)	(0,134)	(0,161)
Controls	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0,996	0,996	0,996	0,994
Adj R^2	0,995	0,995	0,995	0,993
Obs	2118	2118	2118	2118

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

TG = All wealth taxpayers.

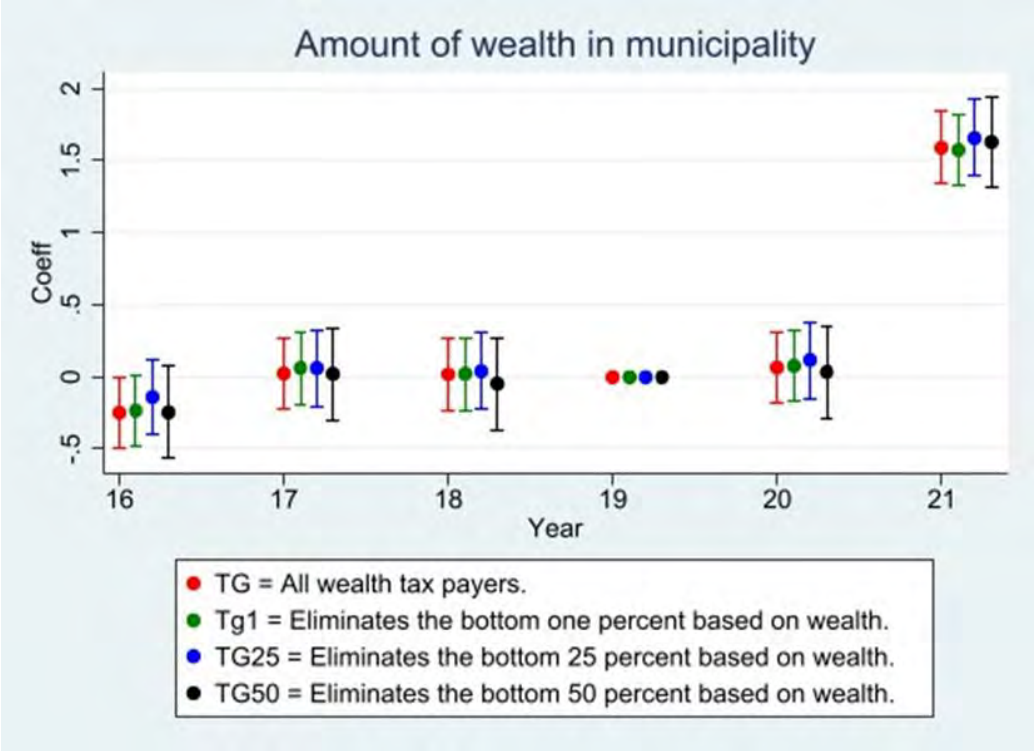
TG1 = Same as Tg but eliminates the bottom one percent based on wealth.

TG25 = Same as Tg but eliminates the bottom 25 percent based on wealth.

TG50 = Same as Tg but eliminates the bottom 50 percent based on wealth.

From the regression, we can see that there is a statistically significant positive coefficient for all the configurations at the 1% level. The effect is illustrated in the event study plots clearly in graph 7.2. There is a clear increase in the coefficient from a previous visually horizontal trend.

Graph 7.2: Amount of Wealth in Bø, 2016-2021.



7.1.3 Amount of wealth tax paid to Bø

We finally compared the amount of wealth tax paid to the municipality of Bø in the different years, compared with the other 355 municipalities in Norway. The groups shown in table 7.3 are the same as in the two previous analyses. We note a 90 % increase in revenue for the full sample, even with the reduced wealth tax in 2021. This was something we elaborated on in subchapter 2.2.2, that the actual revenue in Bø had gone up, but a large portion of the increase had to be paid due to the equalization calculation.

Table 7.3: Results amount of Wealth tax paid in BØ, 2016-2021.

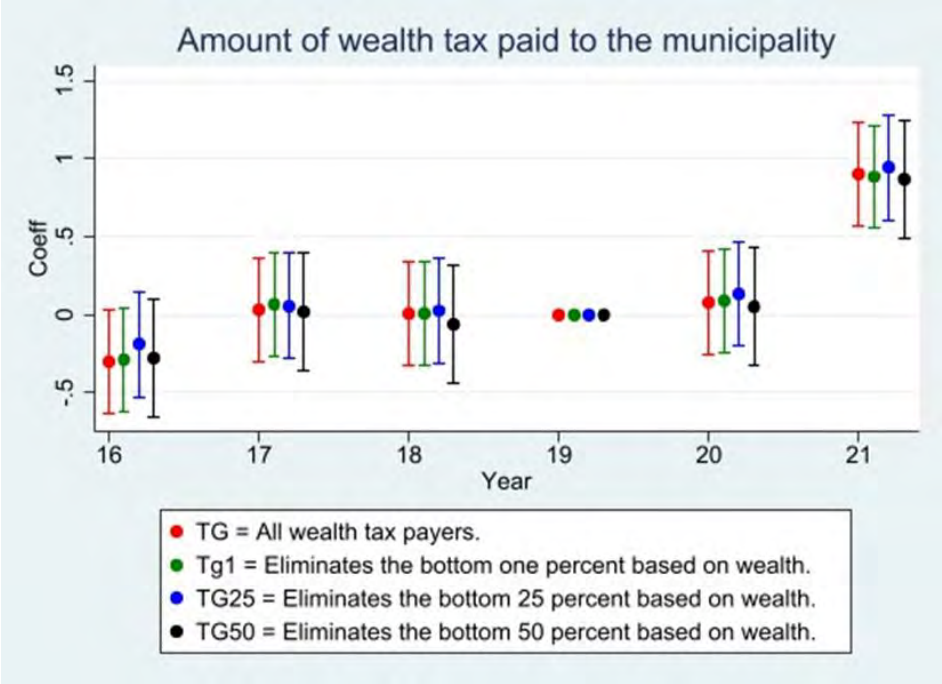
	TG	TG1	TG25	TG50
16	-0,301*	-0,287*	-0,188	-0,277-
	(0,168)	(0,168)	(0,171)	(0,192)
17	0,032	0,068	0,054	0,016
	(0,168)	(0,168)	(0,171)	(0,192)
18	0,005	0,007	0,024	-0,062
	(0,168)	(0,168)	(0,171)	(0,192)
19				
20	0,079	0,091	0,132	0,048
	(0,168)	(0,168)	(0,171)	(0,192)
21	0,902***	0,883***	0,943***	0,870***
	(0,168)	(0,168)	(0,171)	(0,192)
Controls	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0,994	0,994	0,994	0,993
Adj R^2	0,993	0,993	0,993	0,991
Obs	2118	2118	2118	2118

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

TG = All wealth taxpayers.
TG1 = Same as Tg but eliminates the bottom one percent based on wealth.
TG25 = Same as Tg but eliminates the bottom 25 percent based on wealth.
TG50 = Same as Tg but eliminates the bottom 50 percent based on wealth.

From the regression, we can see that there is a positive coefficient, all significant at the 1% level, for all sample restrictions in the year 2021. The results are illustrated in graph 7.3.

Graph 7.3: Amount of Wealth tax paid in BØ, 2016-2021.



7.2 Introducing control groups

In this part, we introduce the control group (people with a minimum income of 600.000 NOK). The aggregate model is then constructed among people living in the different municipalities (full sample), and then only people that move in the given period (Movers). The complete results from all combinations can be found in the appendix (9.2).

7.2.1 Full sample

We run regressions with all combinations of the treatment and control groups. The dependent variable is either converted from ln(Y) to ln(Y+1) due to the issue of log of zero (see subchapter 5.1.4).

Table 7.4: Results event-study of people in Bø.

	b6	26	56	106	506
16	0,128	0,249	0,141	0,825-	0,167
	(0,357)	(0,363)	(0,374)	(0,536)	(1,014)
17	-0,017	0,064	-0,019	-0,065	-0,013
	(0,357)	(0,363)	(0,374)	(0,538)	(1,014)
18	0,009	0,033	-0,111	-0,106	-0,081
	(0,357)	(0,363)	(0,374)	(0,538)	(1,014)
19					
20	0,059	0,101	-0,010	0,425	-0,014
	(0,357)	(0,363)	(0,374)	(0,536)	(1,014)
21	0,107	0,150	0,099	1,416***	1,253
	(0,357)	(0,363)	(0,374)	(0,536)	(1,014)
Controls	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0,985	0,984	0,984	0,984	0,968
Adj R^2	0,984	0,983	0,982	0,982	0,965
Obs	4236	4236	4236	4236	4236

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

b6: everyone

26: excluding the lowest 25%

56: excluding the lowest 50% wealth taxpayers

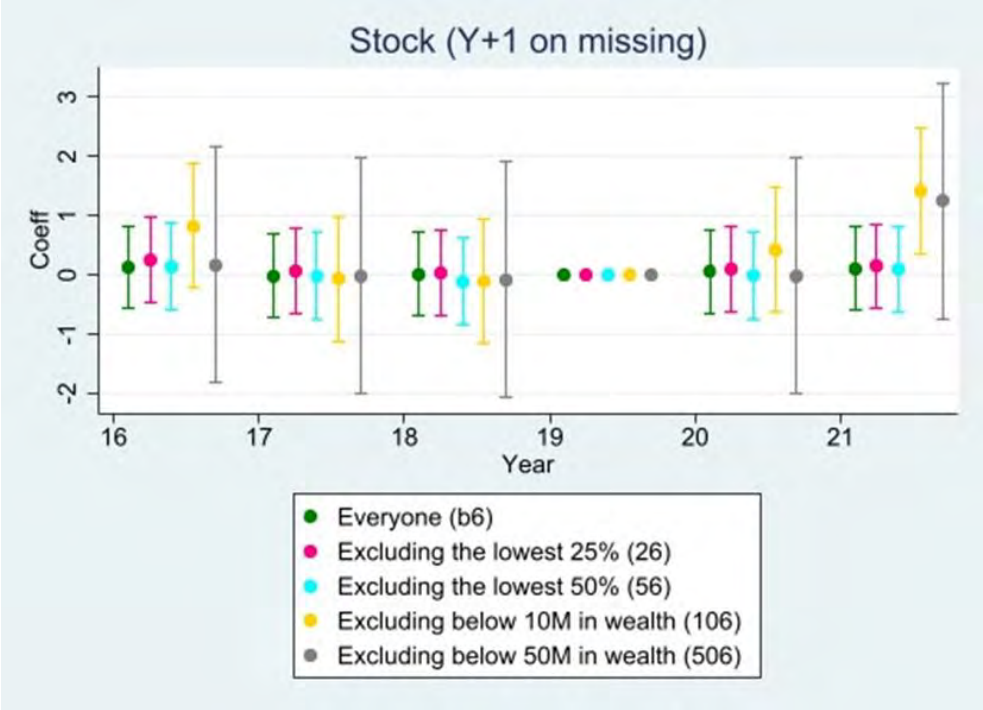
106: excluding below 10M in wealth

506: excluding below 50M in wealth

For most of the groups the coefficient is close to 0 and the P-value is high. However, the groups, excluding individuals with taxable wealth below 10 million NOK and 50 million NOK, have a positive coefficient with a lower P-value. The results indicate that the stock of people in Bø has changed in these wealth groups with 142% and 125%. This result seems to collaborate with the previous insight that there has been a large influx of wealth into Bø, while the number of wealthy individuals moving to BØ has slightly increased. In this sense,

we note that the composition among the wealthy moving to Bø has transformed such that it is wealthy individuals with wealth over a certain amount (10 million).

Graph 7.4: Event-study of people in Bø.



7.2.2 Full sample excluding missing

After doing the regression where we add a constant to the 0 values, we also run the regression without adding the constant. In this configuration we will have fewer observations since Y = 0 will go missing than doing ln(0). That means that in this regression we do not compare Bø to all other municipalities, but the municipalities that have observations that year.

Table 7.5: Results event-study of people in Bø excluding missing.

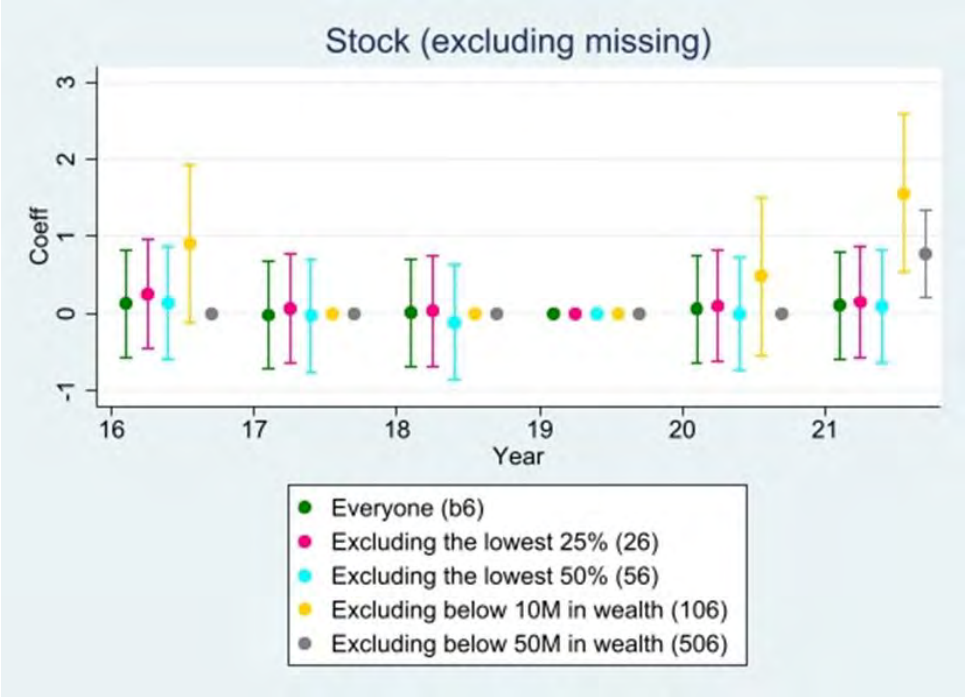
	b6	26	56	106	506
16	0,128	0,249	0,141	0,905*	0
	(0,357)	(0,363)	(0,374)	(0,522)	(0)
17	-0,017	0,064	-0,019	0***	0
	(0,357)	(0,363)	(0,374)	(0)	(0)
18	0,009	0,033	-0,111	0***	0
	(0,357)	(0,363)	(0,374)	(0)	(0)
19					
20	0,059	0,101	-0,010	0,485	0***
	(0,357)	(0,363)	(0,374)	(0,522)	(0)
21	0,107	0,150	0,099	1,554***	0,779***
	(0,357)	(0,363)	(0,374)	(0,522)	(0,287)
Controls	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0,985	0,984	0,984	0,981	0,964
Adj R^2	0,984	0,983	0,982	0,979	0,959
Obs	4236	4236	4236	3985	2998

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

b6: everyone
26: excluding the lowest 25%
56: excluding the lowest 50% wealth taxpayers
106: excluding below 10M in wealth
506: excluding below 50M in wealth

The results for the analysis where we do not add a constant seems to be in line with the previous analysis. Here we also see a positive increase for the wealthiest groups in 2021 for Bø.

Graph 7.5: Event-study of people in Bø excluding missing.



In graph 7.5 we illustrate the effect from the analysis on the stock without the missing values. We have statistically significant values on the 1% level in the two wealthiest groups the accept in these groups are 155% and 78% compared to the other municipalities that had observations in these groups.

7.2.3 Mover sample

We do the same analysis on the movers. This means that you are only included in the aggregate numbers if you move to that municipality the given year. The stock of people is a larger number and is harder to affect, since the movers are only registered the year when they move. The composition of the mover-sample is hence more likely to show an eventual effect. A potential problem with the mover-sample is missing values, which we will write more about later. The regressions of the complete stock and the movers must be viewed in combination for the thesis.

Table 7.6: Results event-study of movers in Bø.

	b6	26	56	106	506
17	-0,627	-0,253	-0,113	-0,034	-0,241
	(0,771)	(0,759)	(0,772)	(0,918)	(0,934)
18	-0,339	-0,029	-0,016	0,050	0,156
	(0,769)	(0,759)	(0,773)	(0,918)	(0,933)
19					
20	0,676	-0,111	0,330	0,419	0,526
	(0,769)	(0,758)	(0,773)	(0,918)	(0,933)
21	1,040-	0,806	0,978	0,898	0,166
	(0,769)	(0,758)	(0,772)	(0,919)	(0,934)
Controls	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0,932	0,932	0,928	0,890	0,884
Adj R^2	0,925	0,926	0,921	0,879	0,873
Obs	4236	4236	4236	4236	4236

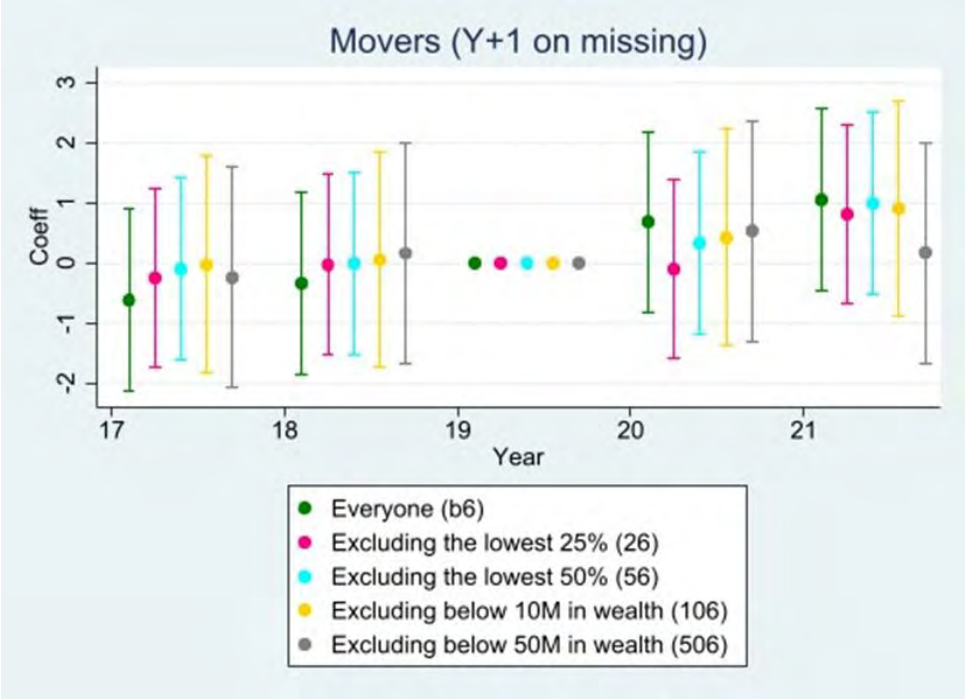
Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

b6: everyone
26: excluding the lowest 25%
56: excluding the lowest 50% wealth taxpayers
106: excluding below 10M in wealth
506: excluding below 50M in wealth

When only looking at the movers we will get a snapshot for each year. From the results, we do not see any statistically significant effect of the tax change in the years after the change. In this sample, a lot of the municipalities have 0 values in the wealthier groups. Consequently, the distribution after we add a constant will be concentrated around Y + 1 = 0 + 1 = 1. The number of observations for the analysis without the constant is specified in table 7.7. This implies that in the regression for each group here there is an amount of

artificial 1 value = 4236 - “number of observations in table 7.7”. This means that in the last sample in table 7.6 there are 2868 values of 1 which should be 0.

Graph 7.6: Event-study of movers in Bø.



7.2.4 Mover sample excluding missing

We did also run the analysis for the movers without adding the constant. The results from that analysis is presented here. In the case of the movers analysis, we prefer the one without the added constant since it will compare the actual compositions between the municipalities with observations. Since there are relatively few movers which generate a lot of zero observation, that means missing values (especially in the highest wealth groups).

Table 7.7: Results event-study of movers in Bø (excluding missing).

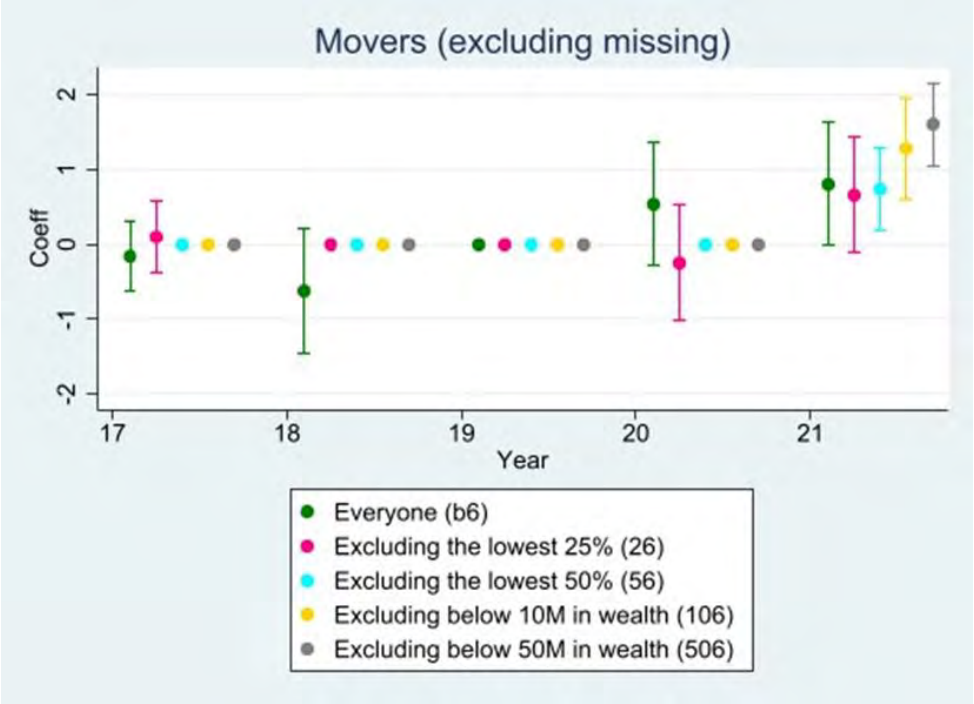
	b6	26	56	106	506
17	-0,161	0,099	0***	0*	0***
	(0,239)	(0,239)	(0)	(0)	(0)
18	-0,623-	0***	0***	0***	0
	(0,419)	(0)	(0)	(0)	(0)
19					
20	0,538-	-0,244	0***	0***	0***
	(0,419)	(0,394)	(0)	(0)	(0)
21	0,801*	0,659*	0,735***	1,276***	1,596***
	(0,419)	(0,394)	(0,279)	(0,344)	(0,283)
Controls	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0,916	0,912	0,892	0,866	0,922
Adj R^2	0,903	0,897	0,873	0,828	0,895
Obs	2648	2522	2310	1604	1368

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

b6: everyone
26: excluding the lowest 25%
56: excluding the lowest 50% wealth taxpayers
106: excluding below 10M in wealth
506: excluding below 50M in wealth

In the regression output shown in table 7.7, there is a positive significant effect among the wealthiest groups compared to the control. For example, there is an increase of 159,6 % among individuals with wealth above 50 million moving to Bø in the year 2021, compared to other municipalities.

Graph 7.7: Event-study of movers in Bø (excluding missing).



7.3 Elasticity

In this paper we have examined the elastic response in terms of the percentage change of wealth and numbers of taxpayers in Bø (Table 7.8). The semi-elasticity measures the response to a 1 percentage change of the net-of-wealth tax rate. This represents how much the taxpayer has after paying tax. In effect, a one percent increase in the net-of-tax rate can be viewed as lowering the tax rate by 1 percentage point (This is twice as much as the actual change of 0.5 p.p in Bø).

We have calculated a relatively powerful response to the net-of-tax rate on the amount of wealth in Bø. The semi-elasticity is 174,76. Further, we have calculated that a change of 1 p.p increases the number of wealth taxpayers by 16.26.

We suspect that the elasticities are biased upwards. The suspicion is based on results in previous studies and methodological concerns when conducting this study.

The values are clear outliers, outside the general higher bounds in previous studies. For instance, the wealth elasticities in some of the main previous studies range from 0.3 to 43.2 (Advani & Tarrant, 2021, 513). Noting that the reason for this outlier might be the DiD-design itself, which has been shown to produce higher semi-elasticities than methods such as bunching estimates, used in the lower bounds estimations of elasticity (Bjørneby, 2022, Advani & Tarrant, 2021).

Part of the results might also be explained by specific characteristics of the tax change. Bø is the first and only municipality in Norway to lower wealth taxes compared to the national level. For instance, in the lower bound elasticities of wealth-response presented in studies by Jakobsen et al. 2020, the change is made at the national level. The elasticity is not influenced by internal mobility. We examined the study by Brülhart et al. 2022 which presents the upper bound of wealth-elasticities. We see a similar result as our study, in the DiD-study of the tax-rate difference between Lucerne and Bern. The cumulative wealth difference in the response to wealth tax rate is 33.7 %, calculating a wealth elasticity of 187 (Brülhart et al. 2022,130). However, the paper did not focus on the results since the number varied when using different approaches.

It would be interesting to examine how much of the wealth-elasticity is due to wealthy individuals moving to BØ from other parts of Norway. Further, how adjusting for these results makes the elasticity comparable to other studies. This is something that should be studied further, but it is outside the scope of the master thesis.

The number of wealth taxpayers moving to Bø after tax change produce a mobility elasticity of 16.26. Previous studies on elastic responses to tax changes, highlight several plausible explanations for the high elasticity (Martinez, 2022 & Agrawal et al., 2022). For instance, the tax-change i Bø gives the wealthy an opportunity to express an opinion about the tax by moving: Changing address to Bø after the tax change is a statement. Further, the change becomes large when compared to the small starting base. As shown in Graph 6.3 the average wealth for a wealth taxpayer in Bø increased from 3.6 million to 25 million between 2019 and 2021.

Further, the results are similar to the internal mobility elasticity in Spain when including Madrid as a comparison region (13.178-20.169). Agrawal et al. explain the reason for the different results that wealthy individuals are more responsive to tax rate changes, something that pushes the elastic mobility upwards (Agrawal et al. 2022).

In total the elasticities must be seen in context of this specific case. The magnitude is not necessarily representative to predict changes if other municipalities, countries, or units that are considering a wealth tax change. What we are taking from this is that there are clear signs of an effect, which is in the upwards bounds compared to previous studies.

Table 7.8: Results elasticity.

	Amount wealth	Number of wealth taxpayers
ln(1-t)	174,76	16.26
SE	16,14	1,63
p value	0,00	0,00
Number of obs	2118	4236

7.4 Individual analysis

On the Individual level, we are examining the probability that a person either lives in BØ (full-sample) or has moved to the municipality in a given year (Mover-sample). The regressions have been organized based on the samples presented in subchapter 5.3. For each sample, we interact the year with the different levels of wealth to get the change in probability of an individual living (Full sample) or moving to (Movers sample) Bø. The criteria are as follow:

0) Not paying wealth tax
1) Bottom 25 % of wealth taxpayers
2) between 25% -50%
3) Between 50%-75%
4) Top 75 % excluding those included in group 5 and 6.
5) people with wealth over 10 million NOK, below 50 million NOK
6) people with above 50 million NOK in Wealth

Information about the sample interactions are summarized in appendix 9.3.

7.4.1 Full sample

The LP-model in table 7.9 for the full sample, shows that the coefficient is marginally low, to the extent of practically 0 %. This is in line with the descriptive data presented in graph 6.1, showing that there was a small increase of wealth taxpayers after the reform. Bø is a small municipality that had 184 wealth taxpayers in 2020 and 209 in 2021. This of a total 572.000 wealth taxpayers in Norway in 2021. The small number makes the relative changes in likelihood of a person paying wealth tax and living in BØ, generally low.

Noting that there is a 0,3 % increase in the chance that a person with above 50 million NOK in wealth, lives in BØ in 2021. This change is clearer when looking at the mover-sample in table 7.10.

Table 7.9: LP-model on full sample.

	1	2	3	4	5	6
17	0***	0 ***	0**	0*	0***	0-
	(0)	(0)	(0)	(0)	(0)	(0)
18	0***	0-	0*	0	0***	0-
	(0)	(0)	(0)	(0)	(0)	(0)
19						
20	0	0	0	0	0**	0***
	(0)	(0)	(0)	(0)	(0)	(0)
21	0	0	0	0-	0***	0,003***
	(0)	(0)	(0)	(0)	(0)	(0,001)
Region controls	Yes					
Individual FE	Yes					
Origin controls	No					
Obs	5494239					

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

1: Bottom 25 % of wealth taxpayers

2: between 25% -50%

3: Between 50%-75%

4: Top 75 % excluding those included in group 5 and 6.

5: people with wealth over 10 million NOK, below 50 million NOK

6: people with above 50 million NOK in Wealth

7.4.2 Movers

The second sample is restricted to people that changed their residence in the given time period. The movers sample shows coefficients lower than 1% for all the groups except the wealthiest group (group 6) for 2021. Here we see a statistically significant (p-value < 0.05) increase of 22,5% in the likelihood that a person moving in 2021, with wealth above 50 million NOK, moved to Bø.

Table 7.10: LP-model on movers.

	1	2	3	4	5	6
17	0,001	0	0,001	0	0,001	0,040
	(0,002)	(0,001)	(0,003)	(0,002)	(0,001)	(0,037)
18	0	0,001	0,004**	0,002-	0,002-	0,043
	(0,001)	(0,001)	(0,002)	(0,001)	(0,002)	(0,047)
19						
20	0	0,001	0,001	0,001	-0,004	0,078-
	(0,003)	(0,002)	(0,001)	(0,001)	(0,004)	(0,058)
21	0	0	0,001	0,002-	0,004	0,225**
	(0,002)	(0,001)	(0,001)	(0,001)	(0,005)	(0,091)
Region controls	Yes					
Individual FE	Yes					
Origin controls	Yes					
Obs	99140					

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

1: Bottom 25 % of wealth taxpayers

2: between 25% -50%

3: Between 50%-75%

4: Top 75 % excluding those included in group 5 and 6.

5: people with wealth over 10 million NOK, below 50 million NOK

6: people with above 50 million NOK in Wealth

7.4.3 Wealth taxpayer

The third sample restriction eliminates everyone that does not pay a wealth tax. We can see that there is no difference in the likelihood compared to the full sample. There is still a small significant coefficient for the wealthiest group in 2021.

Table 7.11: LP-model on wealth taxpayers.

	2	3	4	5	6
17	0*	0***	0**	0***	0**
	(0)	(0)	(0)	(0)	(0)
18	0	0*	0***	0	0**
	(0)	(0)	(0)	(0)	(0)
19					
20	0	0	0	0-	0***
	(0)	(0)	(0)	(0)	(0)
21	0	0	0-	0***	0,003***
	(0)	(0)	(0)	(0)	(0,001)
Region controls	Yes				
Individual FE	Yes				
Origin controls	No				
Obs	3170116				

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

1: Bottom 25 % of wealth taxpayers
2: between 25% -50%
3: Between 50%-75%
4: Top 75 % excluding those included in group 5 and 6.
5: people with wealth over 10 million NOK, below 50 million NOK
6: people with above 50 million NOK in Wealth

7.4.4 Wealth tax paying movers

When restricting to movers that pay wealth tax, we get coefficients lower than 1% for all the groups except the wealthiest group (group 6) for 2021. Here we see a significant probability increase of 22,2% for group 6.

Table 7.12: LP-model on wealth tax paying movers.

	2	3	4	5	6
17	-0,002	0	-0,002	-0,002	0,035
	(0,002)	(0,003)	(0,003)	(0,003)	(0,036)
18	-0,001	0,003	0	0,001	0,04
	(0,002)	(0,003)	(0,002)	(0,003)	(0,048)
19					
20	0,001	0,002	0,002	-0,002	0,082-
	(0,003)	(0,003)	(0,003)	(0,005)	(0,057)
21	-0,002	-0,001	0,001	0,004	0,222**
	(0,003)	(0,003)	(0,003)	(0,005)	(0,089)
Region controls	Yes				
Individual FE	Yes				
Origin controls	Yes				
Obs	40590				

Standard errors are reported in parentheses. -,*, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

1: Bottom 25 % of wealth taxpayers
2: between 25% -50%
3: Between 50%-75%
4: Top 75 % excluding those included in group 5 and 6.
5: people with wealth over 10 million NOK, below 50 million NOK
6: people with above 50 million NOK in Wealth

8. Conclusion

There have been relatively few empirical studies examining the effect of tax-rates on mobility among wealthy individuals. The aim of this thesis is to contribute to that empirical literature by examining the tax change in Bø. We have analysed the effect of a lower wealth tax, on both an aggregate and individual level. The data was made available in Microdata, allowing for access while preserving the anonymity of the observed population.

8.1 Key findings

The municipality of Bø tried to attract wealthy taxpayers by a lower wealth tax rate. The validity of such a policy can be debated both in terms of fairness and economic impact. Our study indicates that the taxpayers are responsive to a lower wealth tax-rate, when examining the short-term response.

We find, using the event study design, that the municipality has experienced an increase in the amount of taxpayers (graph 7.1), amount of wealth tax (graph 7.2) and the amount of wealth (graph 7.3) due to the lower wealth tax. The positive response by wealth taxpayers substantiates previous studies, by Brülhart et al. 2022 in Switzerland, and Agrawal et al. 2022 in Spain. Though, the high elasticities indicate that our results are biased upwards. Certainly, the results are closely intertwined with the particular case of the tax change in Bø (as discussed in subchapter 7.3). Even if the magnitude can be due to specific characteristics of this tax change, the results point towards that wealth taxpayers are moving north due to the tax rate change in Bø.

When running a DiDiD event study, there is no significant difference between the lower brackets of wealthy taxpayers and people with high income in our control group. The effect seems to be stronger on the mobility of wealth taxpayers with wealth above 10 million NOK.

The observation that more wealth equals more responsiveness to a tax change, is replicated in the individual analysis. The individual LP-model (table 6.11) shows that if you had above 50 million NOK in wealth and moved in 2021, there was an increased likelihood of moving to BØ by 22,5 %. This compared to non-visible changes for the entire timeframe before the policy change. When only looking at the sample restricted to movers: There is a higher probability among individuals with more than 10 million NOK and among individuals with more than 50 million NOK.

This means that the decrease does not affect all wealthy taxpayers, but individuals with a substantial amount of wealth, 10 million NOK or more. These results are in line with economic theoretical models presented in chapter 2.1. A person with 10 million NOK in taxable wealth, would in simplistic terms with a tax rate of 0,85% save 50,000 NOK a year by moving to Bø. The saved taxes might not cover the potential alternative costs of leaving family and friends in the area that the person lived before, plus plausible additional costs due to moving. Though, the more wealth, the more a person earn by moving north. If you are a person with a taxable wealth of 50 million NOK, you could save 250,000 NOK.

In conclusion, we see a small increase in wealthy individuals, but a large increase in wealth. The event study indicated that people in the upper part of the wealth-distribution are more mobile due to wealth taxes, and internal mobility impacts the elasticity.

8.2 limitations

There are some concerns and issues when conducting the data collection, coding and modelling for this thesis. We hope transparency on these issues will help future studies to navigate this research topic.

8.2.1 Tax numbers for 2021

We do not have wealth tax-numbers for 2021 and used an estimate for the wealth tax based on 2020. Since the residence-addresses are continuously updated, and your taxable residence is where you live on the first of January 2021, we could calculate an estimate for wealth taxation among the wealthy individuals living in Bø and in the rest of Norway.

The assumption is that you are likely to have the same income, wealth and pay the same taxes as you did in 2020. The only difference in the numbers between 2020 and 2021 is that we mechanically calculated a lower tax rate in BØ (0,85 - 0,5 = 0,35) for the year 2021. Since these numbers are an estimate and not the true tax paid, the calculation is open for potential errors when estimating.

8.2.2 Limited software capacity

Microdata has some limitations in allowed data processing-capacity, user interface and the availability of variables, compared to other statistical software. For this reason, we had to limit the scope of the analysis in both timeframe observed and amount of control variables. The dataset is limited to 5 million inhabitants over 6 years due to this capacity-limit in data processing power. In short: We had to run a simpler version of the analysis.

We also had issues implementing control variables, due to the lack of contextual variables in Microdata. We had to code the values manually to use some of these control variables. This was time consuming, and we therefore did not have a chance to test a wider selection of control variables. This also implied that we sometimes used simpler control variables such as controlling for the closest municipalities instead of a variable that uses distance between municipalities. Since the variables were coded manually, there might be human error involved in coding.

It was difficult to check if everything lined up since the dataset is non-viewable due to the anonymity protection in Microdata. On top of this, the small sample size in Bø, sometimes meant that we could not get descriptive statistics to check or affirm the coding process was done correctly.

8.2.3 Further research

For further studies, it would be interesting to conduct an event study with the correct tax numbers for 2021. Using estimates as in this study opens for potential errors that impact the validity of the findings.

Further, to examine the long-term effect of such a tax change, for instance how loyal are the new inhabitants in Bø. In recent news, more wealthy individuals are moving to another tax haven in Switzerland, that previously emigrated to Bø (Ulvin, 2022). Since this study only examines the short-term impact, it would be interesting to examine if the wealthy individuals moved north or only report an address change. As an expansion to this point. did the tax change generate more economic activity in Bø?

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9. Appendix

9.1 Variable description

Variables 1 through 9 are available through microdata and are imported straight from there. These variables are explained in microdatas official register of variables and the information below are from this Variable overview. (Statistics Norway[2], n.y)

Birth year and month **Variable name: BEFOLKNING_FOEDSELS_AAR_MND as Birthyearmonth** The variable contains information on which year and month the individual is born in the format YYYYMM. This variable will be the first one we import. This means that we initially include all the observations in the microdata database.
Registration status **Variable name: BEFOLKNING_STATUSKODE 20xx-01-01 as regstatus16-21** The variable contains information about whether you live in norway, have emigrated or died. This information will help us to shrink the population by eliminating everyone that has been dead or emigrated for the entire period.

Municipality of residence

Variable name: BEFOLKNING_KOMMNR_FORMELL 20xx-01-01 as Municipality16-21

The variable contains information on which municipality you are living in on the 1st of January each year. The reason we use this date is that this is the date The Norwegian Tax Administration use. There are also other variables that tell us where you are living, but this variable is the formal address. That means that this is where you report to be living and this is where you pay your taxes to the municipality.

Wealth tax

Variable name:INNTEKT_FORMUESKATT 20xx-12-31 as Wealthtaxpaid16-21

The variable contains the calculated wealth tax you are paying to the state and the municipality. This is an important variable for us since it will be defining the people that are affected by the change in Bø.

Net income

Variable name: SKATT_ALMINNELIG_INNTEKT 20xx-01-01 as Income16-21

The variable contains the net income. This one will be used to define the different controll groups.

Total tax **Variable name: SKATT_FASTSATT_SKATT 20xx-01-01 as tax16-21** The variable contains information about the total incometax and wealthtax paid to state, county and municipality. In addition the membership fee to the national insurance (folketrygden) is included.
Wealth **Variable name: SKATT_NETTOFORMUE 20xx-01-01 as wealth16-21** The variable contains information on the taxable wealth where debt is deducted.
Sex **Variable name: BEFOLKNING_KJOENN as sex** The variable contains infomration about the sex of the individual.

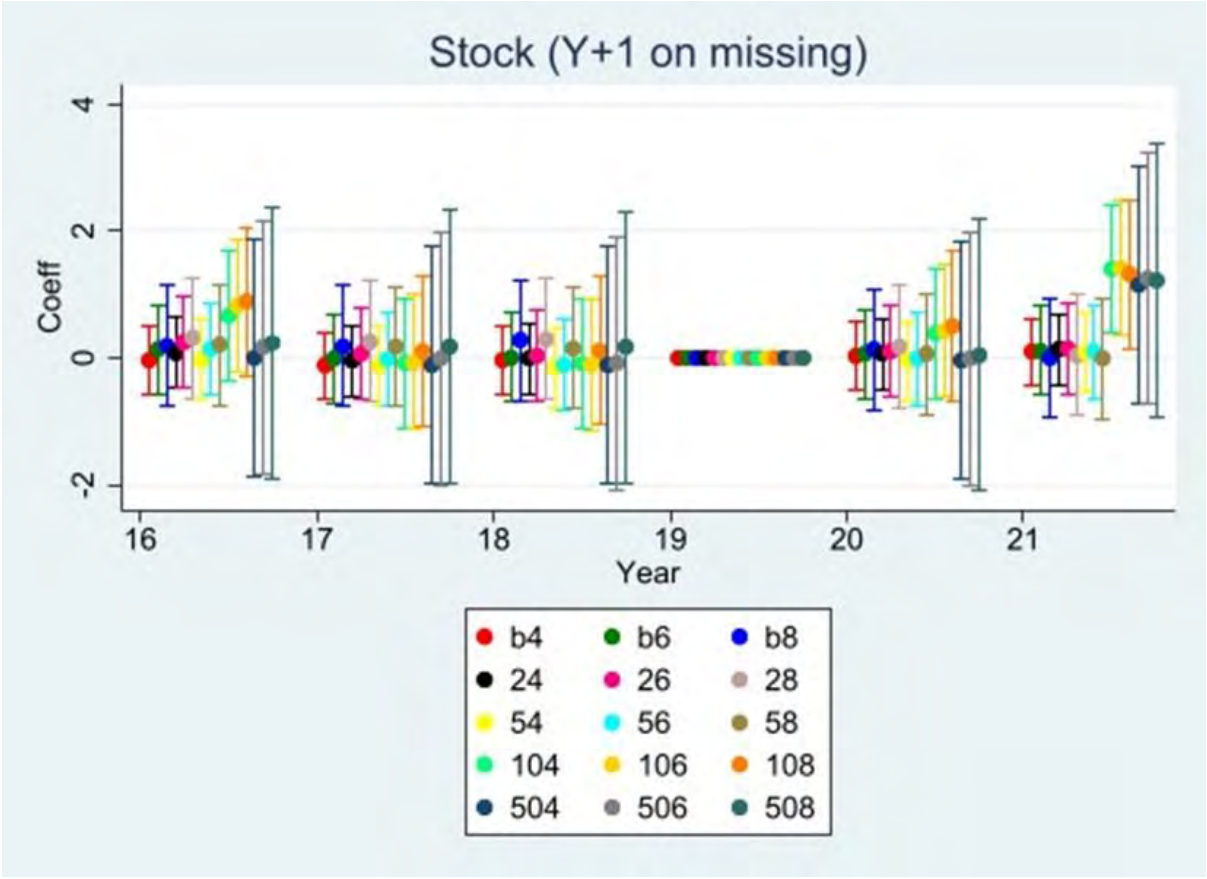
9.2 Robustness test

In this part we will present the complete results tables for the different analysis, we will follow the same structure as in the 6.0 Results.

9.2.1 Full sample

	b4	b6	b8	24	26	28	54	56	58	104	106	108	504	506	508
16	-0,037	0,128	0,194	0,084	0,249	0,316	-0,023	0,141	0,208	0,661	0,825-	0,885-	0,005	0,167	0,234
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0,520)	(0,536)	(0,598)	(0,955)	(1,014)	(1,092)
17	-0,124	-0,017	0,181	-0,042	0,064	0,262	-0,126	-0,019	0,178	-0,083	-0,065	0,104	-0,117	-0,013	0,177
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0,522)	(0,538)	(0,600)	(0,955)	(1,014)	(1,092)
18	-0,032	0,009	0,273	-0,008	0,033	0,297	-0,153	-0,111	0,152	-0,090	-0,106	0,116	-0,119	-0,081	0,167
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0,522)	(0,538)	(0,599)	(0,955)	(1,014)	(1,092)
19															
20	0,024	0,059	0,131	0,066	0,101	0,173	-0,045	-0,010	0,062	0,386	0,425	0,502	-0,046	-0,014	0,047
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0,520)	(0,536)	(0,598)	(0,955)	(1,014)	(1,092)
21	0,094	0,107	-0,002	0,138	0,150	0,040	0,086	0,099	-0,010	1,403***	1,416***	1,315**	1,147	1,253	1,219
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0,520)	(0,536)	(0,598)	(0,955)	(1,014)	(1,092)
R^2	0,991	0,985	0,979	0,990	0,984	0,977	0,990	0,984	0,976	0,989	0,984	0,975	0,979	0,968	0,951
Adj R^2	0,990	0,984	0,977	0,990	0,983	0,975	0,989	0,982	0,974	0,988	0,982	0,972	0,977	0,965	0,946
Obs	4236	4236	4232	4236	4236	4232	4236	4236	4232	4236	4236	4236	4236	4236	4236

Standard errors are reported in parentheses. -, *, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.



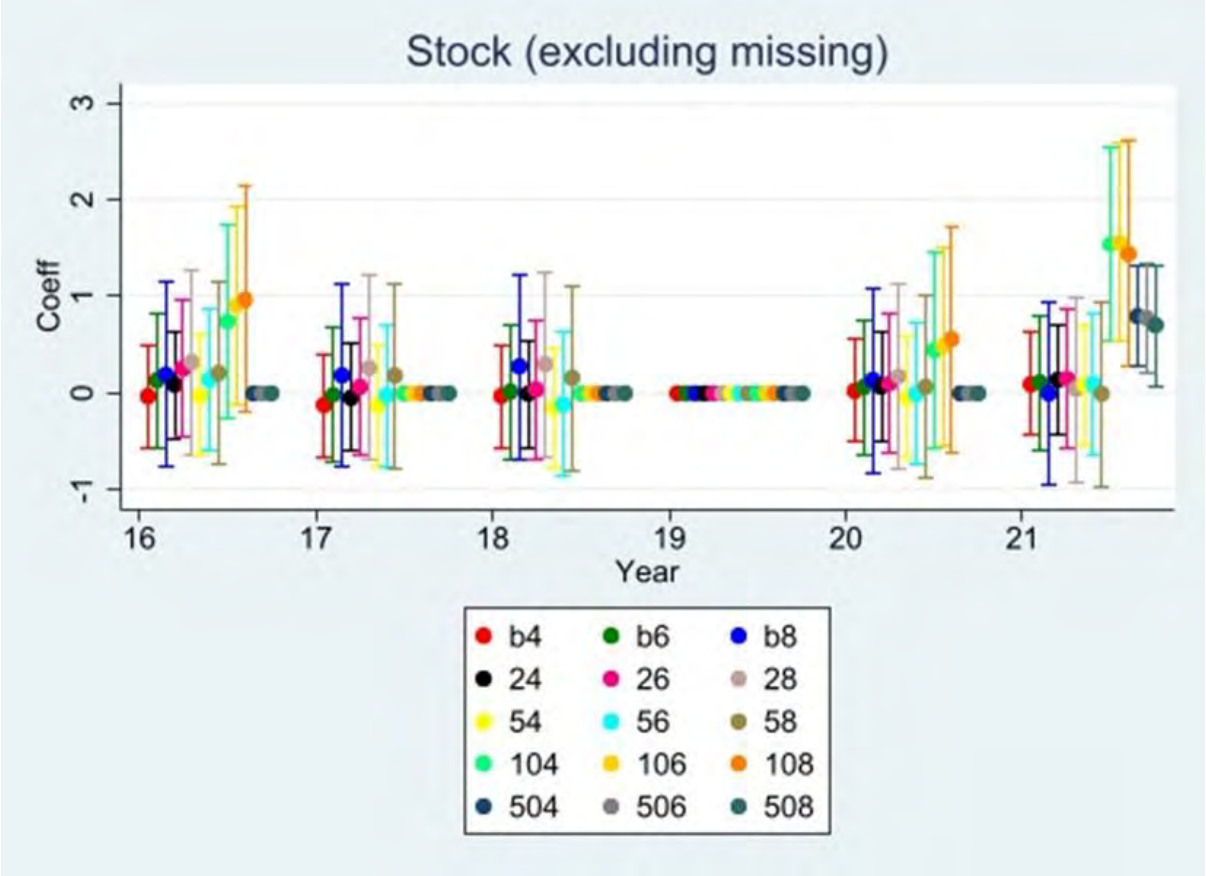
For groups 104,106,108,504,506 and 508 we have added a constant of 1 to Y (Y+1) to mitigate the missing values we would have gotten from ln(0). We also control for the 0 values in the regression for the different years.

In the table we can see that changing the control group (last number: 4, 6 or 8) does not make a big difference whether you look at the coefficient or the p-value. From this we conclude that the analysis is robust to a change in the control group.

9.2.2 full sample excluding missing

	b4	b6	b8	24	26	28	54	56	58	104	106	108	504	506	508
16	-0,037	0,128	0,194	0,084	0,249	0,316	-0,023	0,141	0,208	0,739-	0,905*	0,970-	0	0	0***
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0,514)	(0,522)	(0,594)	(0)	(0)	(0)
17	-0,124	-0,017	0,181	-0,042	0,064	0,262	-0,126	-0,019	0,178	0***	0***	0***	0-	0	0***
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0)	(0)	(0)	(0)	(0)	(0)
18	-0,032	0,009	0,273	-0,008	0,033	0,297	-0,153	-0,111	0,152	0***	0***	0***	0	0	0***
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0)	(0)	(0)	(0)	(0)	(0)
19															
20	0,024	0,059	0,131	0,066	0,101	0,173	-0,045	-0,010	0,062	0,446	0,485	0,558	0***	0***	0***
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0,514)	(0,522)	(0,594)	(0)	(0)	(0)
21	0,094	0,107	-0,002	0,138	0,150	0,040	0,086	0,099	-0,010	1,541***	1,554***	1,445**	0,791***	0,779***	0,701**
	(0,271)	(0,357)	(0,485)	(0,283)	(0,363)	(0,488)	(0,319)	(0,374)	(0,484)	(0,514)	(0,522)	(0,594)	(0,265)	(0,287)	(0,319)
R^2	0,991	0,985	0,979	0,990	0,984	0,977	0,990	0,984	0,976	0,987	0,981	0,968	0,978	0,964	0,943
Adj R^2	0,990	0,984	0,977	0,990	0,983	0,975	0,989	0,982	0,974	0,986	0,979	0,965	0,975	0,959	0,935
Obs	4236	4236	4232	4236	4236	4232	4236	4236	4232	3985	3985	3981	2998	2998	2994

Standard errors are reported in parentheses. -, *, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.

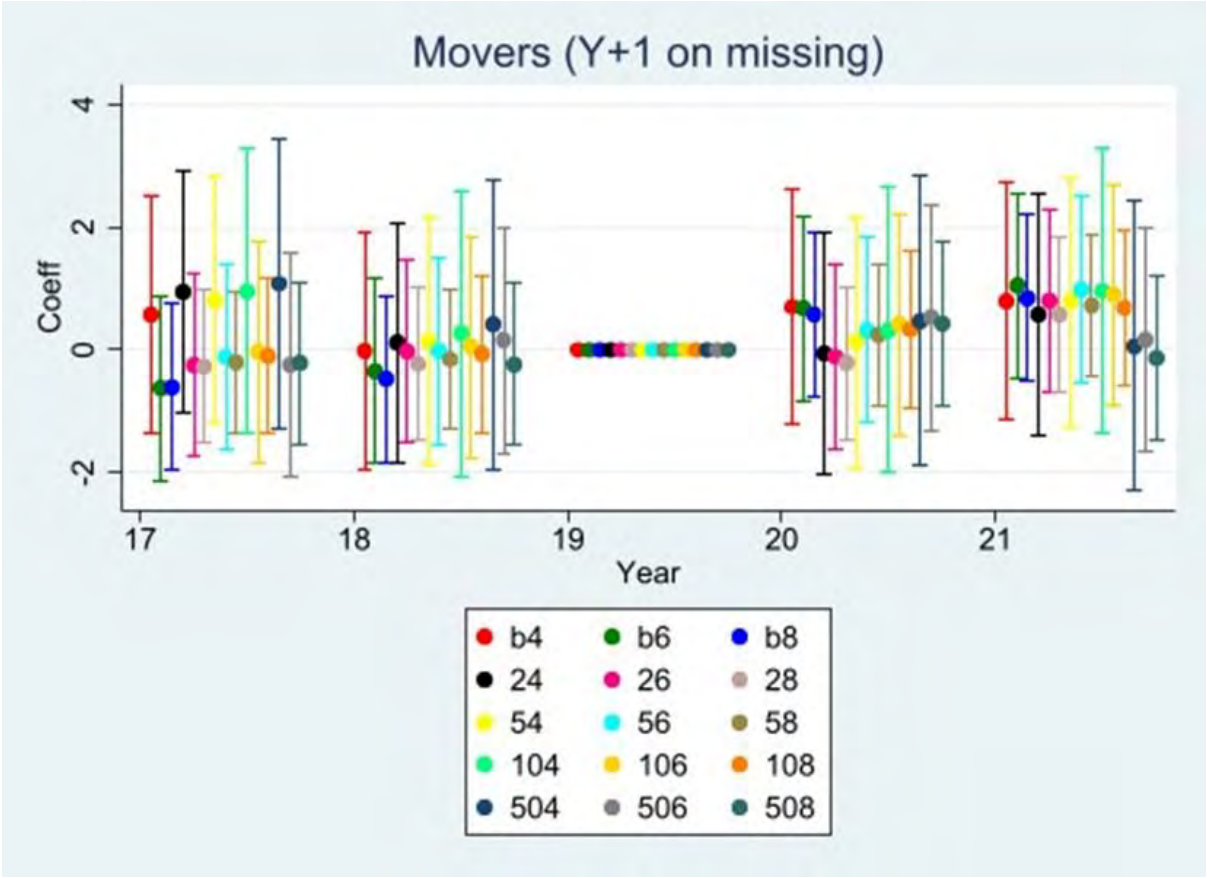


In the table we can see that changing the control group (last number: 4, 6 or 8) does not make a big difference whether you look at the coefficient or the p-value. From this we conclude that the analysis is robust to a change in the control group.

9.2.3 Movers

	b4	b6	b8	24	26	28	54	56	58	104	106	108	504	506	508
17	0,572	-0,627	-0,603	0,938	-0,253	-0,268	0,810	-0,113	-0,199	0,953	-0,034	-0,103	1,076	-0,241	-0,213
	(0,981)	(0,771)	(0,687)	(0,997)	(0,759)	(0,636)	(1,034)	(0,772)	(0,585)	(1,183)	(0,918)	(0,647)	(1,194)	(0,934)	(0,674)
18	-0,014	-0,339	-0,475	0,115	-0,029	-0,223	0,144	-0,016	-0,150	0,268	0,050	-0,071	0,410	0,156	-0,232
	(0,981)	(0,769)	(0,687)	(0,998)	(0,759)	(0,636)	(1,034)	(0,773)	(0,585)	(1,183)	(0,918)	(0,647)	(1,194)	(0,933)	(0,674)
19															
20	0,702	0,676	0,580	-0,058	-0,111	-0,216	0,134	0,330	0,251	0,320	0,419	0,333	0,478	0,526	0,430
	(0,981)	(0,769)	(0,687)	(0,997)	(0,758)	(0,636)	(1,034)	(0,773)	(0,586)	(1,183)	(0,918)	(0,647)	(1,194)	(0,933)	(0,674)
21	0,787	1,040-	0,845	0,577	0,806	0,572	0,787	0,978	0,725	0,963	0,898	0,686	0,065	0,166	-0,133
	(0,981)	(0,769)	(0,687)	(0,997)	(0,758)	(0,636)	(1,034)	(0,772)	(0,586)	(1,185)	(0,919)	(0,649)	(1,201)	(0,934)	(0,677)
R^2	0,912	0,932	0,939	0,911	0,932	0,945	0,907	0,928	0,949	0,888	0,890	0,919	0,888	0,884	0,905
Adj R^2	0,904	0,925	0,933	0,902	0,926	0,940	0,898	0,921	0,945	0,877	0,879	0,911	0,877	0,873	0,895
Obs	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236

Standard errors are reported in parentheses. -, *, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.



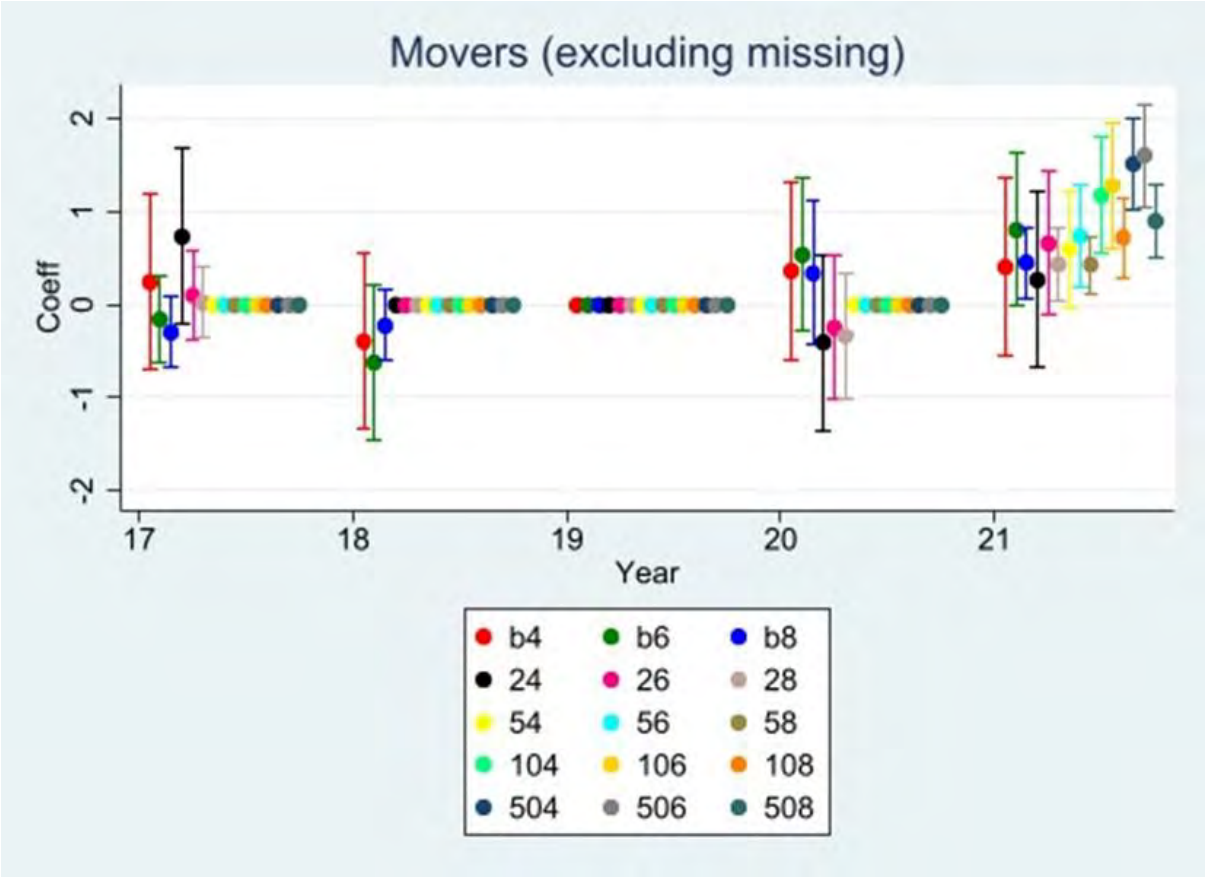
All observations is (Y+1)

In the table we can see that changing the control group (last number: 4, 6 or 8) does not make a big difference whether you look at the coefficient or the p-value. From this we conclude that the analysis is robust to a change in the control group.

9.2.4 Mover excluding missing

	b4	b6	b8	24	26	28	54	56	58	104	106	108	504	506	508
17	0,245	-0,161	-0,293-	0,733-	0,099	0,022	0***	0***	0***	0***	0*	0***	0***	0***	0***
	(0,485)	(0,239)	(0,196)	(0,483)	(0,239)	(0,194)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
18	-0,391	-0,623-	-0,224	0***	0***	0	0***	0***	0***	0***	0***	0***	0***	0	0***
	(0,485)	(0,419)	(0,196)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
19															
20	0,364	0,538-	0,335	-0,409	-0,244	-0,339	0***	0***	0***	0***	0***	0***	0***	0***	0***
	(0,485)	(0,419)	(0,392)	(0,483)	(0,394)	(0,338)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
21	0,398	0,801*	0,445**	0,267	0,659*	0,430**	0,590*	0,735***	0,426***	1,175***	1,276***	0,714***	1,515***	1,596***	0,894***
	(0,485)	(0,419)	(0,196)	(0,483)	(0,394)	(0,194)	(0,314)	(0,279)	(0,156)	(0,322)	(0,344)	(0,214)	(0,249)	(0,283)	(0,195)
R^2	0,922	0,916	0,904	0,916	0,912	0,911	0,906	0,892	0,906	0,916	0,866	0,843	0,952	0,922	0,894
Adj R^2	0,911	0,903	0,886	0,904	0,897	0,893	0,891	0,873	0,885	0,897	0,828	0,787	0,940	0,895	0,845
Obs	2998	2648	2274	2872	2522	2148	2660	2310	1936	1954	1604	1230	1718	1368	994

Standard errors are reported in parentheses. -, *, **, *** indicates significance at the 80%, 90%, 95%, and 99% level, respectively.



In the table we can see that changing the control group (last number: 4, 6 or 8) does not make a big difference whether you look at the coefficient or the p-value. From this we conclude that the analysis is robust to a change in the control group.

9.3 Linear probability model groups

Configuration	1		2		3		4		
Wealth group	# of people	Avg wealth	# of people	Avg wealth	# of people	Avg wealth	# of people	Avg wealth	note
0	2332588	-605126	77431	-693494	[redacted]				Not paying wealth tax
1	793285	1081083	10000	1104991	793285	1081083	10000	1104991	Botton 25% of wealth tax payers
2	793287	2055476	12303	2040499	793287	2055476	12303	2040499	Between 25-50%
3	793288	3129126	11476	3141941	793288	3129126	11476	3141941	Between 50-75%
4	596328	5876766	9519	5908617	596328	5876766	9519	5908617	Top 75% excluding group 5 and 6
5	174061	18626091	3204	18819682	174061	18626091	3204	18819682	Between 10M and 50M in wealth
6	23778	151904601	548	190292616	23778	151904601	548	190292616	Above 50M in wealth
	Full sample		Movers		Wealth tax payers		Moving wealth tax payers		