



The Effect of Credit Constraints on External Financial Support: Implications for Young Home Buyers in Norway

An empirical study of how the Norwegian Financial Supervisory Authority's introduction of a down payment requirement affected "curling", an external form of financial support for young homebuyers, in the period 2005 - 2020

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NORWEGIAN SCHOOL OF ECONOMICS

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Abstract

In this study, the effect of the Norwegian Financial Supervisory Authority's introduction of a down payment requirement on the extent of parental help young people received to access the housing market in Norway, a phenomenon referred to as "curling", is investigated. To carry out the study, microdata from Statistics Norway ranging from 2005 to 2020 with a selection of people in the age span 20 to 40 years is used. The data is utilized to construct the dependent variable, "curling", to determine whether parental help has found place. Heterogeneity is examined using regression models to uncover demographic trends in parental help.

There is a remarkable increase in curling during the transition from the period before the down repayment requirement to the time after the implementation. The findings indicate that the introduction of a down payment requirement has increased parental help of young people by as much as 18.53 percentage points for them to access the housing market in Norway. The extended analysis of heterogeneity supports this claim and reveal demographic trends of curling that favour Norwegian individuals of the male gender and their economic advantage in terms of education and income in the occurrence of curling. Particularly noteworthy is the causal effect exhibited by the down payment requirement in Oslo, which demonstrates a 14 percentage points higher impact compared to the rest of the country over a decade.

Keywords – Down Payment Requirement, Credit Constraint, Curling, Event Study, Housing

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1 Introduction

Norway's national curling team has attracted interest internationally for their vigorous pants, being somewhat untraditional with their colourful and busy pattern. This stunt has additionally opened the common Norwegian's eyes to the curling sport. Domestically, the term "curling" has been given a different meaning, albeit with origin from the nature of the sport. Curling has in the vernacular been redefined to mention a whole generation of offsprings having parents paving the way for them by being serviced around the clock.

As entering the housing market for the first time has proven difficult, especially for young people, parents have been found guilty of helping their offsprings do exactly that. By either acting as real estate surety or giving them money as an inheritance advance or purely as a gift, parents (or other external parties) can help their young and hopeful access the housing market. This is the additional meaning to the term curling when speaking in housing terms and is what is meant when referring to curling from now on.

In 2010, the Financial Supervisory Authority of Norway introduced a down payment requirement of 10 per cent of the purchasing price on housing, a requirement that was further increased to 15 per cent in 2012. Saving money to be able to meet the down payment requirement may be challenging and even unrealistic to the majority of young people, resulting in dependency on their parents or other willing people to do so. While the curled people enjoy the advantages of resourceful external help to meet the down payment requirement, those who don't struggle to access the housing market. Consequently, the requirement that initially was intended to stagnate housing prices foster a class distinction between the fortunate people who can be curled and those lacking that opportunity. Thus, the Norwegian housing model is challenged.

In this paper, an event study is conducted to investigate how the introduction of the down payment requirement in 2010 affected the extent of parental help of 20- to 40-year-old people in order for them to access the housing market in Norway. To do so, a regression analysis using Norwegian registry data is performed. The result shows that from the estimation window to the event window, there has been an almost doubling of curling, with the most significant increase observed among those receiving curling in the form of real estate surety.

2 Literature Review

2.1 A historic glance at the Norwegian Housing Market

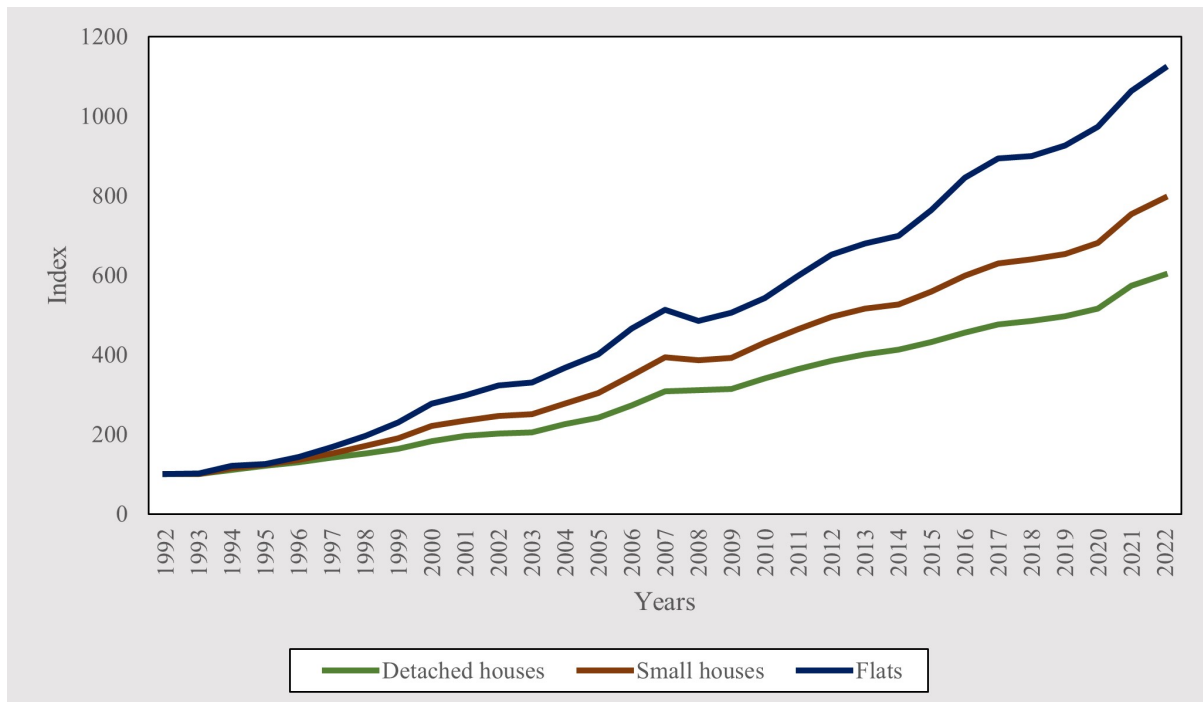
Governmental involvement in the economy is one of the characteristics of the western European countries post-war, from 1945 and onwards. Norway was no exception, and The Norwegian Labour Party with its governments had a large impact on The Norwegian Societal model (Grytten & Hunnes, 2016). The Norwegian societal model is characterized by a welfare state with universal welfare provisions, a high level of taxation and public services, and a commitment to social justice and equality (Zakariassen, 2020). Governmental engagement and control were desired and were believed to combat recessions, crashes and crises better than a market-based economy, which had marked the time before and during war-time (Grytten & Hunnes, 2016). Their politics did however incentivize investments rather than saving money, which in turn led to necessary credit restrictions (Grytten & Hunnes, 2010).

The effect of Governmental involvement also played out in the housing market. After World War II there was shortage on housing in Norway, and the Government teamed up with OBOS and other residential construction teams to build more housing. OBOS is the Norwegian housing cooperative, differing from similar institutions in other countries by organizing house ownership instead of rentals. To finance house ownership during this time, beneficial loans were given to subsidize building through state owned Husbanken, a bank with a social mission to help disadvantaged people acquire housing and keep it (Lundesgaard, 2013; Husbanken, n.a.). House ownership was also favoured by deduction on debt interest and low housing taxation in general. In sum, these measures demonstrate the Governmental intervention in the housing market, making it a state-regulated market where demand exceeded the supply (Sæther, 2008). It led to a black housing market, where under-the-table payments were common as an addition to the stable state-regulated price (Lundesgaard, 2013). Around 10 to 20 per cent of the buyers in an establishing phase of their life's paid money under the table during the 70's (Sæther, 2008).

With this as a backdrop, a deregulation of the housing market took place under the civil Government led by Kåre Willoch from 1981 to 1986. Thus, 1981 became the year

when the state-regulated measures to stimulate building activity were removed, and credit markets were liberalized (Lundesgaard, 2013). In turn, the housing market became more market based. Interest rates were persistently low. Consequently, housing prices increased rapidly, and a bubble emerged (Sæther, 2008). From 1980 to the top 1987 there was a 211 per cent increase in house prices (Grytten & Hunnes, 2010). Shortly after, the crash was a fact and prices rallied. When they hit bottom in 1992-1993, prices were down 40 per cent. At the time, interest rates had increased, the banking and credit system was liberalized, there was no growth in the economy and opportunities for tax deduction on interest rates were limited. This combination is assumed to have driven housing prices downwards (Sæther, 2008).

From 1993 and up until 2007 prices on housing trended upwards, aside from a stagnant period in 2003 (Sæther, 2008). The financial crisis in 2008 fostered a dip in Norwegian housing prices, although it was not a persistent situation. The event and its consequences are described in further detail in section 2.4. Nominally, prices have continued to go upwards for all types of housing on a long-term basis ever since, with a few setbacks that can be categorized as transient, mainly in 2017 and 2022 (Medby, 2023). Historically, housing prices have increased more than inflation, leading to the same trend in housing prices in real terms. Changes in the economic climate, considering the high inflation in particular, has led to real house prices declining while there is a slight increase nominally over the last few years. The upward trending long-term price level is demonstrated in Figure 2.1

Figure 2.1: Statistics Norway's nominal housing price index 1992-2022

Source: Medby, 2023 (1992 = 100)

During the onset of the COVID-19 pandemic, the broader economy witnessed a supply-side shock as a result of lockdown measures. Certain businesses were mandated to suspend their operations and production due to the inherent conflict between their activities and infection control restrictions, leading to an abrupt reduction in consumption. Concurrently, government authorities took measures to stimulate demand through various financial support programs and historically low interest rates. Faced with limited avenues for consumption and the unattractiveness of traditional savings deposits, consumers began seeking alternative investment opportunities (NHH Bulletin, 2020). This quest for alternative investments translated into an upsurge in the stock market, alongside a significant increase in real estate prices, which commenced in 2020 and demonstrates a shift in demand for housing as illustrated in Figure 1. The low interest rate also enabled more consumers to access the housing market than before, and as they used this opportunity demand increased. It has persisted in the years following the pandemic despite higher interest rates, assumingly benefitting from saved funds by both consumers themselves and their parents (NHO, 2023a; Midtgaard, 2023). The interest rate hikes are expected to have a chilling effect on demand and real housing prices have begun to show such

tendencies towards the end of 2023 (NHO, 2023b).

2.2 The Norwegian Housing Model

The Norwegian Government encourages housing ownership and compared to other countries, Norwegians own their houses to a large extent. In fact, more than 90 per cent of Norwegians will own their house at some point during their lives, with 8 out of 10 Norwegians being house owners at any given time. Serving as the preferred saving method among Norway's citizens, house ownership has become a fundamental aspect in the Norwegian welfare society. This approach represents the Norwegian housing model, which encompasses a complex interplay between public regulations, social welfare policies, and collaboration between public and private sectors. This intertwined system consistently aims to ensure the recognition of housing as a fundamental welfare benefit while concurrently maintaining a well-functioning housing market. Tax benefits associated with this asset class serve as a driver for house ownership as the preferred saving method (Eiendom Norge, 2023a). One beneficiary measure is the moderate wealth taxation of only 25 per cent of the market value on the primary residence (Skatteetaten, 2023). Encouraging benefits also include tax deductions for debt interest and the absence of capital gains taxation. A key motivation behind this political encouragement is to preserve Norway as an equal opportunity country. Studies have indicated that countries with a high degree of house ownership experience less inequality and a more even distribution of wealth benefits (Eiendom Norge, 2023a).

The Norwegian housing policy has positioned Norway at the forefront of homeownership among young people in European nations. There are substantial variations in patterns of early independent living across countries, with a trend of earlier departure from parental homes being more prevalent in Nordic countries. Individuals in southern parts of Europe tend to reside with their parents for more extended periods. Despite reaching its peak in 2007, there has been an overall declining trend in homeownership among young individuals in nearly all European countries, including Norway. This trend is observable across all age groups within the 16-34 years range.

The proportion of young Norwegians who own their own homes still remains notably high and particularly in the upper age groups. Among individuals aged 30 to 34, nearly 70

percent own their homes, and the lowest percentage observed between 2004 and 2017 was 46 percent among those aged 25 to 29. The decline in homeownership among young adults has been particularly evident among the unemployed or part-time employed, as well as among those in the lowest income quartile (Revold, 2019).

2.3 Norwegian Housing Prices

2.3.1 Supply and Demand Dynamics in the Norwegian Housing Market

The majority of demand for housing is considered driven by the desire to acquire housing for residential purposes rather than profits alone. This desire is considered strong in Norway, hence the Norwegian Housing Model. Within the domain of economics, demand denotes the quantity of a good or service that consumers wish to purchase at a particular price within the market. Furthermore, the ability to pay and the willingness to pay are two important factors to determine demand. The ability to pay is determined by costs of living such as income, wealth and access to credit. It differs from the willingness to pay in the sense that households are not always similar in the ways they value a house, and some are willing to pay more than others for the same object. However, ability to pay and willingness to pay are closely correlated (Anundsen, 2010).

Numerous fundamental factors contribute to the dynamics of housing supply and demand. Urbanization and centralization have emerged as pivotal catalysts, augmenting the demand for housing within metropolitan areas and consequently exerting upward pressure on property prices relative to more rural regions. Within the framework of housing demand, a multitude of factors come into play, including shifts in access to mortgage financing, expectations of enhanced income prospects, alterations in occupational patterns, and modifications in tax regulations. One should also note that housing is an asset class that has been subject to speculation, a phenomenon that can potentially establish a self-reinforcing cycle, perpetuating the escalation of demand and followingly property prices (Larsen et al., 2004).

The key policy rate functions as a governmental instrument for modulating overall demand within an economy. In this context, elevating interest rates is known to exert a moderating

influence on housing prices. Note, however, that the policy rate operates as a generalized economic lever and is not specifically tailored to the housing sector. Consequently, a comprehensive consideration of various factors becomes requisite in its application. Norway, as a small yet open economy, has been compelled to harmonize with the prevailing global economic environment, which has translated into sustained low interest rates. The protracted low-interest rate environment has, in turn, engendered a stimulating effect on the national economy, thereby propelling heightened demand for housing. This was clearly demonstrated during the pandemic years from 2020 to 2022, as seen in section 2.1. The phenomenon stems from the increased allure of investing in housing as opposed to conventional deposit-based investments, given the comparatively superior returns it offers (Grytten & Hunnes, 2016).

By tightening credit restrictions and introducing a down payment requirement of 10 per cent in 2010, the expected effect was constrained access to credit and consequently lower ability to pay. However, a financially robust parent generation, with help from a favorable economic climate, enabled a way for home buyers to bypass the down payment requirement and by being curled into the housing market. Thus, an artificial demand on housing has been maintained.

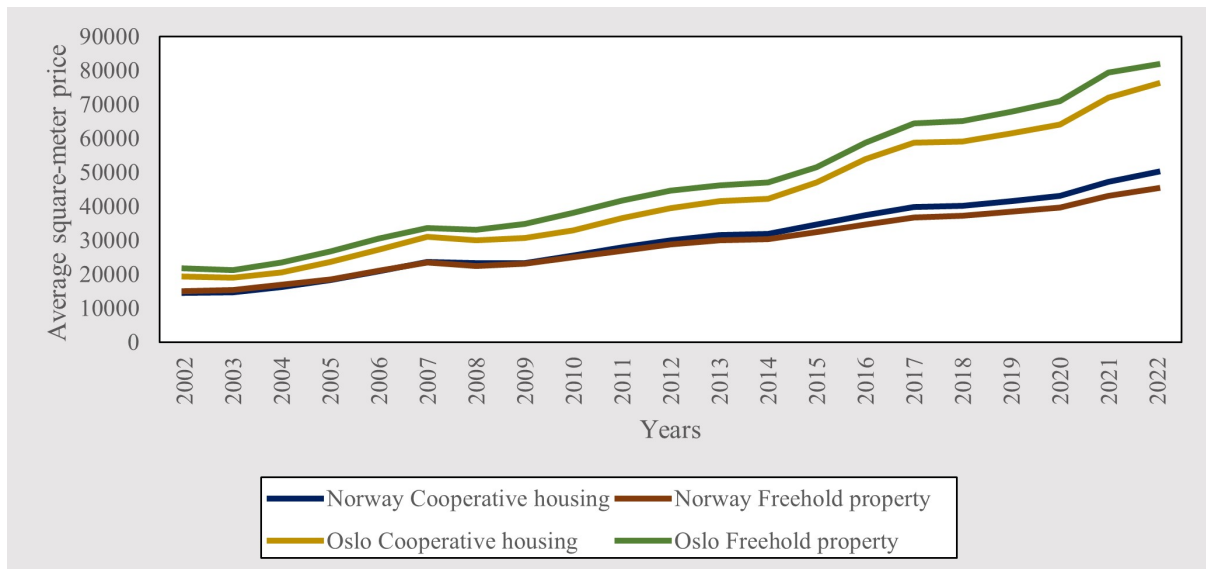
Given the long time it takes to project, build and complete new buildings, housing stock is considered fixed in the short term. In the long term, supply is to a large extent determined by house prices due to the importance of high return on investments for investors. New buildings will be profitable when prices on already existing buildings increase. Increasing long term prices in the Norwegian housing market has resulted in new building investments and thus increased housing supply, however at a low level. While at the same time having the demand maintained at a high level even after the tightening in credit restrictions in 2010, prices have been driven further upwards.

2.3.2 Geographical Differences in Prices

While an overall surge in prices has been observed, notable regional disparities exist domestically. Of specific interest is the trajectory of price growth in Oslo, attributed to urbanization and centralization: factors underscored by Statistics Norway as pivotal catalysts for heightened demand (Larsen & Sommervoll, 2004). Oslo is frequently

highlighted in the media as an exemplar of the challenges associated with entering the housing market, characterized as particularly expensive in comparison to other cities and regions. This is evidenced by a sustained higher level of the average per-square-meter price in Oslo relative to the rest of the country, as illustrated in Figure 2.2. Furthermore, observations reveal a greater increase in square meter prices in Oslo compared to the rest of the country in recent times, thereby confirming assertions that Oslo possesses a particularly expensive housing market in comparison to the rest of the country.

Figure 2.2: Average square-meter price in Oslo and Norway as a whole



Source: Statistics Norway 2023a & Statistics Norway, 2023b

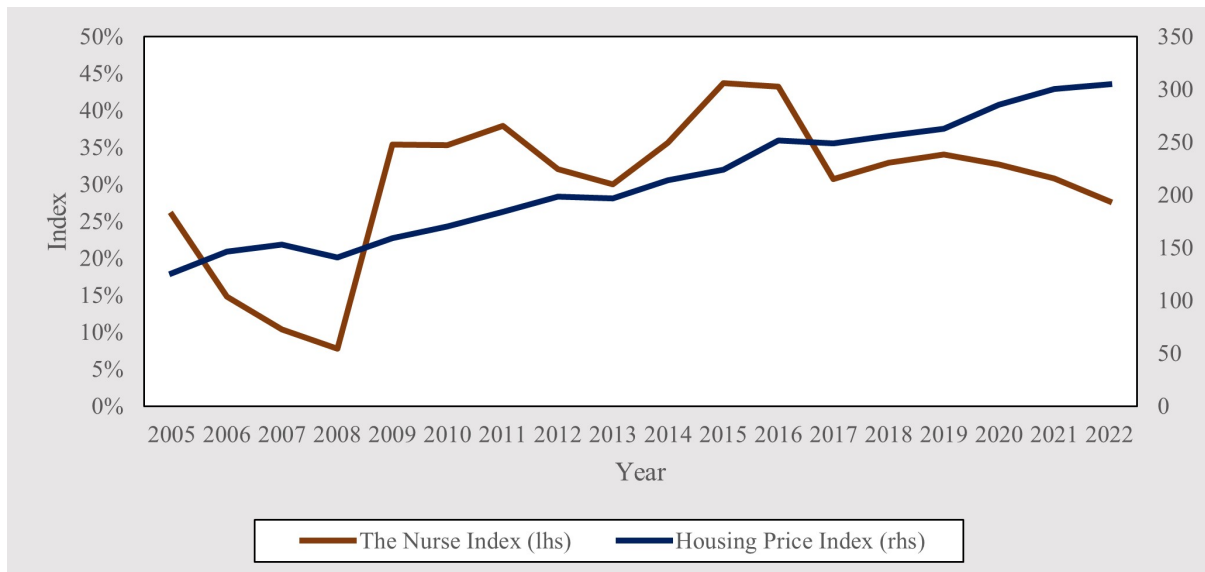
The elevated square meter price in Oslo relative to the national average can be attributed to the supply and demand dynamics outlined above (see section 2.3.1). With a population growth of 200,000 and just under 60,000 newly constructed homes between 2001 and 2021, it is argued that the issue can be attributed to the supply side. Kristiansand is highlighted as a prime example of how policy measures can mitigate price growth by actively stimulating supply side growth. While the proportion of homes accessible to first-time buyers has decreased in the rest of the country's major cities, and particularly in Oslo, it has increased in Kristiansand. When the square-meter price of housing surpassed the national average in 2009, politicians took proactive measures, setting goals that effectively influenced the market, developers, and buyers. Despite differences in the two cities, including available area and population growth, similar measures in Oslo could

stimulate the supply side and impact the long-term equilibrium price of housing. All else being equal, researchers at the Housing Lab estimate that the housing price in Oslo would decrease by 10 percentage points if the supply on housing is strengthened by 10,000 homes (Jakobsen, 2021).

2.3.3 Norwegians' Ability to Pay Demonstrated by the Nurse Index

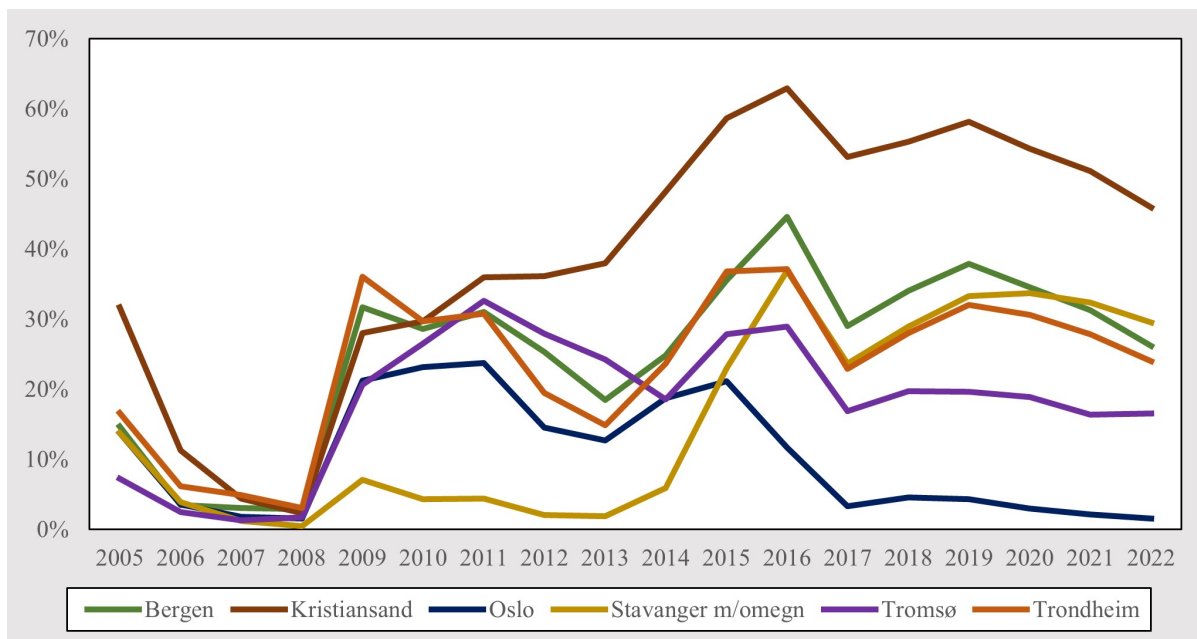
In Norway, there is an index that quantifies the extent to which an average-paid nurse can secure financing for the acquisition of a residential property. When this index indicates a nurse's ability to purchase a substantial portion of available housing, it implies that housing prices are relatively low. Conversely, when the index suggests that a nurse cannot afford any housing, it implies that housing is not accessible to individuals with an average nurse's income. The selection of income from this specific occupation is predicated on its representativeness for the broader population and its relatively low susceptibility to economic fluctuations. This index has been compiled for specific Norwegian urban centers spanning the period from 2005 to the present day (Eiendom Norge, 2023b).

The Nurse Index is measured up against the housing price index to see how the ability to pay for housing changes over time. It considers prevailing credit restrictions in its calculations and thus demonstrates an average income individual's ability to pay in a good manner. Figure 2.3 shows how the index has moved upwards while the ability to pay has been far more volatile over the years. This indicates that income does not increase alongside the housing prices, and that the purchasing power in the overall population fluctuates (Jansen, 2011).

Figure 2.3: Historical development of the Nurse Index

Source: Eiendom Norge, 2023b

The elevated housing price levels in Oslo are evidenced by the index when comparing various cities as shown in Figure 2.4. There is a decline from 13 out of 100 Oslo homes in 2013 to 2 out of 100 in 2022. Consequently, the housing choice for nurses has diminished despite an increased housing budget. This reduction is attributed to the fact that housing prices have surged at a faster rate than the housing budget. Oslo did not exhibit any particular distinction until 2014. In Trondheim, Bergen, and Tromsø, housing prices have risen since 2014, but the freedom of choice for nurses has expanded due to the growth in the housing budget outpacing the housing price increase. The nurse index also demonstrates the success of political measures taken in Kristiansand, showing the rapid increase in share of houses available to single nurses over time. However, ability to pay has shown a declining trend in all cities in recent years (Eiendom Norge, 2023b).

Figure 2.4: Historical development of the Nurse Index in different Norwegian cities

Source: Eiendom Norge, 2023b

2.4 The Financial Crisis in 2008 as a Runner-up to Tightened Credit Restrictions

Subsequent to the banking crisis that emerged in the early 1990s, there was a notable shift in policy emphasis towards the restoration of economic growth and the cultivation of a sustainable economic environment. This paradigm shift prompted the adoption of an expansionary monetary policy as a counter-cyclical measure to mitigate the impact of economic recessions. Central to this new policy framework was the establishment of inflation management as a principal objective for monetary authorities, which, in turn, played a pivotal role in the determination of prevailing interest rates. The overarching goal of this approach was the attainment of a stable inflation rate, thereby reflecting a deliberate emphasis on price level stability as a central tenet of monetary policy. Norway has harmonized its inflation target with a stable exchange rate against its primary trading partners. As a result, Norwegian monetary policy has been conducted with significant flexibility to address the imperatives related to economic cycles, industries exposed to international competition, and asset price dynamics (Grytten & Hunnes, 2016).

Numerous novel financial products were introduced and subsequently materialized within the financial industry, giving rise to innovation that concomitantly bolstered the supply and demand for capital (Grytten & Hunnes, 2016). This development, when amalgamated with the practice of inflation targeting, laid a robust foundation for credit and monetary expansion. As a resultant consequence of these factors, financial instability ensued, marked by the persistence of low interest rates and a global surge in credit availability (Grytten & Hunnes, 2010). Credit volumes quadrupled in Norway in the time period between 1992 and 2008, and gearing increased, meaning that loans made up more and more of the funding for credit institutions, businesses and private consumers. Hence, asset bubbles emerged, and the economy was overstimulated (Grytten & Hunnes, 2010; Grytten & Hunnes, 2016).

The origins of the global financial crisis can be traced back to the emergence of a housing bubble in the United States, primarily underpinned by the practice of international money markets offloading loan portfolios onto investment banks. International money markets thus played a pivotal role by providing the necessary financial resources to American investment banks for the acquisition of these loan portfolios (Grytten & Hunnes, 2010). These portfolios were strategically designed to help banks continue to extend credit accessibility beyond traditional parameters. This expansion was underpinned by the sustained growth in housing prices, which, in turn, engendered a perception of minimal downside risk. The financial landscape, characterized by a speculative outlook, or even evoking characteristics reminiscent of a Ponzi scheme, was contingent upon the anticipation of continued growth in the market (Grytten & Hunnes, 2016).

However, the year 2006 marked the inception of a decline in housing prices. A cascading negative economic cycle occurred at the same time, precipitating a surge in unemployment figures. By the latter half of 2008, the financial markets plummeted, and numerous financial institutions went bankrupt. Market liquidity reached a new low, strangling businesses' access to capital to the extent previously experienced, thereby catalyzing a domino effect of downward spirals in stock exchanges across the globe (Grytten & Hunnes, 2016). The global financial crisis was hence a reality.

The financial crisis had a moderate outcome in Norway. The modestly diversified business structure led to the oil-dependent Norwegian stock exchange plummeting rapidly alongside the oil price, but quickly recovered when the oil price doubled the following

year (Finanstilsynet, 2011a; Grytten & Hunnes, 2016). The interest rate was also quickly decreased before the crisis could have a too severe effect on the economy, and the Government offered detailed plans to stimulate Norwegian businesses. Additionally, demand for Norwegian goods remained high during the crisis. In matters of housing, the prices experienced a correction with a downfall of 18 per cent. It is considered moderate as these prices had five folded from 1993 and up until 2007. Besides, prices started to slope upwards again as soon as in 2009 (Grytten & Hunnes, 2016).

Exposed during the financial crisis were households' susceptibility to economic downturns, leading to a downturn in their financial status. This was evidenced by the surge in their debt burdens, diminished debt repayments, and elevated mortgage loan-to-value ratios. As interest rates climbed in 2008, households experienced lower consumption, savings, and investments. While decreased interest rates temporarily mitigated vulnerability, they swiftly led to rising housing prices, potentially heightening long-term susceptibility. Housing prices and household debt significantly impact financial stability. Subsequently, the Norwegian Financial Supervisory Authority advocated for a more cautious lending approach in the years to come, issuing guidelines for sound residential loan practices in March 2010, reflecting the housing and lending market conditions at the time (Finanstilsynet, 2011b; Finanstilsynet, 2009; Hveem et al., 2013).

2.5 Credit Restrictions on Residential Loans

The financial crisis revealed the vulnerability of Norwegian households with their highly leveraged house investments and how this posed a risk to financial stability. Following that, the Norwegian Financial Supervisory Authority introduced guidelines for financial institutions in order to achieve more modest lending practices to households (Finanstilsynet, 2011a). Prior to this, it was more up to the banks themselves to assess creditworthiness and grant loans based on it. However, they worked according to other guidelines, although their effectiveness has been questioned. This includes the loan discouragement duty that was defined in 2000. Studies have revealed that the banks only discouraged a vanishingly small proportion of the marginal mortgage application cases from taking the loan offer, and as good as 100 per cent of those who were discouraged chose to take up the loan anyway (Hveem & Nyhus, 2013). The guidelines introduced in 2010 that serve as the event

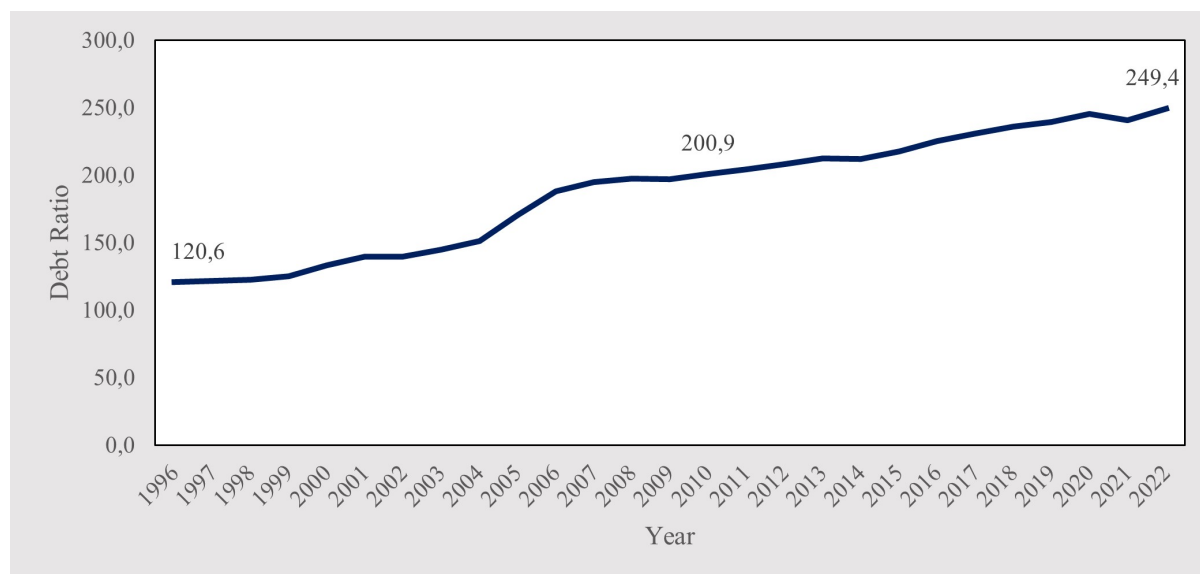
of study in this paper, were further regulated by the lending regulation issued by The Ministry of Finance in 2015, a temporary regulatory framework that has been extended and edited three times after its first issuance.

As house prices are to a large extent determined by demand, down payment requirements can serve as a mean of action to decrease demand and thus avoid a too steep increase in house prices (Bajari et al., 2013). Several empirical studies suggest that households' purchase of a home can be constrained by a down payment requirement (Jones, 1989; Linneman et al., 1989; Zorn, 1989). Reduced homeownership follows as a consequence of this, which is a less desirable outcome in the Norwegian context, given the desire to withhold the Norwegian housing model (Haurin et. al., 1996).

2.5.1 The Introduction of the Down Payment Requirement in 2010

Several significant factors combined led up to the introduction of the down payment requirement. Experiences from past economic crises, including the global financial crisis, shed light on the potential threats associated with an unchecked rise in debt levels and housing prices. Debt-to-income ratio had increased by 67 per cent from 1996 to 2010, which can be seen in Figure 2.5. Although losses incurred by Norwegian banks on mortgage loans historically have been low, the possibility of a deterioration in households' financial circumstances and adverse events in the housing market were acknowledged (Finanstilsynet, 2010).

Figure 2.5: Seasonally adjusted debt as a percentage of disposable income corrected for savings in pension funds



Source: Statistics Norway, 2023c

Considerations for consumer well-being and financial stability necessitated the establishment of a more robust housing finance system and increased stability in the housing market. The Financial Supervisory Authority developed guidelines for responsible lending practices aimed at limiting the extent of high loans, both concerning income and property value (Finanstilsynet, 2010). The down payment requirement of 10 per cent of the house value was introduced in March 2010 and further tightened to demand 15 per cent from 2012. The loan-to-value ratio included all loans with mortgage in the house (Finanstilsynet, 2011b). These guidelines would serve as guiding principles for banks in their lending practices, with the Financial Supervisory Authority overseeing their implementation in its routine supervision of banks. The central objective of limiting high loan-to-value ratios was to enhance the resilience of both households and banks, by making them better equipped to handle economic downturns and market fluctuations and thus contribute to improved financial stability (Finanstilsynet, 2010).

2.5.2 The Lending Regulation Introduced in 2015

In June 2015, the Ministry of Finance introduced a regulatory framework outlining the prerequisites for new residential mortgage loans, a regulation attachment aligning with the guidelines established by the Financial Supervisory Authority of Norway. Thus, Norwegian

banks' lending is subject to Governmental restrictions and not entirely based on banks' own credit rating assessments. The regulatory criteria have evolved over time. After the initial regulations in 2015, the Ministry of Finance has iteratively extended and revised these provisions on three separate occasions. Even stricter mortgage regulations were introduced through this framework in 2017, where they quantified a limitation on total debt at five times income. In February 2019, the Ministry expanded its regulatory scope by introducing a similar set of requirements for consumer loans. Then, in December 2020, the Ministry amalgamated the stipulations into a consolidated regulation encompassing both residential mortgage and consumer loans. From mid-2023 other loans with mortgage are also included in the regulation.

The prevailing regulatory framework, effective from January 1st, 2021, through December 31st, 2024, imposes stringent controls on the lending practices of financial institutions, encompassing pivotal facets. These facets include customers' debt-serving ability as well as their debt-to-income (DTI) ratio. Mortgage size in relation to property value is also an important part of the requirements, with associated principal payments for loans with a high loan-to-value (LTV) ratio. This is the down payment requirement referred to throughout the paper and has remained unchanged at 15 per cent since 2012. The interest rate stress test of debt-servicing-ability was subject to an easing from 01.01.2023 when a reduction from 5 per cent to 3 per cent took place.

To enable banks to undertake individualized assessments, a degree of flexibility is permitted, wherein a certain proportion of the banks' loans may surpass the regulatory thresholds. For mortgage loans, this flexibility quota is set at 8 percent of the lending volume each quarter in Oslo and 10 percent outside of Oslo. Conversely, for consumer loans, a nationwide flexibility quota of 5 percent applies. Loans secured by collateral other than real estate are allocated a 10 percent flexibility quota.

The table below provides an overview of the development in requirements from the introduction of the guiding framework in 2010 and up until the expiration of the prevailing regulatory framework for mortgages:

Table 2.1: Development in Norwegian lending regulations

Facet	Requirement				
	Guiding Framework		Lending Regulation		
<i>from / to</i>	03.03.2010 30.11.2011	01.12.2011 30.06.2015	01.07.2015 31.12.2016	01.01.2017 31.12.2022	01.01.2023 31.12.2024
Max. LTV ratio	90%	85%	85%	85%	85%
Max. DTI ratio	300%			500%	500%
Interest rate stress test	Not specified	5%	5%	5%	Whichever is highest of: a 3 percentage points increase from the current level or 7%
Flexibility quota			10%	10% (Oslo: 8%)	10% (Oslo: 8%)

Source: Finanstilsynet, 2022 & Government, 2022

2.6 Curling

2.6.1 Redefining the Curling Term

High housing prices and increased interest rates make it difficult for young buyers to obtain sufficient financing for home purchases independently. A robust economy in the parental generation contributes to further driving up housing prices. Optimally leveraging the purchasing capacity their robust economy entails, would thus involve assisting the younger generation entering the housing market. The support can be in the form of financial gifts, inheritances, or by being real estate surety (Wig, 2021). Certainly, such financial support contributes to creating opportunities for those who have had a stroke of luck and come from resourceful families. This helps define the concept of the “curling generation”, which contributes to social and economic inequality in society (Midtgaard, 2023). Thus, curling is defined as the help one receives in order to access the housing market. Note that curling in this study not only refers to help from parents, as help also

can be received by other external parties, but parents are the most common helpers, and the term has its outspring from that.

Acting as a real estate surety involves assuming the role of a guarantor for another individual's financial obligations, commonly associated with loans or debts. Real estate surety usually provides a substantial asset, such as high-value property, to assure the lender that all or part of the financial obligation will be repaid. This collateral serves as additional security for the lender in case the primary borrower fails to fulfill their obligations as stipulated in the loan agreement (Iversen, 2019).

In such an arrangement, the surety becomes legally bound to cover any outstanding payments that the primary borrower cannot fulfill, including the principal amount, interests, fees, and other associated costs stipulated in the loan agreement. If the surety is unable to settle the unresolved debt, the loan agreement typically grants the lender the right to take measures to sell the asset used as collateral, with the aim of recovering the outstanding loan amounts (Eiendomsfinans, 2023).

2.6.2 Why is Curling an Interesting Topic?

Escalating housing prices have brought housing and housing wealth into focus on the political agenda in Norway, much like in many other countries. Concurrently, there has been an increased awareness of the generational conflict between young individuals characterized as "housing-poor" and middle-aged and elderly individuals regarded as "housing-wealthy". A report published in the *Journal of Housing Research* has provided evidence that only 1 percent of first-time buyers in Oslo have the opportunity to enter the housing market without financial support from their parents (Marjamaa, 2021). Consequently, curling, where the older generation supports younger individuals in accessing the housing market due to soaring prices, has become widespread.

Housing prices, especially for smaller, more affordable properties, have steadily risen since 1993, creating increased demand among first-time buyers or those with limited financial means. This trend has added pressure to housing prices, resulting in potential artificial demand and housing market imbalances. Approximately 40 percent of individuals aged 20 to 39 rely on financial support to enter the housing market (Ambita, 2022), raising concerns about housing bubbles. The reliance on curling raises concerns about its impact

on social democracy and the potential contribution to increased social inequality. In 2013, the Nurse Index indicated that an average salaried worker had the opportunity to purchase 11 percent of the available properties in the Oslo housing market, while this percentage had dwindled to only 1 percent in 2021 (Marjamaa, 2021). This phenomenon may exacerbate economic disparities between generations and within generations, potentially affecting family solidarity (Gulbrandsen et al., 2015). Understanding curling's implications is vital, given its significant role in shaping housing consumption patterns.

3 Research Question and Hypothesis

3.1 Development of Research Question

For most individuals, the purchase of a home represents the most significant financial investment over the course of their lives. The real estate market, therefore, constitutes a pivotal component of an individual's financial situation and has a substantial impact on their quality of life. Potential changes in the real estate market and related policy guidelines can have significant implications for the financial well-being of individuals and for society. In 2010, The Norwegian Supervisory Authority introduced guidelines for down payment requirements in home purchases. The primary objective was to promote financial stability and safeguard individual borrowers by preventing excessive debt burdens (E24, 2010). However, the heightened down payment requirements for home purchases have posed challenges for young adults with average incomes, impeding their ability to partake in what is traditionally considered one of Norway's most valuable welfare benefits: homeownership (Dreyer, 2014). Among first-time homebuyers, there has consequently been a growing prevalence and a heightened need for support to enter the real estate market. To comprehend the extent to which this kind of support is utilized to offset credit restrictions and the challenges they pose, the following research question in this study is posed:

How has the Norwegian Financial Supervisory Authority's introduction of a down payment requirement affected the extent of curling of young people into the Norwegian housing market?

3.2 Development of Hypothesis

Hypothesis testing constitutes a fundamentally crucial aspect of scientific research. Within this process, hypotheses are formulated to represent statements or assumptions that reflect the research question. These statements are translated into two competing hypotheses. The purpose of these hypotheses is to shed light on the effect of an exposure or treatment. The null hypothesis posits that there is no significant difference or effect of the exposure. In other words, it assumes there is no statistically significant relationship between the

dependent variable and the independent variables when the null hypothesis is valid. Even though clear numerical differences in the results may appear, these variations are considered products of random variation. Conversely, the alternative hypothesis expresses a contradiction to the null hypothesis, suggesting that the latter is untrue. To evaluate the validity of the null hypothesis, statistical methods are employed to calculate the probability of its truth. This calculated probability measure is known as the p-value. If the calculated p-value falls below a predetermined threshold, this leads to the rejection of the null hypothesis, indicating the presence of a statistically significant result (Pripp, 2015).

In this study, the following null hypothesis is formulated:

H₀: The introduction of credit restrictions has no effect on the extent of curling among young homeowners in the Norwegian housing market.

This assumption is based on the general understanding that changes in credit restrictions, specifically down payment requirements, do not lead to substantial alterations in curling. Any observed differences are therefore attributed to random variation.

The alternative hypothesis in this research is formulated as follows:

H₁: The introduction of credit restrictions has an effect on the extent of curling among young homeowners in the Norwegian housing market.

This hypothesis suggests that there is indeed a relationship between changes in credit restrictions and the extent of curling among young homeowners in the Norwegian real estate market. It questions the validity of the null hypothesis and indicates that changes in credit restrictions have a measurable impact on curling. This implies that observed changes in curling cannot be ascribed to random variation but represent an actual statistical relationship.

To assess the validity of these hypotheses, one can employ statistical methods to determine whether there is sufficient evidence to conclude whether the null hypothesis should be rejected in favor of the alternative hypothesis. The results of hypothesis testing will contribute to illuminating whether credit restrictions have had an effect on curling since the introduction of the down payment requirement in 2010.

4 Methodology

4.1 Data Collection

This section introduces the datasets used in this analysis and provides a detailed description of their structure and content. An explanation of the selection of these specific datasets and their relevance to the research question is provided. Understanding how the data was collected and organized is crucial for assessing the reliability and validity of these findings.

4.1.1 Population and Sample

In the context of the research question, “How has the Norwegian Financial Supervisory Authority’s introduction of a down payment requirement affected the extent of curling of young people into the Norwegian housing market”, it is advisable to select a population that focuses exclusively on potential first-time buyers in the housing market. First-time buyers are particularly vulnerable to down payment requirements, as they often lack substantial equity and have limited financial resources (Ambita, 2022). Therefore, they are more reliant on external support to enter the housing market. To narrow down this study to this specific population, the age group ranging from 20 to 40 years old is included. This choice is justified by the fact that this age group often represents the demographic that is capable of purchasing their first home. Data from the 2015 Living Conditions Survey indicates that the average age at which young Norwegians leave their parental homes stands at 20 years. Furthermore, the study highlights that approximately half of the young homeowners in the age group of 20 to 34 years have received financial support to access the housing market (Sandlie, 2019).

In the initial stages of preparations and programming, information about the status code of each individual, indicating whether the person is a resident, emigrant, or deceased were gathered. The variable encompasses all individuals who have had or currently have a national identification number with a status code in Norway (Microdata, 2023c). Since this study are exclusively examining the Norwegian housing market, the dataset is delimited to include only individuals who are still residing in Norway as of the present date.

Furthermore, data from Statistics Norway are utilized with a selective approach to establish

a representative sample within this age group. The data comprises registry data collected by various Norwegian government institutions, primarily obtained from the tax authority for taxation purposes. Therefore, the sample is based on available data from Statistics Norway to gain insights into the economic circumstances of buyers in the housing market, as well as their association with curling.

4.1.2 Design of the Study

Due to Statistics Norway's extensive historical data collection over several years, it has enabled the implementation of a longitudinal analysis in this study. Longitudinal analysis, also known as panel data analysis, is employed to measure changes over time related to one or more variables or a defined group of individuals. Longitudinal studies often use panel data, which is examined through experimental research to analyze changes over time. However, it's vital to note that experimental research focuses on external alterations or exogenous variations to establish causal connections. Panel data serves as a valuable tool for observing long-term changes in individual units over time but is not an experimental approach itself (Arnold et al., 2017). This approach has thus afforded the opportunity to follow the developments over time regarding the impact of down payment requirements on curling among buyers aged 20 to 40 years. Data utilized is spanning from 2005 to 2020, which has allowed to identify trends, patterns, and shifts in the phenomenon and dynamics associated with curling in the real estate market. Through the application of longitudinal analysis and a time interval of 15 years, conclusion based on both short-term and long-term have been drawn, thereby enhancing the validity and relevance of these findings in relation to the research question. However, it is important to acknowledge that such analyses can be time and resource-intensive, and the risk of people drop-out must also be considered.

4.2 About Microdata

Microdata.no is employed as the primary source for the data analysis for this study in this paper. Microdata.no provides access to unaltered registry data from Statistics Norway without requiring project approval or applications. This platform, a collaboration between Sikt - The knowledge sector's service provider and Statistics Norway, offers simplified

access to valuable Norwegian registry data. Approved research institutions, departments, and directorates gained access to microdata.no from spring 2022, allowing comprehensive analyses involving all available variables. Utilizing microdata.no has facilitated flexible and accessible data exploration, enabling in-depth investigations into relationships relevant for the research question. The platform's user interface includes privacy measures and confidentiality filters, ensuring data remains within the platform, complying with legal regulations. As of the first quarter of 2023, microdata.no encompasses data from 11 million individuals and 405 variables, with a time series stretching back to 1964 (Microdata, 2023a).

4.3 Variable Selection

To identify which individuals have entered the Norwegian real estate market through curling, several preparations and findings are necessary to define this variable and its underlying conditions. The first condition focuses on collecting information about individuals' housing situations, specifically whether they rent or own a property and, if applicable, when the transition from renting to property ownership occurred. The second condition for the curling variable pertains to the resources used to facilitate the transition from renting to property ownership, as the study aim to ascertain how an individual has become part of the real estate market through this process. In this context, curling can take the form of financial support, such as inheritance or gifts, or a specific sum of money deposited into a bank account. An alternative form of curling may involve the participation of a co-borrower or a real estate surety. Based on these conditions, it is possible to determine whether individuals have entered the real estate market through curling or not. Below, a definition of the various conditions and the subsequent process for developing the variable is provided.

4.3.1 Debt

To systematically assess the impact of down payment requirements as credit restrictions on curling within the Norwegian real estate market, the analysis initiated by conducting a classification of individual housing situations, specifically, whether individuals were in a renting or ownership situation. Furthermore, it was pertinent to perform a temporal

identification of the moments when these individuals transitioned from renting to owning a residence. The objective was to investigate and analyze whether the respective housing acquisitions were autonomously executed by the individuals themselves or if they were introduced to the housing market through curling.

Microdata.no provides several pertinent variables for analyzing individual housing situations, specifically for distinguishing between ownership and rental arrangements. Unfortunately, the validity period of these variables was limited to data starting from 2015. Consequently, due to this constraint, alternative approaches were explored for assessing individual housing situations.

In this context, a methodology was developed to estimate the likely timing of individual's housing purchases using the debt variable. This variable provides information about an individual's debt to both national and international creditors, as well as their share of debt in a housing company (Microdata, 2023b). To identify potential housing purchases, a threshold value was established to represent a reasonable amount to indicate such a purchase. It is assumed that an increase in debt exceeding 1,000,000 NOK, excluding student loans, car loans, and other potential loans, likely reflected a housing purchase. The year 2015 is set as the reference year based on Statistics Norway's housing price index, as this year represented a stable starting point for housing prices and debt. Using the 2015 housing price index, the relative changes in housing prices is calculated, forming the basis for identifying the debt jump for the relevant years within the timeframe. This allowed identifying the first condition in the curling variable, namely the transition from renting to owning a property.

4.3.2 Inheritance and Gifts Received

As previously mentioned, curling can manifest itself in the form of financial support, such as through inheritance or gifts. To identify curling in the form of inheritance or gifts for individuals still residing in Norway, Statistics Norway's custom variable for received inheritances and gifts is utilized. This variable displays the total sum received through inheritances or gifts of 100,000 NOK or more (Microdata, 2023d), as there is no obligation to report gifts or inheritances with a lower value in the tax return (Accountor, 2020). The criterion inclusion in the curling variable as a recipient of inheritance or gifts was thus

set to have received a cumulative sum, for the current year and the subsequent year, of 100,000 NOK or more.

4.3.3 Deposits

Curling can also manifest through bank deposits. An analysis of individual bank deposits at the end of the year compared to the previous year can provide insights into the financial progression from one year to another. Therefore, the inclusion of the bank deposit variable from Statistics Norway in the analytical approach was employed to unveil potential financial support related to curling in the housing market. These variable records all deposits made in national banking institutions at the year's end in the respective year (Microdata, 2023e).

A threshold value of 200,000 NOK was established as a criterion to identify possible instances of curling or financial support in the Norwegian housing market. This choice was rooted in a meticulous assessment of several factors, including the age group of individuals in the population, comprising individuals aged 20 to 40 years. While, in theory, individuals in this age bracket could accumulate 200,000 NOK in savings over the course of a year by practicing stringent financial discipline, it is essential to consider the financial realities faced by most individuals in this age group. These financial realities encompass substantial obligations such as student loans, daily living expenses, and frequent modest incomes, particularly among individuals within the lower income strata of the population.

Considering the economic realities of the target demographic, one can conclude that a bank deposit exceeding 200,000 NOK between two consecutive years likely indicated some form of financial support.

4.3.4 Gross Wealth

As mentioned earlier, curling often occurs through financial support provided by parents, grandparents, parents-in-law, or other individuals with financial resources to offer support. However, a particularly prominent method of curling takes the form of real estate sureties or co-borrowers. With the objective of capturing such instances of curling, it was decided to incorporate gross wealth as a third condition in the curling variable. The variable employed to uncover this type of curling is taxable gross wealth, encompassing assets

subject to taxation, both within the category of real capital and gross financial capital (Microdata, 2023f).

A pivotal aspect of this decision involved estimating the percentage share of gross wealth that can be directly attributed to housing capital. This was conducted taking into consideration tax legislation that assigns homes a tax assessment value representing only 25 percent of their actual market valuation (Skatteetaten, 2023). To calculate this proportion, the following mathematical formula is utilized:

$$\text{PercentageOfGrossWealth} = \frac{\text{TaxAssessmentValueOfHousing}}{\text{GrossWealth}} * 100\% \quad (4.1)$$

The calculations revealed that home equity constituted 70 percent of the overall gross wealth. Considering the tax regulations assigning a 25 percent assessment value of the real market value (denoted as “V”), the following equation are formulated:

$$70\% = \frac{0.25V}{\text{GrossWealth}} * 100\% \quad (4.2)$$

Solving for “V”, shows that the residence’s actual value was 2.8 times the gross wealth. Applying this factor of 2.8 corrected the gross wealth variable from Statistics Norway to reflect the real market value of the residence more accurately.

Furthermore, a methodical approach akin to that used for the debt variable were employed to establish a threshold value indicating potential housing purchases. In this context, 2015 is also selected 2015 as the reference year based on the housing price index if an increase in gross wealth of more that 1,000,000 NOK most likely reflected a housing acquisition in 2015. Using the housing price index for 2015, calculations were performed to gauge the relative changes in housing prices, forming the basis for identifying the significant increments in gross wealth for the pertinent years within the defined timeframe.

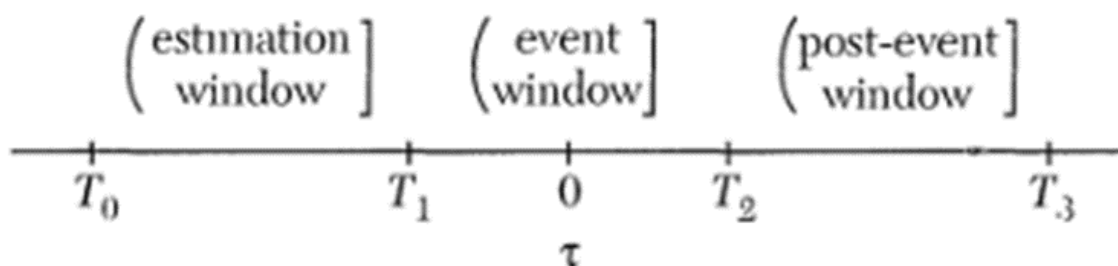
4.4 Event Study as Methodology

To measure the effect of the change in down payment requirement on curling, an event study has been carried out. In economics and finance, such studies often center around events’ effect on equity pricing using financial data, as this is the original purpose of

the event study (MacKinlay, 1997; McWilliams et al., 1997). The economic event is traditionally assumed to have a market reaction measured by market price on a stock (MacKinlay, 1997). In this case, the market reaction is measured by a different dependent variable: curling. Thus, literature about event studies has formed the foundation of the methodology and design of the study but has been customized to fit the matter at hand. The event of interest must be defined along with selection criteria (MacKinlay, 1997). The economic event in this study refers to the introduction and change in down payment requirements in Norwegian housing investments, which occurred in 2010 and 2012. An effect of this change on the extent of curling serves as the subliminal assumption of the study. The data made available from Statistics Norway made it possible to use a large selection when conducting the study. With data ranging in the interval from 2005 to 2020, the effect on curling and its evolution is observed over time and thus there is a longitudinal aspect of the study.

According to MacKinlay (1997), an event study is usually divided into three: the estimation window finding place from $\tau = T_0$ to $\tau = T_1$, the event window between $\tau = T_1$ and $\tau = T_2$, while $\tau = T_2$ to $\tau = T_3$ representing the post-event window as shown in Figure 6 below. The estimation window allows for estimation of the expected value on the dependent variable if the event did not take place. In this study the curling variable will be the subject of interest in the estimation window. Comparing and contrasting the expected value up against the realized value in the event window enables calculation of the abnormal value of the dependent variable, defined as the difference between the expected value and the actual value in the event window (MacKinlay, 1997).

Figure 4.1: Timeline of Event study



Source: MacKinlay, 1997

4.4.1 Defining the Event- and Estimation Window

Based on the information outlined in section 2.5, the event of the study in this paper is defined as the introduction of a down payment requirement in 2010.

In the estimation window, the expected value of the dependent variable is measured. No standard length is determined on a general basis, but literature suggests different lengths of time intervals to define an appropriate estimation window, although mostly referring to days as stock data is likely to be generated daily (MacKinlay, 1997; Sorescu et al., 2017; Brown et al., 1985; Aktas et al., 2007). It should, however, contain sufficient data amount to make the estimation of the dependent variable representative. With yearly data at hand, an estimation window in the interval from 2005 to 2008 is constructed in order to achieve a representative estimate of curling prior to the event.

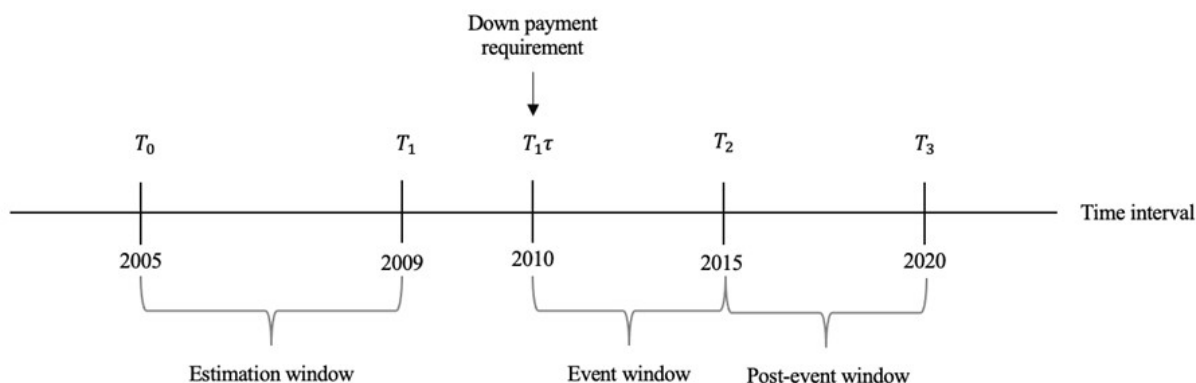
The event window should not overlap with the estimation window, to avoid that the event is captured by both windows (MacKinlay, 1997). Customization of the estimation- and event window to avoid noise can in some cases be effective, for instance to avoid the effect of event announcements on the dependent variable. One can assume that the announcement of the change prior to its entry into force did not affect the dependent variable, as buyers would not need the help that the change posed before it actually took effect. Thus, the event window begins at the point of the down payment requirement change in 2010. McWilliams and Siegel (1997), supported by Delattre (2007), argue that the event window should be kept quite short to avoid other events that are not related to the one of interest from polluting the values. Due to no change in the requirement after 2012, the event is pending; therefore, the event window in reality is not yet closed. However, to avoid such pollution from other events, especially the lending regulation from recent years, the end date of the event window is determined to be at the point where the next major credit restriction event took place in 2015. Then, the Ministry of Finance adopted a regulation based on guidelines from the Financial Supervisory Authority of Norway, regarding new residential mortgage loans. The regulation has been extended and amended on three occasions since the first introduction. The event window in this study is 2010-2014, effectively.

4.4.2 Post-Event Window

The constraint imposed by the down payment requirement continues to be operative, thus sustaining an event window that remains open. The promulgation of this regulatory measure by the Ministry of Finance in 2015 marks as the next salient milestone in the context of credit restrictions, thereby defining the event window delineated above. Therefore, the outcomes require a thorough examination considering this crucial development. The available data extends until 2020, affording a post-event window spanning from 2015 to 2020.

The event study outlined above is illustrated in Figure 4.2.

Figure 4.2: Event timeline illustrated



4.5 Regression Analysis

Regression analysis constitutes a fundamental tool and a basic method employed to systematically explore the relationship between multiple potential independent variables (predictor variables) on a dependent variable (response variable). The aim of such an analysis is to comprehend how changes in the independent variables correlate with and predict the marginal changes occurring in the dependent variable. The simplest regression model can be formulated as $y_{it} = \beta_0 + \epsilon_{it}$, where one estimates the parameter β_0 , often represented as $\hat{\beta}_0$ and this value serving as the estimated value of y , denoted as $\hat{y} = \hat{\beta}_0$.

In this study, the dependent variable, referred to as the curling variable, is a discrete variable with binary outcomes, $y_{it} \in \{0, 1\}$, meaning that the variable can assume only the values of 0 or 1. Given this characteristic, the dependent variable in this analysis is

characterized as a binary dependent variable. To systematically examine and model the relationship between a binary dependent variable and one or more independent variables, logistic regression analysis is commonly employed. However, this approach has been to utilize OLS regression, justified by its capability to yield similar results to logistic regression in this specific contextual scenario, while being somewhat less complex in interpretation. To reinforce the approach, a logistic regression analyses is conducted, and the outcomes are available in Appendix 1.

The overall model structure for an ordinary least squares regression with t explanatory variables can be expressed as follows:

$$y_{it} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_t X_t + \epsilon_{it}$$

Here, Y represents the dependent variable, the response variable one aims to predict or explain. The X s in the regression equation are the independent variables or explanatory variables, assumed to influence or explain the variation in the dependent variable. β_0 denotes the intercept or constant term, indicating the expected value of Y when all explanatory variables X are zero. $\beta_1, \beta_2, \dots, \beta_p$ are regression coefficients signifying the strength and direction of the relationship between the dependent variable and each of the explanatory variables. These coefficients are measured in units of Y per unit of the respective X variables.

The purpose of an ordinary least squares regression is to find values for $\beta_1, \beta_2, \dots, \beta_p$ that minimize the overall error between the actual observations of the dependent variable Y and the predicted values generated by the model. The overall error is measured by calculating the gap between the actual values of Y and the model's predictions, often termed as predicted values. Formally, these predicted values are represented as residuals, and these values are squared. An ordinary least squares regression minimizes the sum of the squared residuals by adjusting the $\beta_1, \beta_2, \dots, \beta_p$ values in the model. The objective is to find the β values that minimize this sum of squared deviations, resulting in the best fit of the linear regression line in the dataset (Sahu, 2023).

To evaluate a policy, such as the implementation of the down payment requirement in 2010 occurring at time t , the most effective approach would be to conduct a regression analysis, as illustrated below:

$$y_{it} = \beta_0 + \beta_1 * Event_t + \epsilon_{it}$$

This regression allows us to understand how the event influences the likelihood of observing $y = 1$. Here, “Event” represents a variable indicator determining whether the event takes place before or after year t .

4.6 Heterogeneity

In the results section, the analysis is expanded to incorporate tests for heterogeneity modeling, referring to the variation or differentiation in patterns of outcomes within a dataset. The objective of such modeling is to identify factors that can elucidate the reasons for individual differences among participants in the study, even when they share similar characteristics. Heterogeneity analyses offer a deeper understanding of demographic variables associated with curling. Heterogeneity tests provide insight into whether a model or relationship remains consistent across different segments of the population. By integrating aspects of heterogeneity, precision in statistical models can be enhanced, and the stability of findings validated, thereby bolstering confidence in the obtained results.

4.6.1 Difference-in-Difference Analysis

For the purpose of examining whether the probability difference for the dependent variable based on the independent variables exhibits a change associated with an intervention or treatment, as the study in this paper intend to investigate regarding the implementation of credit restrictions, the application of a difference-in-differences analysis is employed. This analytical approach represents a statistical method used to estimate the impact of a policy alteration, treatment, intervention, or program on a specific group by comparing changes in outcomes between a treatment group and a control group over time. In this study, individuals within the estimation window constitute the treatment group, while those within the event window and post-event window form the control group.

To employ the difference-in-differences analysis, longitudinal data from both the treatment and control groups are necessary to establish a comparable situation, enabling the estimation of a causal effect, which implies a relationship between cause and effect. Subsequently, it becomes plausible to ascertain whether the alterations in the outcome

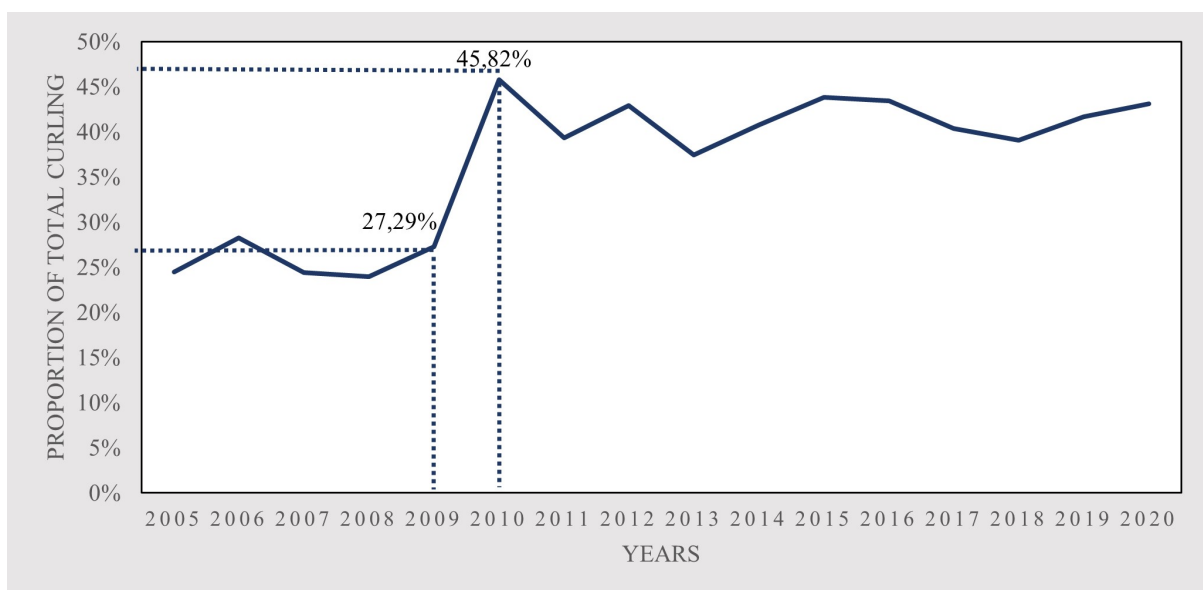
are attributable to this intervention or may be attributed to other concurrent factors or trends (Goodman-Bacon, 2021).

5 Results and Analysis

5.1 Curling

The purpose of this study is to investigate the potential influence of the introduction of a down payment requirement for mortgage loans in 2010 on individuals aged 20 to 40 who have received support to access the housing market. A clear and coherent representation of the findings in Figure 5.1. The graph illustrates the proportion of individuals who have received financial support for home purchases among those who have bought homes in the respective years. The approach chose to focus on buyers who received support, avoiding distortions that may arise from analyzing the entire population. This selective approach provides a more precise assessment of the support's impact on actual property buyers.

Figure 5.1: Jump in curling



*y-axis: Proportion of curled people as a share of total home purchases

*x-axis: Respective years

This graph shows an increase of 18.53 percentage points in the transition from the estimation window to the event window. It can be observed from the graph that this surge remains consistent at around 40 per cent, without a subsequent decrease. This finding is also supported by Statistics Norway's data indicating that 5 out of 10 homebuyers in their twenties have received financial support from parents or in-laws for financing in the period from 2010 to 2015. It is also common among homebuyers in their thirties to

receive support. Similar results from Statistics Norway and the model constructed for the purpose of this study indicates that the model produces reliable results.

The increase implies a turning point, or that a noteworthy event occurred during the transition from 2009 to 2010, as this was the only year where the percentage displayed such a substantial surge. Figure 8 exclusively shows the pronounced surge in curling; however, for a more comprehensive representation of the actual figures, a table is compiled that illustrates the mean proportion of individuals who have received support, either in the form of financial support or through the involvement of a real estate surety, to facilitate entry into the housing market. The table also incorporates the mean total number of home purchases per year, enabling a comparison between recipients of support and non-recipients in various years. The mean proportion is calculated by averaging the instances of curling observed across the relevant years within the given period, aiming to ensure a comprehensive representation.

Table 5.1: Development in curling

	Estimation window	Event window	Post-event window
Curling	21 924	37 024	42 559
Real estate surety	20 661	35 460	40 112
Financial support	4 234	4 879	6 674
Purchase	85 412	89 897	101 595
Proportion of curling	25.68%	41.27%	41.92%

**Curling: Total number of individuals assisted in entering the housing market.*

**Real estate surety: Number of individuals aided in purchasing a home with a real estate surety.*

**Economic support: Number of individuals receiving support for home purchase in the form of financial support.*

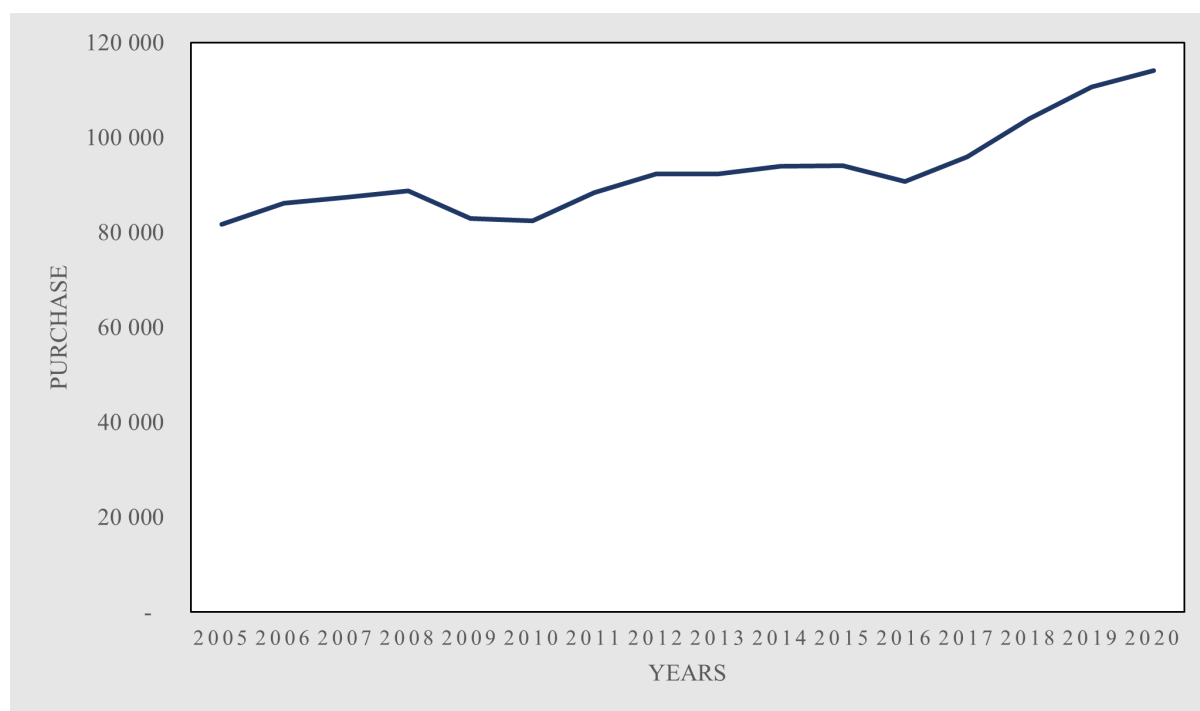
**Purchase: Total number of home purchases among individuals aged 20 to 40.*

**Proportion of curling: Aggregate count of curling divided by the total number of home purchases*

Table 5.1 illustrates the longitudinal development of curling during the observation period from 2005 to 2020, divided into estimation window, event window, and post-event window as this arrangement facilitates clarity in the table. Another reason is the fact that the increase from 2009 to 2010 might not be singularly representative, as 2009 itself was a unique year with the economy in a recovery phase following the financial crisis. Observing if the alteration is significant across the averages in the three distinct periods also provides

reassurance that the effect is persistent. Table 2 demonstrates a notable increase in the number of curling instances from the estimation window to the event window. With an average percentage of 25.68 and 21,924 individuals in the estimation window, the number of curling instances increases, on average, by a change of 15.59 percentage points to the event window, amounting to an alteration of 15,100 persons. It is also noteworthy that this increase does not correlate with a corresponding rise in the number of home purchases within the same timeframe, as illustrated in Figure 5.2. The graph in Figure 5.2 reveals a relatively steady increase in the number of home purchases over the years compared to the trend observed in curling. This observation further bolsters the assertion that credit restrictions have contributed to an increased need for support among individuals entering the housing market.

Figure 5.2: Number of home purchases



*y-axis: Number of purchases

*x-axis: Respective years

Table 5.1 suggests a trend where more individuals opt for entering into real estate surety agreements instead of receiving substantial sums of money as financial support. This phenomenon can be explained by several factors. Some individuals seek financial independence from other parties, hence their preference to avoid becoming financially reliant by accepting substantial monetary gifts. Additionally, real estate surety agreements

may be more accessible to those who lack financial resources or available capital to receive monetary gifts. For some, it may also be perceived as less risky to provide collateral in a physical asset, as opposed to receiving substantial sums of money, which can be more challenging to track and manage.

In the aftermath of the global financial crisis in 2008, Norway sought to stabilize the economy and mitigate the risk of future financial crises by making housing loans less accessible to the general public, thus ensuring their repayment ability. The observed increase in curling from the estimation window to the event window can be understood in the context of the financial crisis, as stricter credit restrictions amplify the need for support to access the housing market for the younger generation. However, parents were able to aid their children in entering the housing market as owning one's home is considered a societal norm in Norway, aligning with the Norwegian housing model, which artificially stimulates demand and consequently shields housing prices from decline.

5.1.1 Regression Analysis of Curling

Based on the presented figure and table above, and whether the down payment requirement introduced in 2010 have had an impact on curling among young individuals, a regression analysis with curling as the explanatory variable and the introduction of credit restrictions in 2010 as the independent variable is here presented. The independent variable is coded as 0 for the estimation window and 1 for the remaining periods.

The following constitutes the regression equation for the intended analysis below:

$$y_{curling} = \beta_0 + \beta_1 * Event + \epsilon$$

Table 5.2: Regression analysis of curling

	Coef.	Std.	t	P > t	[95% Conf. interval]
Event	0.006352	0.000031	203.32067	0	0.006291 0.006413
Constant	0.007687	0.000023	332.378108	0	0.007642 0.007732

The regression analysis in Table 5.2 reveals a β_1 value of 0.006352, suggesting that the implementation of the down payment requirement leads to an increase of 0.6352 percentage points in the probability of receiving support to access the housing market. In conducting

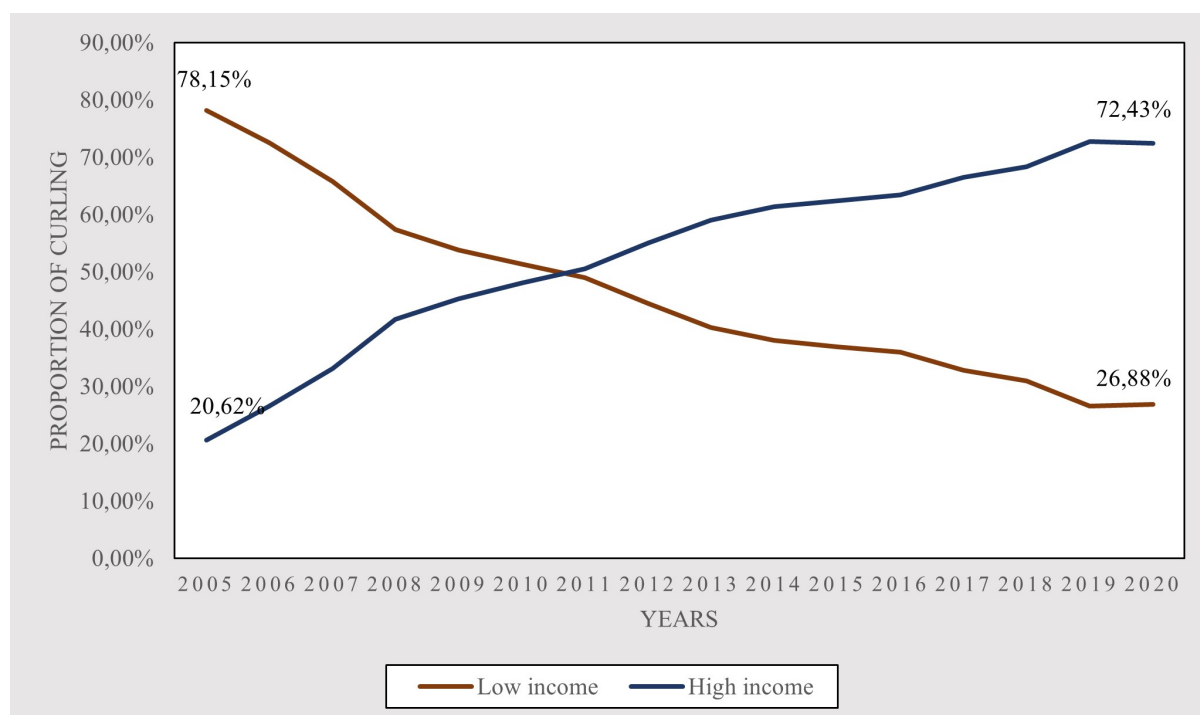
the regression analyses, the entire population is encompassed rather than exclusively focusing on buyers in the market. Primarily, this decision aims to circumvent sample selection bias, as selecting a subset from the population could introduce data skewness due to variations in the number of buyers across different years. β_0 suggests a 0.7687 percentage point likelihood of receiving housing market access support before the down payment requirement's introduction. After 2010, the probability of curling increases to 1.4039 percentage points.

The results from the regression analysis indicate high t-values with an associated p-value of 0 and narrow confidence intervals. This suggests a statistically significant association between credit restrictions and curling.

5.2 Income

In the analyses of heterogeneity, the process is first categorized by individual income among those who have received support to enter the housing market. The income variable encompasses cash wages, taxable fringe benefits, as well as compensation for sickness and maternity benefits received during each respective calendar year (Microdata, 2023g).

The income variable is divided into two categories: low and high income. Low income is defined as earnings below 400,000 NOK, while high income includes individuals earning over 400,000 NOK. This categorization is based on the average income between 2005 and 2020 for individuals aged between 20 and 40. The threshold value for average income within this group was set at 400,000 NOK.

Figure 5.3: Distribution of income

*y-axis: The proportion of curling in the population

*x-axis: Respective years

Figure 5.3 depicts changes over time, offering insight into the progression of curling throughout the observed period spanning from 2005 to 2020. The graph represents the proportion of individuals with high and low income who have received support for home purchases among all those who have received help. Before the implementation of credit restrictions, individuals with low income received the most support for home purchases. However, after the introduction of the down payment requirement, this trend shifted, and individuals with higher income started receiving the most support. For those with a low income, the share falls approximately as much as the share for those with a high income rises, which may seem to be due to the financial credit restrictions implemented in 2010. The financial credit restrictions implemented in 2010 mandated that homebuyers had to cover a substantial portion of the property's purchase price with a down payment while demonstrating sufficient financial stability to manage potential interest rate hikes. Consequently, individuals with lower incomes might have been compelled to abstain from substantial participation in home purchases, while curling plausibly emerged as a more viable option for those with higher incomes. This divergence potentially emerges since individuals with higher income levels generally possess better financial stability, enabling

them to withstand substantial increases in loan costs. Accordingly, this situation might have facilitated their ability to finance home purchases by meeting the down payment requirement through curling, potentially leading to a higher exclusion rate of individuals with lower incomes from this arrangement.

Increased access for those with the highest income underline the existing economic inequality within society and may have contributed to further amplification of this disparity within the housing market, as those with higher incomes seem to have had greater advantages and flexibility associated with stricter credit restrictions. This, in turn, raises questions about equal access to housing and exclusion from a public welfare good in Norway, which contradicts the Norwegian housing model that suggests that home ownership should be available to the great majority of the population.

5.2.1 Regression Analysis of Income

To investigate the statistical significance associated with the difference in the probability of curling among high or low income and its association with the implementation of the down payment requirement, a regression analysis is presented below. To conduct the regression analysis and reach a conclusion, the following hypotheses have been formulated:

H₀: The difference for curling based on income shows no change associated with the implementation of credit restrictions in 2010. The alternative hypothesis is formulated as follows:

H₁: The difference for curling based on income shows a change associated with the implementation of credit restrictions in 2010.

The following constitutes the regression equation for the intended analysis below, where low income = 1 and high income = 0:

$$y_{curling} = \beta_0 + \beta_1 * Event + \beta_2 * Income + \beta_3 (Income * Event) + \epsilon$$

Table 5.3: Regression analysis of income

	Coef.	Std.	t	P > t	[95% Conf.	interval]
Event	0.009625	0.000038	255.851011	0	0.009551	0.009698
Income	0.005303	0.000049	108.780991	0	0.005208	0.005399
Income * Event	-0.00792	0.000065	-122.586993	0	-0.008047	-0.007794
Constant	0.005391	0.000026	209.366444	0	0.005341	0.005441

The results from Table 5.3 reveal a total of four potential outcomes estimated for two groups across two time periods. Firstly, one has the probability of receiving financial support for home purchases for a randomly selected individual with high income before the introduction of the down payment requirement. This means that $\text{Income} = 0$ and $\text{Event} = 0$, leaving us with $\beta_0 + \epsilon$, which amounts to 0.5391 percentage points in this case. In other words, an individual with high income is 0.5391 percentage points likely to receive support in entering the housing market before the implementation of the down payment requirement.

The probability that the same individual receives support after the implementation of the down payment requirement entails $\text{Income} = 0$ and $\text{Event} = 1$, resulting in $\beta_0 + \beta_1 + \epsilon$. This indicates that an individual with high income is 1.5016 percentage points likely to receive support after the introduction of the down payment requirement. This gives us a change in probability for those with high income before and after the implementation of the down payment requirement of 0.9625 percentage points.

Now, moving on to individuals with low income, where $\text{Income} = 1$. For an individual with low income before the implementation of the down payment requirement, $\text{Event} = 0$, and the probability is estimated as $\beta_0 + \beta_2 + \epsilon$. This shows that a randomly selected individual with low income is 1.0694 percentage points likely to receive support for home purchases between 2005 and 2009.

Finally, one can analyze the probability that an individual with low income receives support for home purchases after the down payment requirement came into effect in 2010. This probability indicates that $\text{Income} = 1$ and $\text{Event} = 1$, resulting in the probability of curling as $\beta_0 + \beta_1 + \beta_2 + \beta_3 + \epsilon$, which amounts to 1.2399 percentage points. The probability change for those with low income is 0.1705 percentage points.

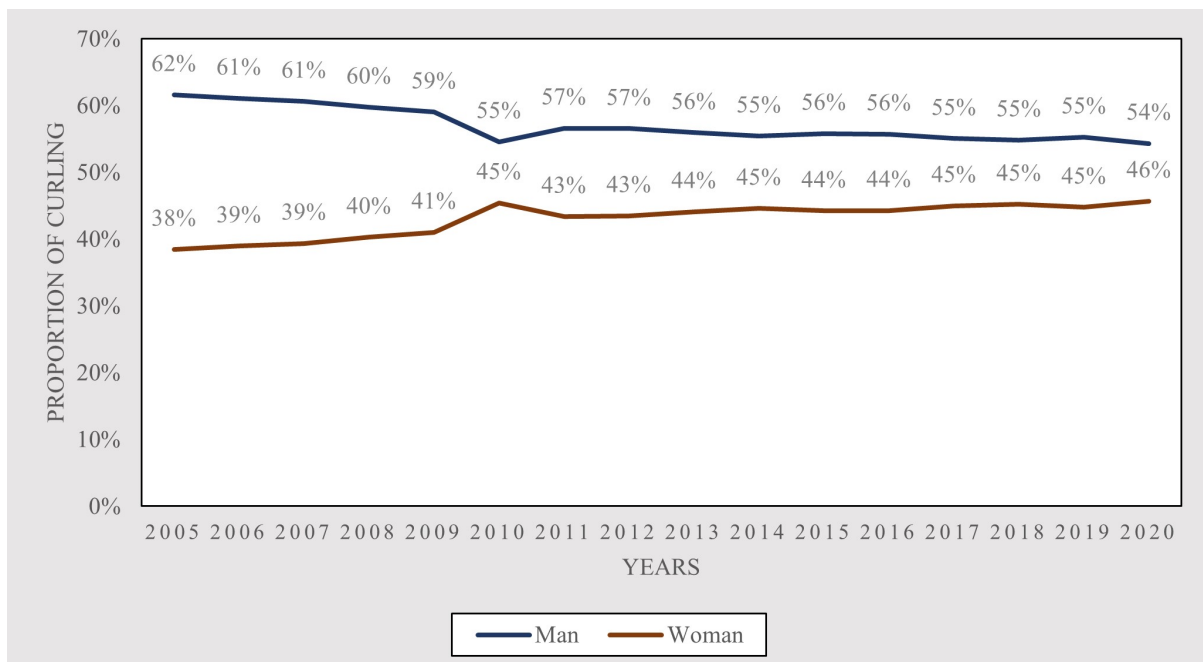
From the results, it can be estimated that the difference between low and high income

before 2010 is 0.5303 percentage points, while it has decreased to a difference of 0.2617 percentage points after 2010. This decrease can be associated with Figure 5.3, where it is observed that the probability for individuals with high income increases by approximately the same magnitude as the decrease in probability for those with low income. Table 5.3 therefore presents an indication of a significant relationship between the differences in probabilities across income and the impact of the implementation of credit restrictions in 2010. This is inferred from the substantial absolute values of the t-values alongside an associated p-value of 0 for all coefficients. The observed change, linked to increased probability of curling for individuals with higher income, is therefore statistically significant, allowing for a high degree of confidence in rejecting the null hypothesis.

5.3 Gender

Furthermore, the sample is divided by gender and analyze the effect of change between genders. The distribution of curling is presented in the figure below. The graph represents the proportion of men or women who have received support for home purchases out of the total curling.

Figure 5.4: Distribution of gender



*y-axis: The proportion of curling in the population

*x-axis: Respective years

From Figure 5.4, it is evident that men have received a larger share of financial support compared to women during the years. Both genders exhibit a slight increase in the proportion from 2009 to 2010. One potential explanation for this gender-related difference may be linked to the traditional disparity in average income between the genders. Nevertheless, the graph shows that women might generally be better positioned to meet the stringent financial requirements imposed by new regulations, such as the mandate of having a 10 per cent down payment for housing purchases.

The financial advantage may make men more inclined to receive financial support from their parents to fulfill the required financial criteria, resulting in a higher proportion of men utilizing curling. It should be noted, however, that traditional gender role patterns may also play a role in shaping expectations related to financial independence and responsibility. If there is an expectation that men, who often represent the older party in a relationship, should bear a greater financial burden within a family, this could potentially lead to them receiving more financial support to secure the opportunity for homeownership.

Historically, in the Norwegian housing- and financial market, men have been characterized by a higher degree of financial risk-taking and a greater propensity to engage in investments, such as in financial markets. This has led to men having an increased capacity to accumulate wealth from such financial investments, which could subsequently be used as down payments for housing purchases (Framstad, 2018).

Nevertheless, the figure reveals that the distribution of curling between genders has gradually equalized over time. This can be partially attributed to the social changes that have taken place, including an increasing emphasis on gender equality between men and women. The heightened focus on financial independence for women has likely contributed to increased female participation in economic activities and investments. Because of this development, gender differences in financial capital have gradually become less pronounced, granting women access to the financial resources necessary for homeownership. This may have also contributed to reducing disparities in the need for financial support. Hence, this contributes to a more egalitarian approach to home acquisition in accordance with the principles of the Norwegian housing model.

5.3.1 Regression Analysis of Gender

The following hypotheses have been formulated to assess the statistical significance regarding the disparity between men and women concerning curling and its association with the implementation of down payment requirements. To proceed with further analysis and conclusions, a regression analysis is presented with the following null hypothesis:

H_0 : *The probability difference for curling based on gender shows no change associated with the implementation of credit restrictions in 2010.*

The alternative hypothesis is formulated as follows:

H_1 : *The probability difference for curling based on gender shows a change associated with the implementation of credit restrictions in 2010.*

The following constitutes the regression equation for the intended analysis below, where man = 1 and woman = 0:

$$y_{curling} = \beta_0 + \beta_1 * Event + \beta_2 * Man + \beta_3 (Man * Event) + \epsilon$$

Table 5.4: Regression analysis of gender

	Coef.	Std.	t	P > t	[95% Conf.	interval]
Event	0.006621	0.000042	158.964041	0	0.006539	0.006703
Man	0.002755	0.000046	59.858601	0	0.002665	0.002845
Man * Event	-0.000523	0.000062	-8.396034	0	-0.000645	-0.000401
Constant	0.00627	0.00003	209.030955	0	0.006211	0.006328

The results from the regression analysis in Table 5.4 suggest differences between men and women regarding the probability of receiving support for home purchases before and after the implementation of the down payment requirement in 2010, with the following findings:

From Table 5.4, before the down payment requirement, the probability of a randomly chosen woman receiving home purchase support was $\beta_0 + \epsilon$, at 0.627 percentage points. After the requirement's implementation, this rose to $\beta_0 + \beta_1$, resulting in a probability of 1.2891 percentage points after 2010. This indicates that women have a 0.6621 percentage point higher probability of receiving support for home purchases post-requirement. For men, the pre-requirement probability was $\beta_0 + \beta_2 + \epsilon$, at 0.9025 percentage points, and

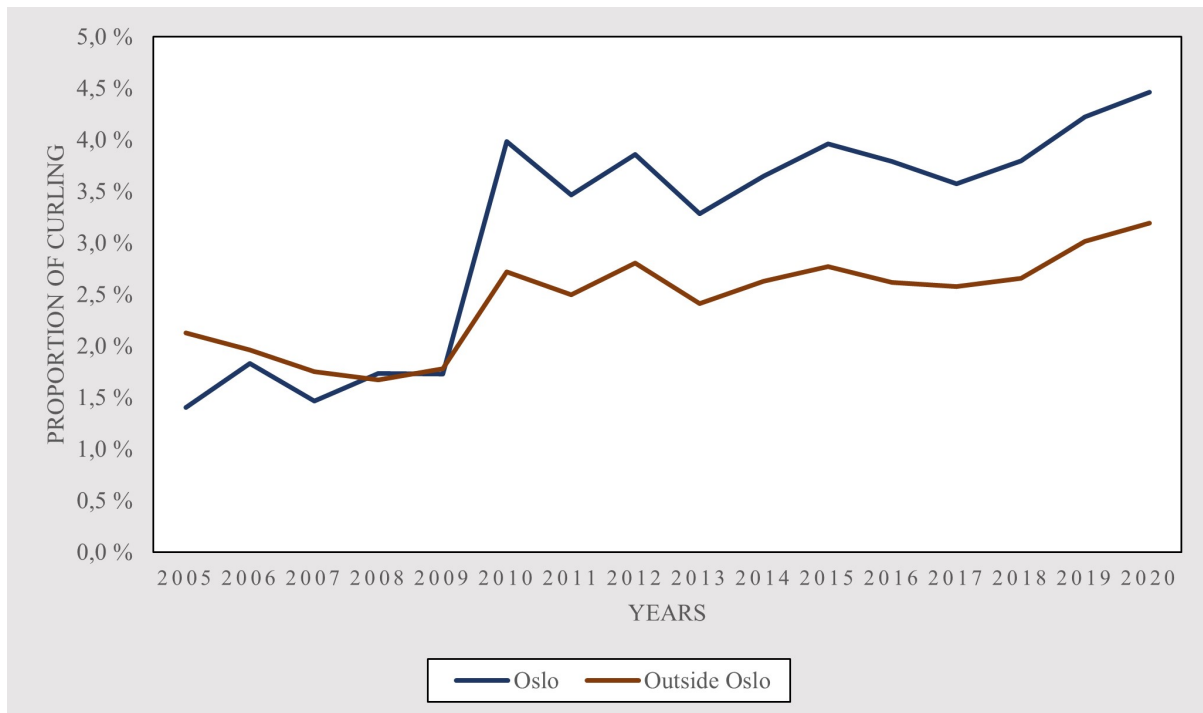
post-requirement it became $\beta_0 + \beta_1 + \beta_2 + \beta_3 + \epsilon$, at 1.5123 percentage points, indicating a 0.6098 percentage point increase in likelihood after 2010.

From the results, it can be estimated that the difference between men and women before 2010 is 0.2755 percentage points, while it has decreased to a difference of 0.2232 percentage points after 2010, which is also supported by Figure 11. The results therefore indicate that the difference in the probability of receiving support for home purchases based on gender underwent a statistically significant change in connection with the implementation of credit restrictions in 2010. This is evident as all coefficients in the regression analysis have a value of 0, with high absolute values for the t-statistics. The confidence interval, established with 95% confidence, shows narrow intervals, thus allowing for the confident rejection of the null hypothesis.

5.4 Place of Residence

Individual residential situations are categorized among those who have received support to enter the housing market. The residence variable encompasses an individual's municipality of residence as per the population registry, dated no later than December 31st for each respective year.

The residence variable is divided into two primary categories: Residing in Oslo and not in Oslo, as housing prices in Oslo have demonstrated a considerable disparity compared to the rest of the country. While this variable may appear somewhat skewed, the primary interest in this analysis lies in the proportion of curling in Oslo. Below, Figure 5.6 is presented to demonstrate the distribution of curling in various observation years, based on residence in Oslo or outside of Oslo.

Figure 5.5: Distribution of place of residence**Figure 5.6:** Distribution of place of residence

*y-axis: The proportion of curling in the population

*x-axis: Respective years

It is evident from Figure 5.6 that Oslo has a higher proportion of curling compared to the rest of the country after the introduction of a down payment requirement in 2010. From 2005 to 2020, the proportion of curling in Oslo has increased by 2.34 percentage points. In contrast, the rest of the country has experienced an increase in the proportion of curling by 0.94 percentage points. This phenomenon can be attributed to Oslo, which is the city with the highest housing prices in Norway. The considerably higher housing prices create likely barriers for young homebuyers in their attempts to meet the financial requirements associated with housing loans, especially regarding the down payment requirement. In addition to this, there is a continuously rising demand in the housing market. With more young individuals seeking to purchase homes in Oslo, combined with limited housing availability, the pressure intensifies. Thus, financial support becomes a crucial factor to many young people in order to overcome the high entry barriers in Oslo's housing market.

5.4.1 Regression Analysis of Place of Residence

The following hypotheses are formulated to determine if there are differences in curling based on the geographical location within the country and whether these changes are associated with the implementation of credit restrictions in 2010:

H_0 : *The probability difference for curling based on place of residence shows no change associated with the implementation of credit restrictions in 2010.*

The alternative hypothesis is formulated as follows:

H_1 : *The probability difference for curling based on place of residence shows a change associated with the implementation of credit restrictions in 2010.*

The following constitutes the regression equation for the intended analysis below, where Oslo = 1 and outside Oslo = 0:

$$y_{curling} = \beta_0 + \beta_1 * Event + \beta_2 * Oslo + \beta_3 (Oslo * Event) + \epsilon$$

Table 5.5: Regression analysis of place of residence

	Coef.	Std.	t	P > t	[95% Conf.	interval]
Event	0.004559	0.000035	128.430914	0	0.004489	0.004628
Oslo	-0.001088	0.000052	-20.748199	0	-0.001191	-0.000985
Oslo * Event	0.007617	0.000076	100.29048	0	0.007468	0.007766
Constant	0.007995	0.000027	294.573865	0	0.007942	0.008048

Table 5.5 illustrates the alterations in the probability of housing support among residents outside and within Oslo before and after the implementation of the down payment requirement. Prior to the policy modification, the probability of support for those outside Oslo stood at 0.7995 percentage points, escalating to 1.2554 percentage points after 2010, representing a 0.4559 percentage point increase in probability. Within Oslo, the probability surged from 0.6907 percentage points to 1.9083 percentage points after 2010, resulting in a substantial rise of 1.2176 percentage points. The data suggests a reduction in the gap between residents outside and within Oslo, decreasing from 0.1088 percentage points before 2010 to 0.0378 percentage points after 2010, potentially due to the notable surge in curling cases within Oslo following the implementation of the down payment requirement.

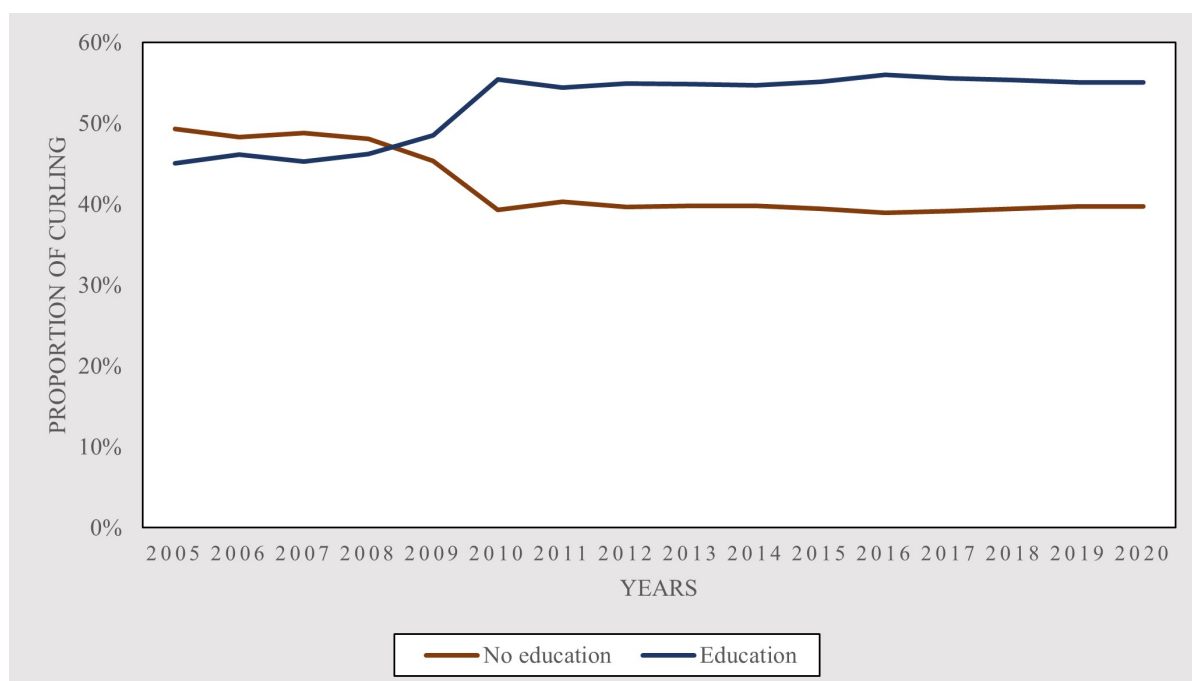
The results in Table 5.5 indicate a substantial increase in the difference in the probability of receiving parental support for home purchases between the two groups from the estimation window to the event window. Despite the increase in the number of cases of parental support both inside and outside Oslo from the estimation window to the event window (as shown in Figure 5.6), the proportion of parental support concerning the number of residents demonstrates an augmented disparity between the groups after the introduction of the down payment requirement.

The difference between these groups, based on the proportion of parental support, appears significant according to the results in Table 5.5, with observed high absolute values for the t-statistics, low standard deviation, and a p-value of 0. Narrow confidence intervals further reinforce the credibility with 95% confidence. Based on this information and the analysis findings, the null hypothesis can be rejected and conclude that the difference in the probability of receiving parental support for home purchases based on residence demonstrates a statistically significant change associated with the implementation of credit restrictions in 2010.

5.5 Education

The provision of housing support among young adults aged 20 to 40 years is also subject to an evaluation of educational attainment as a relevant factor. To this end, education level is categorized among those who have received support to enter the housing market. The educational variable reflects an individual's completed level of education in accordance with the definition of educational levels as classified in 2006 (Microdata, 2023h).

The education variable is categorized into two groups: individuals with education and those without. "No education" encompasses completion up to and including high school, while "Education" includes any education beyond this level. Presented in the figure below is a breakdown that indicates the distribution of curling based on if you are educated or not in the respective years.

Figure 5.7: Distribution of education

*y-axis: The proportion of curling in the population

*x-axis: Respective years

From Figure 5.7, it is evident that individuals without education constituted the predominant group receiving financial support for home purchases prior to the introduction of the down payment requirement. However, this dynamic changed upon the implementation of the down payment requirement, leading to a noticeable divergence between the groups. This change can be partially attributed to a broad assumption that individuals with higher education generally possess better financial prospects. They are assumed to have higher income, improved career opportunities, and therefore the capacity to service a home loan. It is also possible that banks favored borrowers with higher education as they are assumed to possess better financial stability and lower risk of defaulting on loans. This may have influenced access to financial support, thereby creating a more distinct divide among educational groups regarding the ability to obtain support for home purchases. Figure 5.7 shows that after the implementation of the down payment requirement, both groups remain stable at around 55 percentage points and 40 percentage points, indicating a clear change occurring in 2010.

Over time, there might have been a growing perception that higher education plays a substantial role in achieving economic success and stability. The increased likelihood might reflect a trend where more individuals have opted to pursue higher education in

recent decades in response to the increasing demand for workers with higher education. Additionally, government provisions of scholarships, loans, and financial aid have made higher education more accessible for the overall population.

5.5.1 Regression Analysis of Education

Below are the hypotheses formulated to investigate potential differences in the probability of parental support for home purchases based on individuals' educational levels:

H_0 : *The probability difference for curling based on education shows no change associated with the implementation of credit restrictions in 2010.*

The alternative hypothesis is formulated as follows:

H_1 : *The probability difference for curling based on education shows a change associated with the implementation of credit restrictions in 2010.*

The following constitutes the regression equation for the intended analysis below, where education = 1 and no education = 0:

$$y_{curling} = \beta_0 + \beta_1 * Event + \beta_2 * Education + \beta_3 (Education * Event) + \epsilon$$

For a comprehensive overview, the obtained results from the regression analyses are presented in Table 5.6.

Table 5.6: Regression analysis of education

	Coef.	Std.	t	P > t	[95% Conf.	interval]
Event	0.003739	0.000041	90.10263	0	0.003658	0.003821
Education	0.001465	0.00005	29.036155	0	0.001366	0.001563
Education * Event	0.006629	0.000069	96.386451	0	0.006495	0.006764
Constant	0.00736	0.000032	230.064222	0	0.007297	0.007423

The findings in Table 5.6 present four potential outcomes for two distinct groups across two periods. Initially, individuals without education had a 0.736 percentage point probability of receiving home purchase support before the down payment requirement. Post-requirement, this likelihood increased to 1.1099 percentage points, marking a 0.3739 percentage point change in probability.

For those with education, the likelihood of receiving support was 0.8825 percentage points before the requirement. After its implementation, this probability surged to 1.9193 percentage points, resulting in a 1.0368 percentage point probability shift.

Comparing those without education to those with education before 2010, the difference was 0.1465 percentage points, which expanded to 0.8094 percentage points post-2010. This widening gap could be correlated with the trends observed in Figure 5.7, highlighting an increased disparity following the down payment requirement's introduction.

Together, Figure 5.7 and Table 5.6 exhibit alterations in the likelihood of curling between educated and non-educated individuals before and after the implementation of the down payment requirement in 2010. The combined findings presented above, coupled with relatively high t-values, a p-value of 0, and virtually negligible standard errors, can conclude with 95% confidence that there is a statistically significant change associated with the implementation of the down payment requirement in 2010 regarding the probability difference in curling based on education, hence rejecting the null hypothesis.

5.6 Origin

Origin is considered a relevant factor in the heterogeneity analyses of differences in curling. The origin variable is divided into two categories: whether you are Norwegian or not Norwegian. Table 5.7 presents the mean distribution of curling based on origin for various years.

Table 5.7: Distribution of origin

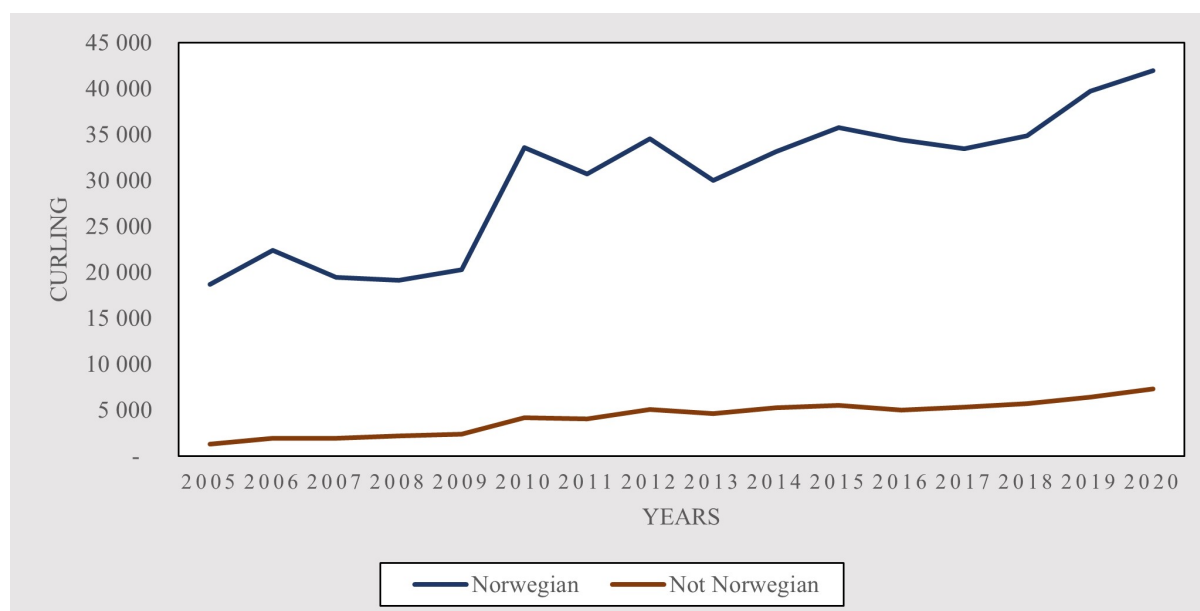
	Estimation window	Event window	Post-event window
Norwegian	91.20%	87.48%	86.21%
Not Norwegian	8.80%	12.52%	13.79%

From Table 5.7, there is no doubt that those born in Norway with two Norwegian-born parents receive the most support compared to other origins. Individuals born in Norway may be more likely to have families with better financial resources or a broader social network that includes family members, friends, and colleagues who can provide support. Moreover, individuals of Norwegian origin may also have preferences or seek specific types of housing or locations that could further influence demand.

Table 5.7 also illustrates a gradual increase in support provided to individuals with an immigrant background to enter the housing market. There might be several reasons behind this trend, including demographic shifts such as immigrants increasingly pursuing higher education, leading to enhanced economic stability. This factor could have facilitated their ability to meet the criteria for support following the implementation of the down payment requirement. Immigrants often face financial challenges, such as limited access to economic resources, lower income, and a greater need for financial support to purchase housing in a new country. Consequently, they may seek support from organizations, local communities, or supportive individuals, particularly as Norway has shown increased emphasis on equality and diversity in recent years.

It could be interesting to relate these findings to Figure 5.1, which reveals that most curling instances involve Norwegians. In Figure 5.1, a significant spike in curling from 2009 to 2010 was observed, which might also be pertinent to this presentation. The distribution of origin is displayed in Figure 5.8 in two separate graphs, depicting a similar leap to that seen in Figure 5.1, along with a rising trend in curling for foreign-born individuals as previously mentioned.

Figure 5.8: Distribution of origin



*y-axis: Number of curled people

*x-axis: Respective years

5.6.1 Regression Analysis of Origin

Below are the hypotheses established to assess any differences in the probability effect of origin:

H_0 : *The probability difference for curling based on origin shows no change associated with the implementation of credit restrictions in 2010.*

The alternative hypothesis is formulated as follows:

H_1 : *The probability difference for curling based on origin shows a change associated with the implementation of credit restrictions in 2010.*

The following constitutes the regression equation for the intended analysis below, with Norwegian = 1 and Not Norwegian = 0:

$$y_{curling} = \beta_0 + \beta_1 * Event + \beta_2 * Norwegian + \beta_3 (Norwegian * Event) + \epsilon$$

For a comprehensive overview, the obtained results from the regression analyses are presented in Table 5.8.

Table 5.8: Regression analysis of origin

	Coef.	Std.	t	P > t	[95% Conf. interval]
Event	0.004577	0.00004	114.958511	0	0.004498 0.004655
Norwegian	0.006846	0.00004	171.553369	0	0.006768 0.006924
Norwegian * Event	0.002396	0.000056	42.574586	0	0.002285 0.002506
Constant	0.002613	0.000027	98.34772	0	0.002561 0.002665

The results from Table 5.8 outline four potential outcomes for two distinct groups across two periods. Initially, non-Norwegian individuals had a 0.2613 percentage point likelihood of receiving home purchase support before the down payment requirement. After its implementation, this probability increased to 0.719 percentage points, indicating a 0.4577 percentage point change.

For Norwegian individuals, the probability of receiving support stood at 0.9459 percentage points before the requirement. Following its introduction, this likelihood rose to 1.6432 percentage points, reflecting a 0.6973 percentage point shift.

Comparing non-Norwegian individuals to Norwegian individuals pre-2010 revealed a difference of 0.6846 percentage points, which expanded to 0.9242 percentage points post-2010. This widening disparity may be associated with the trends observed in Figure 5.8, by indicating that individuals with a Norwegian origin receive the most extensive financial support for home purchases in Norway before and after the down payment requirement.

The analyses therefore indicate that the probability change between Norwegian origin and foreign origin has a statistically significant association with the implementation of the down payment requirement in 2010. This is evident from the regression analysis, which exhibits a narrow confidence interval with almost no standard error. The narrow confidence intervals provide us with confidence to reject the null hypothesis that “the probability difference for curling based on origin shows no statistically significant change associated with the implementation of credit restrictions in 2010”.

6 Discussion and Conclusion

6.1 Discussion

For a long time, there has been a deeply ingrained norm in the Norwegian society that individuals should own their own homes. This norm reflects not only a cultural expectation but also an investment in individuals' economic future and societal belonging. The governmental role in promoting this norm becomes evident through housing policy, which aims to facilitate homeownership through various measures. Consequently, the Norwegian housing model has emerged, and young individuals strive to align their actions with societal expectations regarding homeownership. However, their path into the housing market is not predetermined, as this demographic is less financially endowed than older age groups. Consequently, young individuals primarily finance their home purchases through mortgages.

The introduction of the down payment requirement represented a significant impediment for this group in their pursuit of homeownership. Accumulating sufficient capital to finance 10 or 15 per cent of the home purchase is unrealistic for many, given a market where property prices are rising faster than available income suggests they can save. The Nurse Index has uncovered a decrease in average income people's accessibility to the housing market. In assisting their young and promising offspring's, parents have come to the rescue by curling their children into the housing market, primarily by acting as real estate surety.

The regression analyses performed have revealed a statistically significant estimated probability of 'curling' within the Norwegian housing market for young adults aged 20 to 40 within the specified timeframe from 2005 to 2020. This indicates that stricter credit restrictions appear to be associated with an increase in curling, as depicted in Figure 5.1, which displays a surge in probability of 18.53 percentage points. Consequently, curling has enabled the young generation to bypass the down payment requirement and secure adequate loan financing to purchase a home, and thereby gaining entry into the housing market. The substantial increase in the prevalence of curling as a share of home purchases suggests that its occurrence has risen since the requirement was introduced, implying that

homes, in practice, are financed not by owners' personal savings but by parental returns on property investments in conjunction with loans from financial institutions.

Furthermore, one can observe how the economic influence from the parental generation continues to shape the housing market. This generation, having benefited from long-term growth in housing prices during its presence in the market, has been able to contribute substantial housing capital. Demand remains high, as evidenced by the continued rapid price growth even after the introduction of the down payment requirement. With low investments in new construction, the supply side remains persistently low, and demand is therefore not met at a satisfactory level to curb price growth in the housing market. Particularly interesting is the significant price increase in Oslo compared to the rest of the country, which is accompanied by increased curling in Oslo, with a 2.34 per cent increase following the implementation of the down payment requirement, which demonstrates a 14 percentage points higher impact compared to the rest of the country over a decade. This observation is further supported by a report showing that only 1 percent of first-time buyers in Oslo can enter the housing market without financial support from their parents. Such findings suggest a parental generation with a strong economic backbone. However, there may be a possible change on the horizon, as the recent period has been marked by high inflation, high interest rates, and erosion of savings. This could lead to a decline in housing prices, as the market has already shown tendencies. Nevertheless, the solid economic backbone of the parental generation may mitigate the decline in housing prices, even in challenging times. Moderate growth on the supply side also ensures housing scarcity, which, in turn, has a dampening effect on price decline.

One of the concerning consequences of the down payment requirement is the potential exacerbation of socio-economic disparities. Statistically, a high rate of homeownership is associated with reduced economic inequality and less class divisions in society. Against this backdrop, it is noteworthy that parents, with good intentions, take the initiative to assist their offsprings in establishing themselves in the housing market. However, this practice places young individuals without sufficient external financial resources in an unfavorable position. Heterogeneity analyses conducted in this context indicate how curling reinforces inequalities and gives rise to challenges related to social (in)justice, as individuals are marked by differentiated access to crucial resources such as educational opportunities,

financial support, and the job market. The findings underscore the benefit of being a male born in Norway, particularly the economic advantage associated with higher education and income. Overall, the results suggest that in practice, curling perpetuates or amplifies the existing economic advantages of certain individuals regarding homeownership. Considering this, these findings pose a potential threat to the future of the Norwegian housing model.

On one hand, there is a desire to maintain the housing model that encourages a high degree of homeownership, thereby having positive implications for economic stability and reduced socio-economic inequality. On the other hand, it is crucial to address the challenges associated with price growth and debt burden, which threaten long-term economic stability and the growth in housing prices that young adults cannot finance. In these intricate dynamics of the housing market, consideration must be given to how the balance between the norm of homeownership, economic fairness, and economic stability should be, and this will be pivotal for the development of future housing policy measures in Norway.

6.2 Conclusion

The conclusive observation is that the null hypothesis is rejected, and it is affirmed that the introduction of a down payment requirement has led to a substantial and statistically significant increase in the incidence of curling among young homeowners in the Norwegian housing market.

6.3 Proposals for Further Research

The study is delimited to analyze data from the period between 2005 and 2020. However, given that the post-2020 period has been characterized by the global pandemic, shifts in geopolitics, elevated inflation levels, and rising interest rates, an examination of curling in this context would also be highly intriguing. It is conceivable that both the degree of curling and lending practices may change in accordance with or because of these factors. Therefore, it is suggested that further research is conducted on the topic in its pure form as time passes.

With housing prices being a hot topic in all matters related to real estate, future research

should explore how curling has directly influenced the market and housing prices, or conversely, how prices and curling mutually impact each other. Particularly intriguing would be the discovery of any reinforcing effects between the two, resulting in an upward spiral concerning both prices and curling.

Finally, the social conditions highlighted in this study would be interesting for further in-depth exploration in research, with a specific focus on vulnerable and marginalized groups in society, as well as immigrants.

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Appendices

A Logistic Regression Analysis

A.1 Curling

Table A.1: Curling regression

	Coef.	Std.	z	P > z	[95% Conf. interval]
Curling	-1.516739	0.001541	-984.001665	0	-1.51976 -1.513718

A.2 Income

Table A.2: Income: Event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Income	2.42431	0.03167	76.536	0	2.36222 2.48639
Constant	-5.0489	0.03158	-159.865	0	-5.1108 -4.987

Table A.3: Income: Estimation window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Income	1.85336	0.03155	58.7406	0	1.79152 1.9152
Constant	-5.03701	0.03139	-160.428	0	-5.09854 -4.97547

Table A.4: Income: Post-event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Income	2.24457	0.02451	91.5755	0	2.19653 2.29261
Constant	-4.52581	0.02442	-185.328	0	-4.57367 -4.47795

Table A.5: Income

	Estimation window	Event window	Post-event window
Probability	3.98%	6.76%	9.27%
Odds	6.38	11.29	9.43
Marginal change	3.82%	6.30%	8.41%

A.3 Gender

Table A.6: Gender: Estimation window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Man	0.37572	0.00633	59.3527	0	0.36331 0.38813
Constant	-3.44261	0.0049	-702.105	0	-3.45222 -3.433

Table A.7: Gender: Event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Man	0.18667	0.00486	38.388	0	0.17714 0.1962
Constant	-2.42199	0.00362	-767.342	0	-2.7867 -2.7725

Table A.8: Gender: Post-event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Man	0.16092	0.00419	38.3401	0	0.15269 0.16914
Constant	-2.42199	0.0031	-779.933	0	-2.42808 -2.41591

Table A.9: Gender

	Estimation window	Event window	Post-event window
Probability (man)	4.45%	6.96%	9.44%
Probability (woman)	3.10%	5.84%	8.15%

A.4 Place of Residence

Table A.10: Place of residence: Estimation window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Oslo	-0.153	0.00753	-20.2959	0	-0.16778 -0.13823
Constant	-3.19201	0.0035	-911.994	0	-3.19887 -3.18515

Table A.11: Place of residence: Event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Oslo	0.41531	0.00522	79.4906	0	0.40507 0.42555
Constant	-2.7876	0.00291	-956.126	0	-2.79331 -2.78188

Table A.12: Place of residence: Post-event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Oslo	0.48505	0.00449	107.945	0	0.47624 0.49386
Constant	-2.4651	0.00253	-972.003	0	-2.47007 -2.46013

Table A.13: Place of residence

	Estimation window	Event window	Post-event window
Probability (Oslo)	3.41%	8.53%	12.13%
Probability (not Oslo)	3.95%	5.80%	7.83%

A.5 Education

Table A.14: Education: Estimation window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Education	0.18691	0.00639	29.2329	0	0.17438 0.19945
Constant	-3.27739	0.00447	-732.985	0	-3.28615 -3.26862

Table A.15: Education: Event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Education	0.57653	0.00503	114.437	0	0.56666 0.5864
Constant	-2.92357	0.0038	-768.529	0	-2.93103 -2.91611

Table A.16: Education: Post-event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Education	0.60854	0.00436	139.574	0	0.6 0.61709
Constant	-2.59363	0.00329	-788.366	0	-2.60008 -2.58718

Table A.17: Education

	Estimation window	Event window	Post-event window
Probability (educated)	4.35%	8.73%	12.08%
Probability (not educated)	3.64%	5.10%	6.95%

A.6 Origin

Table A.18: Origin: Estimation window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Norwegian	1.31598	0.01079	121.906	0	1.29482 1.33714
Constant	-4.33305	0.01029	-421.065	0	-4.35322 -4.31288

Table A.19: Origin: Event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Norwegian	0.93771	0.00719	130.379	0	0.92361 0.9518
Constant	-3.43947	0.0067	-512.903	0	-3.45261 -3.42633

Table A.20: Origin: Post-event window

	Coef.	Std.	z	P > z	[95% Conf. interval]
Norwegian	0.8389	0.00594	141.08	0	0.82725 0.85056
Constant	-3.00869	0.00549	-547.338	0	-3.01946 -2.99791

Table A.21: Origin

	Estimation window	Event window	Post-event window
Probability (Norwegian)	4.67%	7.57%	10.25%
Probability (not Norwegian)	1.30%	3.11%	4.70%