Universität Zürich[UZH]

Thesis

For the Attainment of A

Master of Advanced Studies in Real Estate

Does It Really Matter if You Are Left or Right?
- Homeownership and Political Position in Switzerland

Author: Reber
Michael
Ackersteinstrasse 110, 8049 Zürich
reber.m@bluewin.ch

Submitted to: Dr. Mihnea Constantinescu

Date of Submission: September 6th, 2021

Table of Contents

List of Abbreviations IV

List of Figures V

List of Tables VI

Executive Summary VII

1. Introduction 1

1.1 Problem Definition 1

1.2 Aim of Study 2

1.3 Thematic Demarcation 3

1.4 Structure and Approach 3

2. Theoretical Foundations – Literature Review 5

2.1 Land Property Rights 5

2.1.1 Tracing Origins 5

2.1.2 "The Neolithic Revolution" 6

2.1.3 Land Property Rights as "Bundle of Sticks" 8

2.2 The Benefits of Homeownership 9

2.3 Homeownership and Politics 11

2.4 Homeownership and Rent in Switzerland 12

3. Empirical Research 17

3.1 Data 17

3.2 Methodology and Specifications 17

3.2.1 Linear Regression and Logit Regression 17

3.2.2 Logit Regression Model 20

3.2.3 Variable Selection 20

3.3 Results 26

3.3.1 Descriptive Analysis 26

3.3.2 Regression Results Wave 21, 2019 31

3.3.3 Regression Results Wave 18, 2016 39

3.3.4 Measures of Fit 45
3.3.5 Application of Weights 49
4. Conclusion 50
4.1 Summary 50
4.2 Reflection and Outlook 51
Bibliography 53
Appendix 62

List of Abbreviations

BC	Before Christ
BFS	Bundesamt für Statistik
BLUE	best linear unbiased estimator
CATI	computer-assisted telephone interview
c.d.f.	cumulative distribution function
CHF	Swiss franc
e	Euler's number
EPF	École Polytechnique Fédérale
ESTV	Eidgenössische Steuerverwaltung/Federal Tax Administration
ETH	Eidgenössische Technische Hochschule
ETS	École Technique Supérieure
EU	European Union
FORS	Swiss Foundation for Research in Social Sciences
FSO	Swiss Federal Statistical Office
GDP	Gross Domestic Product
HEP	Haute École Pédagogique
HTL	Höhere Technische Lehranstalt
log	natural logarithm
MLE	maximum likelihood estimation/maximum likelihood estimator
NUTS	Nomenclature des Unités Territoriales Statistiques
OECD	Organization for Economic Co-operation and Development
OFS	Office Fédéral de la Statistique
OLS	ordinary least squares
OR	Schweizerisches Obligationenrecht/Swiss Code of Obligations
PH	Pädagogische Hochschule
PhD	Doctor of Philosophy (Philosophiae Doctor)
PPP	Purchasing Power Parity
SHP	Swiss Household Panel
SNB	Swiss National Bank
SPSS	Statistical Package for the Social Sciences
UBS	Union Bank of Switzerland
U.S.	United States of America
VIF	variance inflation factor
ZGB	Schweizerisches Zivilgesetzbuch/Swiss Civil Code

List of Figures

Figure 1: Logit regression model graphic outline 4

Figure 2: OECD countries housing tenure distribution (own outright and owner with mortgage combined) 13

List of Tables

Table 1: Definition of independent variables 21
Table 2: Descriptive statistics Wave 21, 2019 28
Table 3: Logit regression results Wave 21, 2019 32
Table 4: Standardized logit regression results Wave 21, 2019 35
Table 5: Descriptive statistics Wave 18, 2016 41
Table 6: Logit regression results Wave 18, 2016 42
Table 7: Standardized logit regression results Wave 18, 2016 43
Table 8: Statistical test results logit regressions Wave 18, 2016 and Wave 21, 2019.... 46

Executive Summary

Switzerland has the lowest homeownership rate compared to all other countries in Western Europe at about 38% (OECD, 2019).

Although numerous studies suggest that homeownership has a positive influence on society, for example through the owners' investment in social capital in the neighborhood (Di Pasquale & Glaeser, 1999, p. 383), there are doubts about its beneficial nature, for instance by pointing to a possible link of homeownership with unemployment (Oswald, 1996, p. 16), not to mention the 2008 global financial crisis sparked by the collapse of a housing bubble (Shiller, 2008, p. 29).

In Switzerland, 77% of the tenants would prefer to be homeowners (Thalmann & Favarger, 2002, p. 31). Relating this observation to twenty years of rising housing prices (Martel, 2021, p. 17), a propensity to own becomes apparent. Given the risks involved, analyzing and quantifying the factors that contribute to homeownership would help to better understand people's behavior in this regard.

Traditionally, homeowners are said to have a more conservative mindset (Gilderbloom & Markham, 1995, pp. 1602-1603), but left-wing parties favoring homeownership played a decisive role in the growth of the homeownership rate in Western countries (Kohl, 2018, p. 933), pointing to a possible connection between homeownership and political orientation. To test this hypothesis, an econometric model based on empirical data from Switzerland is specified. Eighteen variables ranging from financial to social issues are incorporated into a logit regression model to estimate the probability of individuals being homeowners or tenants. Including a variable on political orientation in the model allows to capture attitudes regarding homeownership.

Since the estimation for the variable political position turns out *not* to be significant in the model results, the hypothesis of a connection between homeownership and political orientation could not be established. Nevertheless, the significant variables in the model show that household wealth is the most relevant determinant of homeownership in Switzerland, followed by the number of adults living in a household and the kind of municipality in which a household resides, while household income, satisfaction with accommodation and age are further influential aspects.

Hence, the tentative finding of this study is that political orientation is not a crucial factor in estimating the probability of being a homeowner in Switzerland.

1. Introduction

1.1 Problem Definition

Switzerland has the lowest homeownership rate in Western Europe at about 38% (OECD, 2019). At the same time, its GDP per capita at PPP is among the highest in the world (World Bank, 2021). Considering that the median homeownership rate of all OECD members, an organization with a significant share of Western countries, is close to 70% (OECD, 2019), homeownership can definitely be deemed a mainstream issue.

Against this background, it is hardly surprising that numerous research findings suggest positive externalities of homeownership not only for individuals but also for society as a whole. For example, Di Pasquale and Glaeser (1999) using data from the United States and Germany in their study "Are Homeowners Better Citizens?", find a significant correlation between homeownership and investment in social capital and in local amenities (Di Pasquale & Glaeser, 1999, p. 384).

In contrast, there is also criticism pointing at possible negative consequences: Oswald (1996) hypothesizes that growing homeownership rates may be associated with rising unemployment rates (Oswald, 1996, p. 16). A prominent negative externality linked to homeownership is the global financial crisis of 2008, a cautionary tale of the dangers that may loom in societies with high levels of mortgage debt. Shiller (2008) refers to the widespread belief that property prices must rise *disproportionately* over time due to population and economic growth and limited land resources, which contributed significantly to the emergence of the sub-prime crisis (Shiller, 2008, p. 69).

An obvious conclusion would be that countries with a low homeownership rate are spared from certain difficulties[1] – however, this reasoning may be short-sighted for Switzerland when considering the result of a survey by Thalmann and Favarger (2002), which found that 77% of the tenants would prefer to be homeowners (Thalmann & Favarger, 2002, p. 31). This statement still seems to be true today, reflecting on the reasons mentioned in a recent article on house prices that have been rising for the last twenty years (Martel, 2021, p. 17). Low interest rates and decreasing construction are important drivers (Martel, 2021, p. 17), while scarcity of land (Bourassa & Hoesli, 2010, p. 306) and demography similarly contribute to the increasing price level in the housing market. But on the other hand, the perennial strong demand also seems to be a

[1] regarding Switzerland, apart from the 2008 state bailout of UBS, a Swiss bank that held investments in U.S. mortgage backed securities (Straumann, 2010, p. 5)

consequence of a propensity to own, in spite of the known advantages of tenancy (Martel, 2021, p. 17). The total mortgage debt balance growing step by step every year (SNB, 2021) proves that although the propensity to own consists of expressed desires, it obviously results in realized aspirations. Even if there are safety margins in mortgage lending (Martel, 2021, p. 17), this development gives an indication of the risks that will be increasingly taken in the future.

1.2 Aim of Study

Given these risks, it is crucial to explore which factors contribute to homeownership in Switzerland, in order to analyze and quantify them, which would help to better understand people's behavior in this regard. For this purpose, an explanatory model is built incorporating demographic, financial, spatial and social aspects of homeownership versus tenancy. A particular challenge is to measure general attitudes toward homeownership in a simple and comparable way. Since the political spectrum is a commonly known framework, it is useful to classify people's opinions and beliefs in order to situate their point of view.

That homeownership rates and political orientation are related is suggested by Kohl (2018), identifying a positive correlation between party manifestos propagating homeownership and the homeownership rate of the countries in question. Traditionally, homeowners are said to have a more conservative mindset (Gilderbloom & Markham, 1995, pp. 1602-1603), but left-wing parties favoring homeownership played a decisive role in homeownership rate growth (Kohl, 2018, p. 933). Although this poses a causality dilemma – are individuals homeowners, therefore they are politically right-wing, or are individuals politically right-wing, therefore they are homeowners – there must be an inherent connection between homeownership and political orientation. Thus, including a variable on political orientation in the model allows to capture attitudes regarding homeownership, which may be critical factors in the explanation.

Research Question

Is there a statistical correlation between homeownership and political position, and if so, is it possible to establish a causal relationship?

To test the hypothesis of a connection between homeownership and political orientation, this study aims to specify an econometric model based on empirical data from Switzerland taking into account political position while controlling for

demographic, financial, spatial and social aspects, to estimate the probability of individuals being homeowners given certain conditions, and to evaluate the outcome.

1.3 Thematic Demarcation

The main reason for choosing Switzerland for this study lies in the distinctive nature of its housing market, which is characterized by the lowest homeownership rate of all OECD countries, combined with a high GDP per capita at PPP (OECD, 2019; World Bank, 2021). Furthermore, it should be noted that the intention of the study is not to conduct either an in-depth market analysis or to provide a foundation for housing policy recommendations. Another topic that has not been investigated is the influence of housing cooperatives on the rent market in larger cities. For instance, a relevant share of rental housing in Zurich is organized as cooperatives, substantially subsidized trough leasehold land rents that are below the market level (Bourassa & Hoesli, 2010, p. 288). In addition, although pensions and social benefits are included in the income variable of the statistical model, taxes are not subtracted to avoid inequalities that could lead to distortions between different regions.

1.4 Structure and Approach

Referring to the research question, a statistical correlation can be established by conducting a regression analysis. This involves – in theoretical terms – that data on the observed value of X are used to estimate the probability of how the value of Y might change (Stock & Watson, 2020, p. 143, Schwarz et al., 2020). If Y is assigned the binary outcome tenant or homeowner and X values for political positioning on a scale from left to right, this allows – after performing a significance test – statements about the statistical relationship between X and Y (Stock & Watson, 2020, p. 115-116). In order to obtain robust results, a number of other variables in addition to political position are included in the model. Most importantly, due of the binary nature of Y, the function between X and Y is not linear. Therefore, the proposed model is a logit regression model based on a nonlinear probability distribution function (Stock & Watson, 2020, p. 402-403). The structure of the statistical model is illustrated by a causal graph in figure 1 on the following page.

This study is organized as follows: First, the theoretical foundations outline the origin of property rights. Subsequently, positive and negative externalities of homeownership, the historical association between political attitudes and homeownership, and the specific situation of homeownership in Switzerland are discussed. The third section describes

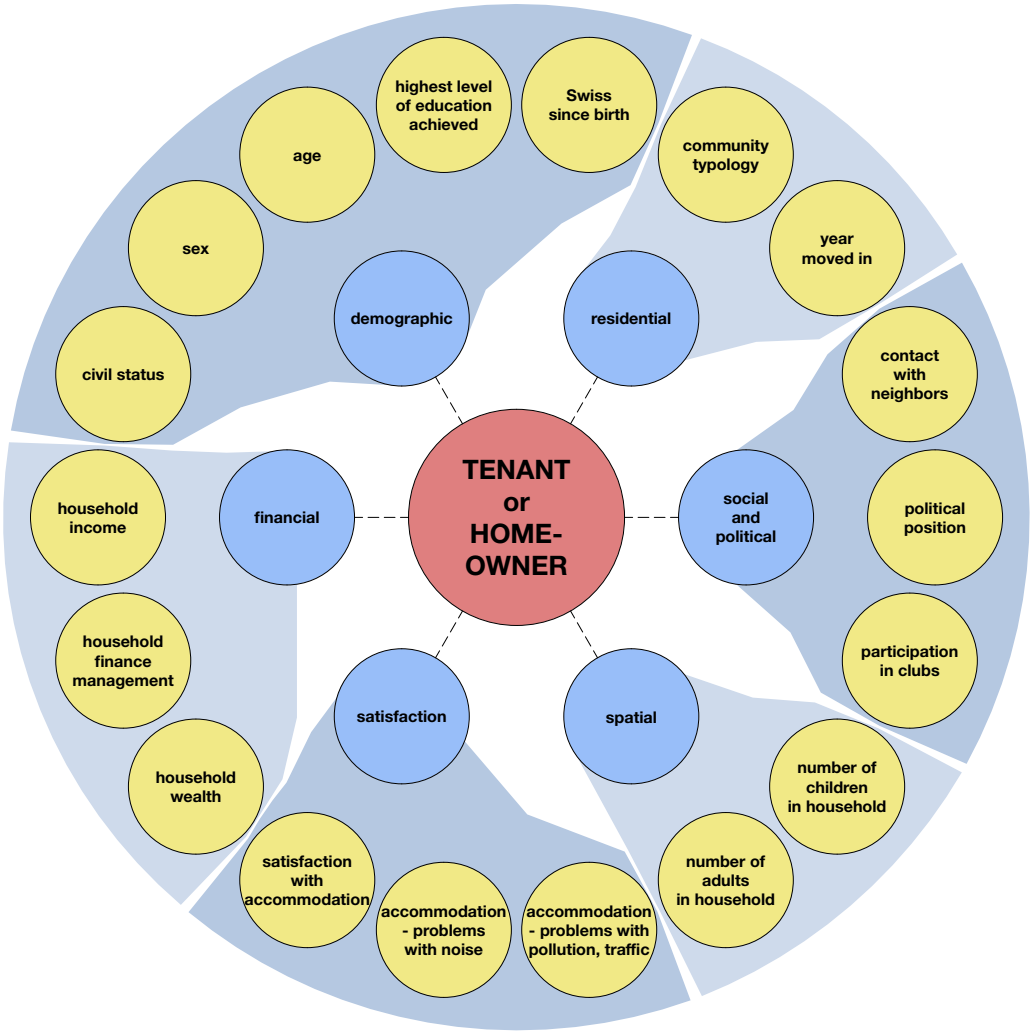

Figure 1: Logit regression model graphic outline

(own representation, sources: SHP Household Questionnaire Wave 21, 2019; SHP Individual Questionnaire Wave 21, 2019; SHP Imputed Wealth Household, 2016)

the methodology of the proposed logit regression model, as well as the specifications of each variable. After the descriptive analysis of the 2019 data sample, the results of the regression are presented and interpreted, together with the explanations due to the special characteristics of logit regression. Furthermore, to identify any similarities or differences, a second regression is performed with a data sample from 2016. Assessing the accuracy of the proposed model, the next section provides an overview of the statistical tests applied and their outcome. This is succeeded by a short consideration of weighting, with a crucial technical comment on significance. In the final part of this study, the findings are summarized, then conclusions are drawn, and in the closing discussion, further perspectives are offered.

2. Theoretical Foundations – Literature Review

2.1 Land Property Rights

General terms and conditions which are used today to describe, classify and manage legal and economic relationships, in this case property and rent, are in their essence by no means a novel invention. This prompts the fundamental question of whether it is possible to determine how property rights arose in the first place.

2.1.1 Tracing Origins

The earliest surviving written records of property rights concerning land and real estate are cuneiform law codices from ancient Mesopotamia in the form of clay tablets or stone stelae. Sumerian court documents from the third dynasty of Ur (22nd to 21st centuries BC) mention the acquisition of houses, lots and gardens, albeit only in two cases rent of ship and plow cattle (Falkenstein, 1956, pp. 122, 127). While its exact original purpose is debatable (Kraus, 1960, p. 283), the famous code of Hammurabi, about 3,800 years old, deals with a comparable set of legal topics, including once again acquisition of houses and gardens, but by contrast, purchase and rent of arable land (Harper, 1999, p. 22-29).

Later in history, medieval feudalism distinguished between allodial and feudal property. According to Emerton (1891), free peasants owned their land, which was passed to their descendants by inheritance. Being independent landowners, they had a duty of military service to the state, the fulfillment of which, however, did not serve as a prerequisite for owning land. Feudal tenure, on the other hand, meant the granting of land by the king to certain nobles ("vassals") for cultivation, not in exchange for money, but for an oath of allegiance to the king, who remained the owner and could revoke the agreement at any time. The first type of ownership was called allodium, the second became known as fief, an institution that represented one of the defining elements regarding politics of ownership and social relations in medieval society (Emerton, 1891, p. 236-247).

If the existence of ancient cuneiform sources may stand as testimony that the rules stated in them were in practice, this inevitably leads to the question why and through which events and transformations new principles emerged and, more importantly, how to gather further evidence and to provide explanations for their occurrence.

In his "Two Treatises of Government", Locke (1698) states that the earth given by God is common to all "Men". However, "... yet every Man has a *Property* in his own *Person*. This no Body has any Right to but himself. The *Labour* of his Body, and the *Work* of

his Hands, we may say, are properly his. Whatsoever then he removes out of the State that Nature hath provided, and left it in, he hath mixed his Labour with it, and joined to it something that is his own, and thereby makes it his Property." (Locke, 1698, Book II, p. 185). The so-called labor theory of property does not address the problem of consent, which imposes enormous administrative costs on the owner to obtain, at least theoretically, approval from all beings to his claim (Rose, 1985, p. 74). Locke (1698) asserts the right to homestead private property, because in his view taking possession of a piece of land by amelioration does not harm anyone else, "since there was still enough and as good left, and more than the yet unprovided could use." (Locke, 1698, Book II, p. 189)

2.1.2 "The Neolithic Revolution"

V. Gordon Childe (1951) introduced the notion "Neolithic Revolution" in order to characterize the transition from hunter-gatherer foraging strategies to a predominantly sedentary society that produced its food through agriculture and livestock breeding. This process, which lasted from 10,000 to 5,000 years ago, eventually laid the foundation for the development of small self-sufficient settlements into today's industrial and commercial cities (Childe, 1951, p. 59-60). Notably, the term "Revolution" was chosen to relate it to population growth during the Industrial Revolution in nineteenth-century Europe (Childe, 1951, p. 18-19). Using a convincing terminology, Childe's concept of a prehistoric shift proved to be widely popular and influential to this day (Green, 1999, p. 98).

Reviewing hypotheses that seek to explain the reasons for the conversion to agriculture based on a range of different key determinants, Weisdorf (2005) examines the economic model proposed by North and Thomas (1977) (Weisdorf, 2005, p. 573-574). Being the only example of the studies referred to, it provides property rights as an important reason: The model compares the consequences of different property rights between hunters and farmers. Under their inherent rules, hunters have an incentive to ignore certain costs of their operations causing overexploitation. On the other hand, farmers' communal property rights prove more efficient by excluding outsiders and rewarding productivity gains, which in the long run favors agriculture. North and Thomas (1977) follow that a decrease in the productivity of hunters, an increase in the productivity of farmers, and an increase in the labor force, thus population growth, may have caused the change (North & Thomas, 1977, p. 231-234).

From a similar point of view, it can be assumed that the prudent distribution of individual property rights is related to efficient allocation, as suggested by Coase (1960) in his study "The Problem of Social Cost". Considering the case of a cattle-raiser whose straying cattle diminish the yield of the neighboring farmer's fields, the conclusion follows that it is necessary to know whether the cattle-raiser is held accountable for the damage or not, "since without the establishment of this initial delimitation of rights there can be no market transactions to transfer and recombine them. But the ultimate result (which maximizes the value of production) is independent of the legal position" (Coase, 1960, p. 7). The theorem's popularity resulted in part from the assumption that the state is solely in charge of determining primary property rights, while users are responsible for their efficient allocation (Stiglitz, 2006, p. 408-409).

Applied to the above mentioned example, this means that an optimal output of food from game or crops will result given well-defined and negotiated ownership rights and market forces. Under the occurrence of a population increase, hunters and farmers will persist in bargaining until enough land has been cultivated to ensure a new balance between the number of remaining hunters and the wildlife stock. Admittedly, this is applicable only under ideal conditions such as no transaction costs, complete information and perfect competition (Coase, 1960, p. 2, 5, 6, 8).

Thus, the interpretation that land tenure rights were established with the advent of agriculture seems a possible reasoning. Based on the results of nineteenth-century ethnographic research on hunter-gatherer societies, the hunting rights of the First Nations studied were at least related to land and resources (Feit, 1991, p. 110), which is tempting to contemplate aspects of comparability with earlier, prehistoric circumstances. Yet this proves misleading, as Feit (1991) points out in the case of the Algonquins (Anicinàpe), the subject of recurrent and heated debates among scholars, with several caveats (Feit, 1991, p. 109-111): Morgan's (1877) influential thesis[2] suggesting First Nation societies' traditional opposition to individual forms of ownership (Morgan, 1877, p. 537, 546, 549), was contradicted by Speck (1915) demonstrating that the institution of family hunting grounds shows concepts of private territory ownership (Speck, 1915, p. 289-290), while Leacock (1952) finds the introduction of Algonquian hunting grounds being in fact the result of exogenous shocks from contact with the intruding fur trade and from ecological changes (Leacock,

[2] In "Der Ursprung der Familie, des Privateigentums und des Staats. In Anschluss an Lewis H. Morgan's Forschungen", Engels (1884) conceives an evolutional model of the closely related development of human society, family and property.

1952, p. 9-10). As a corollary, the latter deduction supports the model of North and Thomas (1977). Subsequently, Feit (1991) mentions the analysis of Scott (1988), which portrays the Algonquian system of granting hunting rights based on elaborate "spiritual and social reciprocity" (Scott, 1988; cit. in Feit, 1991, p. 110) essentially rooted in non-European sources.

Moreover, the obvious drawback of further studies about original property distribution arises from the circumstance that, strictly speaking, land was not a blank slate at the beginning of the observed time period. This results in a double predicament: Where records are available, primordiality is lacking, while pristine sources no longer exist for initial states, making it impossible to verify models with reliable data. Nevertheless, at this point it seems reasonable to conclude that transformations of property structures can be attributed to the influence of exogeneous forces on particular social groups, primarily population growth.

2.1.3 Land Property Rights as "Bundle of Sticks"

In response to their research question regarding the definition of real estate property rights, Smith and Zaibert (2003) apply the popular analogy with a bundle of sticks: "Each stick in the bundle signifies a particular right or power: a right to use, a right to possess, to sub-divide, to rent, to build upon, to enjoy the usufruct from, and so on." (Smith & Zaibert, 2003, p. 62) A second step in their reasoning is to assert that each stick in the bundle is in principle negotiable regardless of the other sticks. Referring to the metaphor commonly attributed to Hohfeld's (1913) conceptual analysis of legal relationships – albeit the expression is not mentioned in it (Baron, 2014, p. 62) – they cite Reinach (1983) clarifying that whatever the outcome of the negotiations might be, the "absolute relation of belonging" remains intact (Hohfeld, 1913; Reinach, 1983, p. 56; cit. in Smith & Zaibert, 2003, p. 62-64). To exemplify this, even in the case of squatters taking possession of his land, the owner may give away or have taken away practically all the sticks in the bundle, yet his "residual property right" to own the object itself stays unchanged (Smith & Zaibert, 2003, p. 64).

With whatever specific characteristics land property rights may have been constituted over the centuries according to the studies' findings outlined so far, as their common denominator will serve the apt representation of the bundle of sticks, which, depending on combination, inclusion or exclusion, translates into what is called homeownership or rent in the present context. For the purposes of this analysis, it is assumed that these two commonly used terms follow the understanding given by the Swiss Civil Code ZGB for

land and real estate ownership and the Swiss Code of Obligations OR for rental contracts (ZGB, 2021, Art. 655-977; OR, 2021, Art. 253-273c). Note that the rights of "Wohnrecht" and "Nutzniessung" (roughly transferred as usufruct) are also subsumed under rent in the present data.

2.2 The Benefits of Homeownership

Since housing affects everybody in some way, there is a cornucopia of studies available on the influence of homeownership on the behavior of individuals and the ensuing consequences. Even summaries that review and discuss research on the topic are numerous. For instance, Dietz and Haurin (2003) divide a selection of previously published work dealing with the consequences of homeownership into thirteen different categories, among them portfolio choice, labor force participation, urban structure and segregation, housing maintenance, health, child outcomes, and relevant for this study, political and social activity (Dietz & Haurin, 2003, p. 427). In evaluating the studies regarding econometric methodology of the utilized statistical models, several shortcomings are criticized, such as omission of important explanatory variables e.g. wealth, influence of unobservable factors that increase both the likelihood of ownership and some other behavior, omitted variable bias of an unincluded but influential factor, and lack of instrumental variables. An instrumental variable that correlates with the outcome variable (e.g. homeownership) and not with the (unobservable) error term allows for separation of individual effects. As one of the examples for which the previously expressed criticism does not apply, Dietz and Haurin (2003) cite DiPasquale and Glaeser's (1999) analysis of the connection between homeownership and social or political activity (Dietz & Haurin, 2003, p. 405-406).

Using data from the Unites States General Social Survey and the German Socio-Economic Panel, the model identifies a statistically significant albeit low correlation between homeownership and investment in social capital and in local amenities. Social capital is defined as social connections among citizens and involves membership in nonprofessional organizations or civic associations, while local amenities include for instance home repair work, gardening or voting in local elections (Di Pasquale & Glaeser, 1999, p. 383). However, when the effect is split between incentives for homeownership and lower propensity to move, it suggests that a substantial share is due to longer duration of residence in the community (Di Pasquale & Glaeser, 1999, p. 356). In summary, as an answer to the question of "better citizens" in the title of the study,

homeownership is likely to generate positive externalities, but the limited mobility of homeowners is another aspect to consider (Di Pasquale & Glaeser, 1999, p. 384).

In examining homeowners' incentives to invest in social capital, Hilber (2010) identifies a correlation with land scarcity. It seems more prudent for homeowners to invest in the long run when potential new housing supply is limited, which is confirmed by empirical evidence showing that homeowners interact more in built-up neighborhoods (Hilber, 2010, p. 30). As a second effect, homeownership appears not positively related to non-neighborhood social capital (Hilber, 2010, p. 30), which may result in fewer contacts at work or lower participation in non-local groups.

Building on the assumption that homeowners tend to move less, Oswald (1996) compares unemployment with homeownership rates from 1960-1990 in Canada, the United States, Australia, Japan, and fourteen European countries including Switzerland. The model employed for this purpose provides a strong correlation and implies that an increase in the homeownership rate of 10 percentage points is associated with an increase in the unemployment rate of about 2 percentage points, which would explain a substantial part of the increase in joblessness over the decades in the countries concerned (Oswald, 1996, p. 16).

However, Dietz and Haurin (2003) note methodological problems in Oswald's model, namely the lack of variables and the sensitivity of the results to the chosen econometric specification. With data from Denmark, Munch, Rosholm and Svarer (2006) test the so-called Oswald hypothesis on the micro data level, finding in contrast a negative correlation between duration of unemployment and homeownership rate (Munch, Rosholm & Svarer, 2006, p. 14). This outcome supports the conjecture that homeowners accept a lower reservation wage due to higher transaction costs in the case of relocation and thus find a job faster locally than in another region, a crucial factor that may outweigh the negative mobility effect (Munch et al., 2006, p. 17-18).

Another negative externality linked with homeownership can only be touched upon here, irrespective of its massive impact on society as a whole. In the United States around 2000, the opinion that house prices can only rise led to an environment in which financial institutions dangerously relaxed their lending policies (Shiller, 2008, p. 29). When house prices nevertheless started to tumble in 2006, the bubble finally collapsed in 2008 and led to a global financial crisis. Moreover, Shiller (2008) argues that a widespread misconception among the general public that real estate prices are bound to

rise *disproportionately* over time due to population and economic growth and the limited availability of land contributed significantly to the emergence of the sub-prime crisis (Shiller, 2008, p. 69-71).

2.3 Homeownership and Politics

In their review of several studies on the subject of homeownership and political activity at the local level, Dietz and Haurin (2003) state that a number of them report that homeownership has little or no effect on overall political beliefs or identification with politics, but that homeowners have higher voter turnout than tenants. Other studies find significant albeit small effects on political activity. Still, the objections raised by the same authors and mentioned in the previous section regarding the econometrical methodology used apply to most of these studies as well, leading the reviewers to conclude that they do not show compelling evidence of a causal effect. A notable exception is considered to be the "robust" analysis of Di Pasquale and Glaeser (1999) discussed earlier (Dietz & Haurin, 2003, p. 428).

In this context, Gilderbloom and Markham's (1995) analysis of homeownership and political attitudes is worth discussing in more detail. A possible reasoning of where the view originated that homeowners are more politically conservative than tenants can be traced back to the work of Engels (1975), who stated in 1872 about the housing question: "The worker who owns a little house to the value of a thousand talers is, true enough, no longer a proletarian" (Engels, 1975, p. 48; cit. in Gilderbloom & Markham, 1995, p. 1590). According to Marx and Engels' theory of class struggle, workers who are tenants, and small capitalists who are homeowners, being distinct classes cannot have the same socially defined problems (Gilderbloom & Markham, 1995, p. 1590). Since Engels developed his theory at a time when tenancy was the norm, it is suggested that it may be limited to specific historical or geographical circumstances. Nevertheless, the idea of a "conservative impact" of homeownership on individuals seems to have become common wisdom (Gilderbloom & Markham, 1995, pp. 1602-1603). To probe a potential relationship, a factor analysis is conducted with six groups of questions that survey opinions concerning civil liberties, women's rights, sexual tolerance, broad social spending, spending on inner-city problems, and support for socialism. Two further variables on voting behavior are added. Using data from the United States General Social Survey, yields the following results: Since the few significant coefficients have standardized values close to zero, it is concluded that homeownership has very little impact on political attitudes. Most notably, however, homeowners have a

tendency to vote more and support spending on social issues in the inner city to a lesser extent (Gilderbloom & Markham, 1995, pp. 1600-1602).

A recent contribution to the topic is an analysis of homeownership determinants from twenty European countries including Switzerland, performed with data from the Survey of Health, Ageing and Retirement. In this study, a logit regression model is set up to estimate the probability that a person with certain individual characteristics is a homeowner or not (Garcia & Figueira, 2021, p. 19). The estimates show that the probability of owning a home is 13.55% lower for a left-leaning respondent than for a centrist, while it is 1.12 times higher for a right-leaning respondent (Garcia & Figueira, 2021, p. 29). Yet, the survey comprises people over the age of 50, and the median age of the respondents in the data sample is 67 years, so the conclusions drawn are applicable to a specific age group of the population.

In a comparative analysis of party manifestos from fifteen European countries among them Switzerland, as well as Australia, New Zealand, Canada, and the United States, Kohl (2018) examines the origins and the dissemination of the political ideal of homeownership since 1945. Inspired by nineteenth-century industrialists buying worker support, it was advocated by conservative parties in most countries, facing opposition based on convictions expressed in Engels' "The Housing Question" (Kohl, 2018, p. 914-916). With a subsequent regression analysis, a positive correlation is identified between the average number of manifestos propagating homeownership and the average homeownership rate of the countries. The reason for this can be found in the fact that a relatively large number of left-wing parties since 1945 have favored homeownership or later adopted it, mainly in Anglo-Saxon and Latin countries but to a lesser extent in Scandinavian and German-speaking countries. Furthermore, this leads to the insight that once a certain level of homeownership in a country is reached, larger parties, no matter which side, place competition above ideology, as they cannot ignore this substantial constituency (Kohl, 2018, p. 931-933).

2.4 Homeownership and Rent in Switzerland

Following what has been outlined so far concerning land property rights, it is hardly surprising to find in 4,000-year-old clay tablets and stone stelae general terms and conditions which, in their essence, are still used today to handle, describe and classify legal and economic relations, in this case property and rent. Of these, the most recently available homeownership rates for a range of predominantly Western countries are displayed in Figure 2 on the following page.

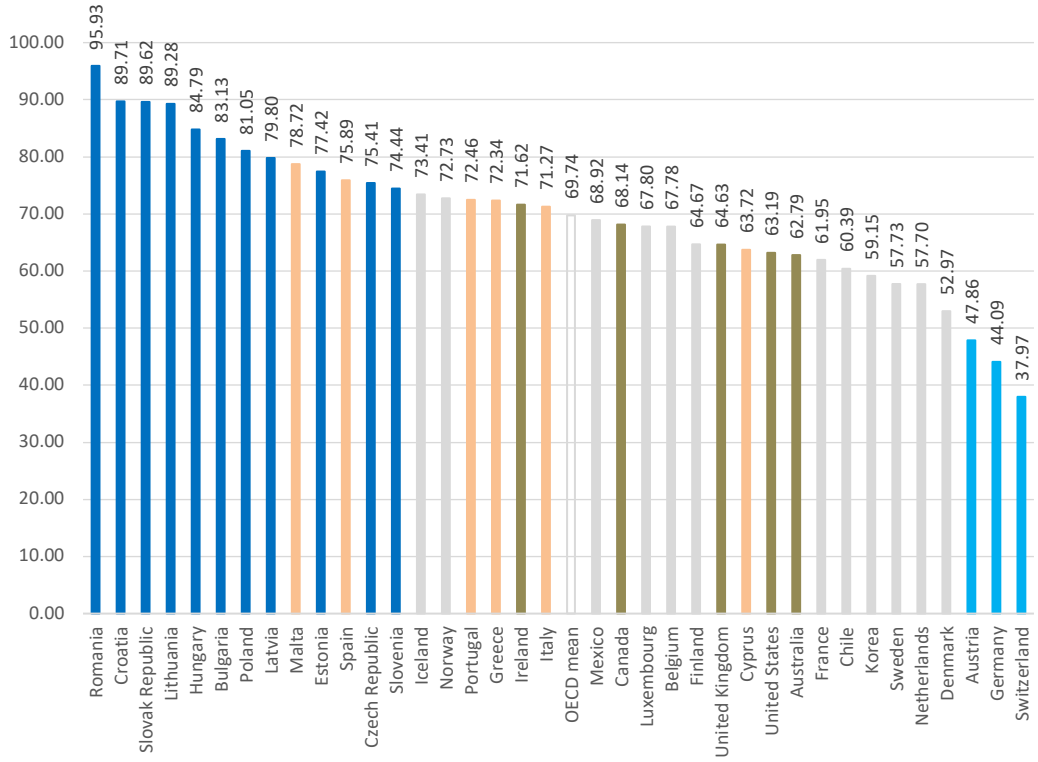

Figure 2: OECD countries housing tenure distribution (own outright and owner with mortgage combined)

(own representation, data source: OECD Affordable Housing Database, worksheet HM 1.3.1 housing tenure distribution, 2019)

Examining housing tenure distribution among OECD members, an organization with a majority of European countries, proportions of owner-occupied and renter-occupied households show considerable differences. The extremes of homeownership rates range from 96% in Romania to 38% in Switzerland, while conversely, renters represent the majority in Switzerland at 61% and a small minority in Romania at 2%. Across all 37 OECD member countries, the average for homeownership stands close to 70% and for tenancy at 24% (OECD, 2019).[3]

Furthermore, the following distribution pattern can be observed for homeownership: On the left side of the chart are Eastern Europe countries with shares varying from 96% (Romania) to 74% (Slovenia), in closed ranks from one to eight. At the opposite end, Austria, Germany and Switzerland are featured with percentages of 48%, 44% and 38%. In between, two more dispersed groups can be identified, Southern European on the one hand and English-speaking countries on the other. Just above mean, the cornerstones of

[3] Figures do not add up to 100% because a proportion is subsumed under 'other, unknown' (OECD, 2019).

the Southern European section are found with Spain and Italy at 76% and 71% respectively. Malta[4] and Cyprus are further apart at 78% and 63%. The focal point of English-speaking countries appears in the second half of the ranking, from 68% (if Canada is included) to 63% (Australia), with the exception of Ireland, which is not far ahead at 72%. However, Nordic countries look somewhat scattered across the diagram, but their range is about the same as that of the Eastern European cluster.

In his analysis of the special characteristics of the Swiss housing market in regard to the low homeownership rate, Werczberger (1997) remarks that in twelve EU countries and Switzerland the correlation between GDP per capita and the homeownership rate is negative, indicating that the wealthier Western European countries usually have a higher proportion of tenants than the countries with a lower GDP per capita (Werczberger, 1997, p. 339). For Switzerland, it is hypothesized that the high cost of homeownership caused by the taxation of imputed rent and capital gains and the relative success of rent control laws contribute substantially to this unusual situation (Werczberger, 1997, p. 350-351). Based on the principle of equal treatment of all taxpayers, the taxation of imputed rent is an income tax imposed on the homeowner in the case of owner-occupied residential property, albeit tax deductions are allowed for mortgage interest payments and some home maintenance costs (ESTV, 2015, S. 3).

On this premise, the dominance of the large private rental market is explained by the high demand for rental housing, due in part to the high cost of ownership and the impact of rental legislation – the longer a tenant stays, the more favorable the effect of tight rent adjustment regulations – and in part to the fact that investment in rental housing remains profitable. Referring to the Swiss referendum law the argument is introduced that it would be impossible to permanently implement a policy against the majority, leading to the assumption that the lack of incentives for home ownership may be an expression of a widespread preference for renting (Werczberger, 1997, p. 350-351). The importance of the imputed rent tax is underlined by the fact that the subject remains an ongoing political issue (Schöchli, 2021).

With the aim of exploring economic causes for the low homeownership rate in Switzerland, Bourassa and Hoesli (2010) specify a tenure choice equation, which encompasses on household level the relative cost of owning versus renting including house value, capital gains, rent, mortgage interest rate, amortization, maintenance,

[4] In fact English-speaking, Malta lies geographically and statistically closer to most of its Southern European neighbors.

insurance, taxes, subsidies and tax deductions, the difference between the predicted and the maximum affordable house value thus measuring the borrowing constraint gap, the after-tax income as an owner, and demographic variables such as marital status and age of the household reference person, and number of children in the household (Bourassa & Hoesli, 2010, p. 295, 302). Data for the selected cantons[5] of Zurich, Berne, Basel-Stadt, Basel-Landschaft, Vaud, and Geneva – corresponding to about 50% of the Swiss population – come from the 1998 Enquête sur les revenus et la consommation (OFS/FSO) except for wealth, while house prices estimations are based on hedonic pricing method.

The estimation is performed using logit regression, with standard errors calculated by bootstrapping[6] because of multi-stage estimation due to potential endogeneity issues (Bourassa & Hoesli, 2010, p. 299). Relative cost of owning, borrowing constraint gap, after-tax income as an owner, and all demographic variables except one are significant at the 1% level. Subsequently, thirteen different tests are carried out simulating the effects of hypothetical changes in taxes and subsidies, mortgage underwriting criteria and price levels on homeownership rates (Bourassa & Hoesli, 2010, p. 305). Reducing down payment and income requirements for mortgage lending increases homeownership rates by 1 to 2%, and by about 3% when combined. Eliminating imputed rent tax while maintaining tax deductions increases homeownership rate by 9%. However, omitting both, the homeownership rate falls slightly by 1% since combined mortgage interest and deductible home expenses are higher than imputed rent. The removal of rent controls results in an increase in the homeownership rate of over 2% although a general equilibrium analysis may yield a smaller effect. Simulating a decline in prices, a 10% drop in house prices and price-rent ratios leads to a 6% increase in the homeownership rate, while a 20% reduction results in a 13% increase (Bourassa & Hoesli, 2010, p. 305-306).

Based on the results of simulating the homeownership rate for five Swiss cantons under different assumptions, Bourassa and Hoesli (2010) conclude that one reason for its comparably low level are very high residential real estate prices in relation to household incomes and wealth. The importance of another reason, the imputed rent tax, is put into perspective, since its exclusion from the model combined with the corresponding tax deductions even results in a slight decrease in the homeownership rate. The high price

[5] member state of the Swiss Confederation, administrative area

[6] "A resampling method that draws random samples, with replacement, from the original data set." (Wooldridge, 2020, p. 798)

level is attributed to the fact that developable land is relatively scarce due to topographical reasons and care for environmental quality i.e. conservation of agricultural landscape and built heritage (Bourassa & Hoesli, 2010, p. 306). In addition, it is pointed out that while a large majority of households would like to be homeowners (Thalmann & Favarger, 2002, p. 29; cit. in. Bourassa & Hoesli, 2010, p. 287), there is a long tradition of renting.

To the question of why Switzerland and Germany are "tenant countries", even though their GDP per capita are among the highest in the world, Sotelo and Hähndel (2008) provide an explanation based on finance theory. A fundamental question in finance is the optimal capital structure of debt and equity (Sotelo & Hähndel, 2009, p. 568). According to transaction cost theory, in order to procure goods or services as cost-effectively as possible, readily available goods are purchased on the market thanks to low transaction costs, while individual and specific goods are better produced in-house because of otherwise high transaction costs (Horsch, Meinhövel & Paul, 2005, p. 105; cit. in Sotelo & Hähndel, 2009, p. 568). Williamson (1988) applies this reasoning to finance theory, arguing that while debt is cheaper than equity, above a certain level of "specificity" (Williamson, 1988, p. 589) of goods, transaction costs are too high, making equity financing more economical. "Specificity" in this context is defined as low third-party usability.

Transferred to the question of renting or buying, this means that specific space, e.g. a villa in a peripheral location, is financed more favorably with equity, i.e. purchased, while non-specific space, such as a centrally located standard apartment, is better financed with debt, i.e. rented (Sotelo & Hähndel, 2009, p. 569). Empirical evidence comes from the analysis of different regions in Germany, which has a similarly low homeownership rate as Switzerland, resulting in a positive correlation between tenancy rate, population density and GDP per capita in dense and high-income areas (Sotelo & Hähndel, 2009, p. 572).

3. Empirical Research

3.1 Data

This study is based on data from the Swiss Household Panel SHP, conducted by the Swiss Foundation for Research in Social Sciences FORS at Université de Lausanne, Switzerland. Started in 1999, the Swiss Household Panel SHP has been asking the same households and the people living in them an identical set of questions on basic facts such as socio-demographic characteristics, accommodation, standard of living, life events, health and quality of life, education, employment and income every year since then. In addition, further topics and opinions on various subjects are surveyed on a three-year cycle, covering the areas of social network and participation, political behavior and values, religion, leisure and media, and psychological scales.

Both household and individual questionnaires combine "objective" data such as resources, social position and participation and "subjective" data such as satisfaction, values and attitudes (Voorpostel, Tillmann, Lebert, Kuhn, Lipps, Ryser, Natal, Monsch, Dasoki, Klaas & Wernli, 2021, p. 14-16). Concerning the sampling frame, the first survey SHP_I in 1999 represents a stratified random sample of private households and their members, refreshed in 2004 (SHP_II) and again in 2013 (SHP_III), this time on an individual basis. More specifically, the stratification of households (SHP_I and SHP_II) or individuals (SHP_III) follows the NUTS 2 level of major geographic regions in Switzerland which consists of Lake Geneva Region, Espace Mittelland, Northwest Switzerland, Zurich, Eastern Switzerland, Central Switzerland, and Ticino. With relatively few exceptions, computer-assisted telephone interview CATI serves as the primary method of data collection (Voorpostel et al., 2021, p. 10-13).

3.2 Methodology and Specifications

3.2.1 Linear Regression and Logit Regression

The basic linear regression model with a single regressor denotes as follows:

$$Y_i = \beta_0 + \beta_1 X_i + u_i,$$

in which the subscript i indicates the observations $i = 1, \dots, n$ (Stock & Watson, 2020, p. 146).

Reading Y as the "dependent" or "response" variable and X as the "independent" or "control" variable aptly describes their role in the equation, while the error term u represents "unobserved" factors other than X that influence Y (Wooldridge, 2020, p.

21). Furthermore, the intercept or constant β_0 and the slope of the regression line β_1 are the coefficients or parameters of the population regression line. While β_0 geometrically specifies the value of X at the intersection of the population regression line with the Y-axis, β_1 indicates the difference in Y_i as a response to a unit difference in X_i (Stock & Watson, 2020, p. 145). An important difference lies in the fact that the population regression line constitutes the 'true' regression line of the entire population (e.g. all households or individuals in a country), which can hardly ever be surveyed completely and therefore has to remain unknown, whereas the estimated regression line represents the sample of units drawn randomly from the same population (Wooldridge, 2020, p. 28-30, 714-715; Schwarz, Bruderer Enzler & Käch, 2020).

The essential purpose of the basic linear regression model mentioned above is that it allows to study how Y varies given changes in X (Wooldridge, 2020, p. 20). More precisely, two different sets of questions ensue: the first type refers to random inference, the second to prediction. In the first case, data are used to assess the influence on the value of Y if the value of X alters; in the second, data on the observed value of X are employed to estimate the probability of how the value of Y might change. (Stock & Watson, 2020, p. 143, Schwarz et al., 2020),

Referring to the research question of this study, its explanatory statistical model deals with the probability of the binary outcome of the limited dependent variable Y: the value of *zero* for being a tenant and the value of *one* for being a homeowner, which can be equally understood as *no* – being *not* a homeowner or *yes* – being a homeowner, where obviously the former excludes the latter and vice versa.

Since the main interest lies in the probability with which $Y = 1$, the standard normal cumulative distribution function c.d.f. has to be applied for this purpose, because it produces predicted values between *zero* and *one*. Using standard *normal* c.d.f. results in a probit regression model, yet a logit regression model contains the standard *logistic* c.d.f. Nevertheless, probit and logit regression models are similar in their estimation outcome. Apart from this, the logit regression model[7] was selected for this research due to its practicality in the statistical software utilized (Stock & Watson, 2020, p. 397, 402-403).

[7] "Historically, the main motivation for logit regression was that the logistic cumulative distribution function could be computed faster than the normal cumulative distribution function." (Stock & Watson, 2020, p. 403)

In their nonlinear curve shape, both cumulative distribution functions display the probability more realistically than in a linear probability model. To illustrate this nonlinearity, Stock and Watson (2020) consider the example of mortgage application rejection (*zero* for approval and *one* for denial) as a function of the ratio between applicants monthly loan payments and their income. Following a stretched "S" shape, the rejection probability tends to rise rather flatly at low payment-to-income ratios, while the curve climbs steeply after a certain point and flattens again at probabilities close to *one*, implying that the probability of denial increases sharply at medium to high payment-to-income ratios, thus questioning the applicants ability of repay (Stock & Watson, 2020, p. 392-403).

Associated with this, another advantage of a logit probability model over a linear probability model is that it avoids the biased output of the latter in the case of a binary dependent variable Y. The steadily rising (or sloping) linear regression line causes probabilities that exceed *one* or drop below *zero*, which are "nonsensical" for the above stated intention (Stock & Watson, 2020, p. 397).

Hence, the logit regression model with multiple regressors is expressed

$$P(Y = 1|X_1, X_2, \dots, X_k) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k),$$

where F stands for the standard logistic cumulative distribution function

$$y = \frac{1}{1 + e^{-x}}.$$

The term e represents Euler's number, the base of the natural logarithm. Rewriting the model yields

$$P(Y = 1|X_1, X_2, \dots, X_k) = \frac{1}{1 + \mathrm{e}^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k)}}$$

(Stock & Watson, 2020, p. 402; Schwarz et al., 2020). Instead of the ordinary least squares estimator OLS to estimate the values of the unknown coefficients for the linear regression, the logit regression requires a different approach, specified as the maximum likelihood estimator MLE, because the population regression function is a nonlinear function of the coefficients $\beta_0, \beta_1, \beta_2, \dots, \beta_k$. While the OLS estimator minimizes the sum of squared residuals and thus calculates the OLS regression line slope (Wooldridge, 2020, p. 26-28), the MLE maximizes the likelihood function. The likelihood function, in turn, constitutes a joint probability distribution function, expressed as a function of the

unknown coefficients $\beta_0, \beta_1, \beta_2, \dots, \beta_k$. By allowing the MLE to select parameter values that maximize the probability of drawing the data that are effectively observed, estimated values of the unknown coefficients are obtained (Stock and Watson, 2020, p. 65, p. 404-406).

Since the best predictor of Y, measured by mean squared error, is the conditional expectation $E(Y|X_1, X_2, \dots, X_k)$ implying the zero conditional mean assumption

$$E(u_i|X_1, X_2, \dots, X_k) = 0,$$

the error term u_i assumes an expected mean of *zero* for any values of X_k (Wooldridge, 2020, p. 82, 98), which similarly holds for nonlinear regression as conditional expectations can be nonlinear functions (Wooldridge, 2020, p. 702).

3.2.2 Logit Regression Model

Thus, inserting the variables of interest provides the following model

$$P(home\ ownership = 1|X_1, X_2, \dots, X_n) = \frac{1}{1 + e^{-(\beta_0 + \sum_{i=1}^{n} \beta_i X_i)}},$$

where the probability of $home\ ownership = 1$ is estimated if an individual owns or co-owns a house or an apartment, given independent variables such as *'age'*, *'civil status'*, *'highest level of education achieved'*, *'yearly household income'*, *'household wealth'*, place of residence by *'community typology'*, *'number of adults'* and *'number of children'* living in the household, *'political position'* and several other individual characteristics. All independent variables X_i included in the model are listed in table 1 on the following page.

Note that the aforementioned basic models are presented in population notation, yet for the estimation model the ^ ('hat' for 'estimation') above Y and the coefficients β_i are omitted because regression analyses essentially incorporate estimates of population parameters based on a sample (Schwarz et al., 2020).

3.2.3 Variable Selection

Inevitably, the question arises which independent variables were selected for the model and why. Therefore, it will be explained how the final selection was approached through a subsequently outlined exclusion process.

Variables	Definition
Demographic	
Age	Age in the year of interview
Sex	Dummy variable: 'man' or 'woman'
Civil status	Civil status in the year of interview: single/never married, married, separated, divorced, widow/widower, registered partnership, dissolved partnership
Highest level of education achieved	Incomplete compulsory school, compulsory school, elementary vocational training, domestic science course, one year school of commerce, general training school, apprenticeship, full-time vocational school, vocational maturity, teacher training college, bachelor/maturity (high school), vocational high school with master certificate, technical or vocational school, vocational high school ETS HTL, university of teacher education HEP PH, university of applied sciences HES FH, university/academic high school EPF ETH, PhD
Swiss since birth	Dummy variable: 'yes' or 'no'
Financial	
log (Household income)	Yearly household income, gross (CHF)
log (Household wealth)	Household wealth other than real estate property (CHF) [a]
Household finance management by whom	Person of reference, partner of person of reference, another member of the household, together, separately, other arrangement
Residential	
Community typology	Place of residence in: center, suburban commune, wealthy commune, peripheral urban commune, tourist commune, industrial and tertiary sector commune, rural commuter commune, mixed agricultural commune, peripheral agricultural commune
Year moved in	Year moved into current place of residence
Spatial	
Number of adults	Number of adults living in household, age > 18 years
Number of children	Number of children living in household, age 0 to 17 years
Satisfaction	
Satisfaction with accommodation	Self-assessment on a ten-point Likert type scale from 'not at all satisfied' to 'completely satisfied'
Accommodation: Noisy external environment	Dummy variable: 'yes' or 'no'
Accommodation: Problems with pollution, environment, traffic or industry	Dummy variable: 'yes' or 'no'
Social and political	
Contact with neighbors	Number of neighbors with whom on good terms and enjoying a close relationship: no neighbors, none, one, two, three to five, six to ten, more than ten neighbors
Participation in clubs or other groups	Dummy variable: 'yes' or 'no'
Political position	Self-assessment on a ten-point Likert type scale from 'left' to 'right'

Table 1: Definition of independent variables

(sources: SHP Household Questionnaire Wave 21, 2019; SHP Individual Questionnaire Wave 21, 2019;

[a] SHP Imputed Wealth Household, 2016)

The first step is based on the fact that the SHP questionnaire addresses a range of political topics, such as opinion on nuclear power, social expenses, public expenses on military and defense, chances for foreigners, taxes on high income, protection of the environment versus economic growth, joining EU or bilateral agreements, and more, a total of twenty questions most of which can be readily associated with explicit political attitudes, thus pointing to the previously outlined objective of this study to test for a possible statistical relationship between homeownership and political position.

What looks to the casual observer as a convenient foundation to cover the whole spectrum of political attitudes, thirteen of these variables together with age, sex, income, education level, number of persons and number of children in the household become formalized into a statistical model an unbalanced and almost completely useless exercise, partly due to the effect of multicollinearity. Multicollinearity in a regression occurs if there is a high correlation between two or more independent variables (Wooldridge, 2020, p. 90). To illustrate the point with an example from the first model attempt, the variables '*number of persons in household'* and *'number of children in household'* indicate a clear correlation, as the two groups of persons display an obvious overlap without any calculations to realize this. Whereas Wooldridge (2020) as well as Stock and Watson (2020) discuss multicollinearity in regard to linear regression models (Wooldridge, 2020, p. 89-92; Stock & Watson, 2020, p. 228-231), Midi, Sarkar and Rana (2010) refer to it in the context of nonlinear logistic regression models (Midi, Sarkar & Rana, p. 255). Recalling the equation

$$P(Y = 1|X_1, X_2, \dots, X_k) = \frac{1}{1+e^{-(\beta_0+\beta_1 X_1+\beta_2 X_2+\cdots+\beta_k X_k)}},$$

the term $\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k$ constitutes in fact a linear regression model (Schwarz et al., 2020).

Hence, multicollinearity can also emerge in logit regression models. Technically speaking, it "inflates the variance[8] of the parameter estimates" (Midi et al., p. 256). As a consequence for the model outcome, the estimates of the individual coefficients may become questionable, even if the result of all coefficients combined remains a reliable approximation. In short, multicollinearity weakens the individual parts of the model but – rather paradoxically at first glance – not the model as a whole (Midi et al., p. 255-256).

[8] "The *variance* of a random variable Y (...) is the expected value of the square of the deviation of Y from its mean" (Stock and Watson, 2020, p. 61)

This appears particularly troublesome since the evidence of *high* multicollinearity does not violate the five assumptions of the Gauss-Markov Theorem[9], suggesting that the problem of multicollinearity is "not really well defined" (Wooldridge, 2020, p. 90). Briefly, the Gauss-Markov Theorem establishes five necessary attributes of the best unbiased OLS estimator optimally suited for linear regression: a best linear unbiased estimator BLUE is linear in parameters, its observations come from random sampling, it shows no *perfect* collinearity, it has a zero conditional mean of the error term, and features homoskedasticity[10] (constant variance) of the error term (Wooldridge, 2020, p. 103-104). Again, 'best' in 'best linear unbiased estimator' BLUE means "having the smallest variance" compared to another unbiased linear estimator (Wooldridge, 2020, p. 95).

Moreover, the second shortcoming of the initial attempt to include the political variables is that combining the variables in a model leads to a very small number of observations. Hence, the comparatively low response rate to the political questions in the SHP questionnaire causes a small sample size which generates undesirably big variance exactly like the high interdependence of the variables in the case of multicollinearity (Wooldridge, 2020, p. 91). Seeing that the phenomena represent two faces of the same coin but science has been focusing primarily on multicollinearity, Goldberger (1991) introduced the topic of "micronumerosity – the problem of small sample size", which, taken with a grain of salt, hints at its equal importance in judging regression models (Goldberger, 1991, p. 249-250; Kiefer, 1989, p. 140-141).

Further examination of the first model reveals another critical flaw in the design, namely the so-called omitted variable bias. Stock and Watson (2020) define it in terms of a linear regression with a single regressor where the effect is found to be most pronounced, identifying two conditions: The independent variable X is correlated with the omitted variable, and the omitted variable exerts a considerable influence on the dependent variable Y (Stock and Watson, 2020, p. 212-213).

Lack of data may be one reason for omitted variable bias. However, a way to avoid or at least mitigate its interference is simply by inserting the relevant variable and carefully selected other variables, if feasible, into a multiple regression model (Stock and Watson, 2020, p. 211). But just as one model appears under-specified and suffer from omitted variable bias, another model, after modification, faces the risk of being over-specified,

[9] named after the mathematicians Carl Friedrich Gauss and Andrey Markov
[10] Greek for 'even distribution'

containing irrelevant variables that have no effect on Y (Wooldridge, 2020, p. 83). The ideal model is supposed to be 'parsimonious' (Laird, 1919, p. 321).

To address concerns about multicollinearity and omitted variable bias, various combinations of variables in the model were evaluated applying statistical tests to determine their suitability. These include VIF diagnostics (Wooldridge, 2020, p. 92; O'Brien, 2007, p. 684; Midi et al., 2010, p. 266), chi-square omnibus/likelihood ratio tests (Wooldridge, 2020, p. 564-565), $pseudo\ R^2$ (Stock & Watson, 2020, p. 407; Schwarz et al., 2020), Hosmer and Lemeshow tests (Lemeshow & Hosmer, 1982, p. 96-97; Kramer & Zimmermann, 2007, p. 2052-2056), and percent correctly predicted (Stock & Watson, 2020, p. 406-407), which are all discussed in detail in the section after the regression results.

This new set of variables thus obtained was divided into six thematic groups, describing the characteristics of the person who answered the questionnaire or of the household in which the person was living in the year of the interview, covering the major preconditions and individual traits related to homeownership:

(1) 'Demographic' variables refer to *inherent or acquired individual attributes* of the person in question: *'Age', 'sex', 'civil status', 'highest level of education achieved'* and *'Swiss since birth'*.

(2) 'Financial' variables concern the 'hard' *financial background* of a household, but also how financial decisions are reached: Gross yearly *'household income'*, *'wealth other than house'*, and by whom the household finance management is handled, assuming that finance management involves decision-making and not only book keeping. Since the distribution of household income and wealth is skewed, it is appropriate to transform the distributions by taking their natural logarithm, denoted as $log(x)$. This may alleviate otherwise ensuing difficulties and provide practical results for interpretations, both by virtue of the slope coefficients β_i being invariant to rescaling (Wooldridge, 2020, p. 186-187). With regard to income and wealth, the following comments are necessary: gross yearly '*household income'* is constructed from the sum of individual income of household members from the individual questionnaire as household income tends to be underestimated in the household questionnaire, 'gross' means before taxes and including pension and social benefits (Voorpostel et al., 2021, p.

58-60). Wealth[11] other than real estate property was surveyed only in 2012 and 2016, hence the values from the latter year were applied.

In order not to overload the model, 'housing costs', albeit surveyed by the SHP household questionnaire, were not taken into account, namely the charges for water, electricity, gas and heating, fire insurance, taxes related to the dwelling and regular expenses for maintenance and repair, which are in this context hardly considered to be decisive for the comparison between tenancy and homeownership.

(3) 'Residential' variables specify on the one hand *geographical aspects* of the place of residence and on the other hand a *temporal dimension* of the attachment to the place of residence: *'Community typology'* of place of residence and *'year moved in'*. Based on the political municipality codes supplied by the Swiss Federal Statistical Office FSO, the chosen variable *'community typology'* with nine groupings is an aggregated version of the original typology with twenty-two categories (Schuler, Dessemontet & Joye, 2005; cit. in Voorpostel et al., 2021, p. 61), reflecting the differences at the level of the 'commune'[12], the lowest administrative division of the country.

(4) 'Spatial' variables quantify the *space requirements* of the household in which the respondent lives, classified by number of adults and number of children per household, while controlling for individual household financial resources in the model.

(5) 'Satisfaction' variables deal with *subjective assessment of accommodation*: Personal satisfaction with the accommodation and individual perception of the immediate surroundings in terms of problems with noise, traffic and pollution. Considering that homeowners are consistently wealthier than tenants, even when property values are subtracted from their total assets (Kuhn & Grabka, 2018, p. 183), there exists an inherent difficulty in distinguishing between satisfaction because of homeownership and satisfaction due to earning a high income or owning a fortune (Hofmann & Umbricht, 2019, p. 8-9). Owing to this possibly inextricable link, two dummy variables are added by targeting the issue more specifically via noise or pollution, generalizing that homeowners are more sensitive to noise and similar concerns due to their expected longer duration of residence, higher investments (and consequently higher risk) as well as higher transaction costs than tenants, albeit noise perception may of course vary greatly across individuals.

[11] 'Wealth other than house' was censored below *zero* for lack of a negative logarithm.
[12] French for municipality, German 'Gemeinde'

(6) ‘Social and political’ variables evaluate participants’ *social involvement* at the place of residence and their *political self-positioning* within a defined framework: *‘Contact with neighbors’*, *‘participation in clubs or other groups’*, and *‘political position’*. *‘Contact with neighbors’* measures the number of neighbors with whom the respondent is on good terms and enjoys a close relationship combining quantitative and qualitative aspects of “social capital”, described as the social connections between citizens (DiPasquale & Glaeser, 1999, p. 355). To capture a further dimension of social engagement, a dummy variable is included regarding participation in clubs defined as a group of people who meet together regularly for a particular activity. As a complement to the variables associated with more or less casual social interaction, the political self-assessment in the existing social context, translated into the political spectrum from left to right, now fits well in the remaining open gap in the last variables group to introduce the main interest of this study and at the same time to conclude the array of independent variables for the model.

Returning to the discussion of multicollinearity and omitted variable bias at the beginning of this section, figuratively speaking the strong ‘thematic overlap’ of the included topics and the exclusion of other important issues, all but one of the originally selected political variables were discarded for the new model. After all, political self-assessment is ideally nothing else than the corresponding summary of the political opinion questions. Moreover, this led to the realization that it becomes imperative to consider a wider scope of aspects when attempting to explain a particular variable.

3.3 Results

3.3.1 Descriptive Analysis

The next step is to perform a descriptive analysis of the data sample for two reasons: First, by describing individual characteristics, input errors during data collection or potentially distorting outliers can be identified, and second, this examination allows to assess the suitability for certain analytical procedures.

To characterize the distribution of the formative features in a data set, the following parameters are used: Location measures such as mean and median identify the central tendency, whereas dispersion measures such as variance and standard deviation indicate the spread of a probability distribution. While the arithmetic mean embodies the mathematical average, the median describes the value that divides the sample into two equal parts (Schwarz et al., 2020). As previously stated, variance means “the expected

value of the square of the deviation of [a random variable] *Y* from its mean" (Stock & Watson, 2020, p. 61), and the closely related standard deviation is its square root. Since the standard deviation has the same unit as the variable itself, it conveniently serves to obtain the average dispersion of the variable's values around its mean (Stock & Watson, 2020, p. 61). The standard error in turn is the average standard deviation of an estimated sample parameter value – in this case the mean – from the 'true' parameter value, and a statement about the accuracy of the parameter estimation (Wooldridge, 2020, p. 50).

Mean and variance, together with skewness and kurtosis[13], define the features of a distribution's shape, subsumed under the four moments of a distribution. Compared to a symmetric normal distribution, a *non-zero* skewness involves asymmetric leaning, besides, a kurtosis with the value above *three* indicates whether the distribution displays so-called 'heavy tails' (Stock & Watson, 2020, p. 62-64). Serving as a rule of thumb, the position of mean, median (and mode[14]) to each other reveals if the distribution has skewness (Schwarz et al., 2020).

The underlying intention of these measurements is to determine whether the sample data are as normally distributed as possible, thus as close to the 'true' population distribution, because this – in addition to a certain scale level – is considered the most important prerequisite for the implementation of many statistical procedures (Schwarz et al., 2020). Hence, minimum, maximum, mean, standard error of mean, median, and standard deviation of the model variables are reported in table 2 on the following page.

Critical features for understanding the characteristics of the data sample are briefly described below. To start with the dependent variable, the distribution of tenants and homeowners in the sample shows the opposite relationship as in the OECD data. 37.3 % tenants to 62.7% homeowners in the sample contrasts with 60.59% tenants to 37.97% homeowners in the OECD data (OECD, 2019).[15] Accordingly, the distribution in the sample is left-skewed and has a predominance of owners.

Regarding the variable *'age',* the sample has a mean of 49.6 and a median of 49 years, while the corresponding figures for the Swiss population in 2019 are lower, at 42.5 and 42.64 years, respectively (BFS/FSO, 2020a). The median of the sample is lower than

[13] Greek for 'curved'
[14] the most frequent value appearing in the sample
[15] Figures do not add up to 100% because 1.44% is subsumed under 'other, unknown' (OECD, 2019).

Variables	Min.	Max.	Mean	S.E.	Median	Std. Dev.
Dependent variable						
Accommodation: Tenant or homeowner	1	2	1.62	0.011	2	0.484
Independent variable						
Demographic						
Age	18	99	49.60	0.439	49	19.673
Sex	1	2	1.45	0.011	1	0.498
Civil status	1	6	2.00	0.024	2	1.095
Highest level of education achieved	0	16	8.31	0.105	7	4.867
Swiss since birth	1	2	1.09	0.006	1	0.290
Financial						
Household income	12,000	1,356,000	150,530.46	0.013*	132,000.00	103,750.807
Household wealth [a]	200	100,000,000	716,662.07	0.039*	150,000.00	3,791,154.550
Hh finance management	1	6	2.13	0.033	1	1.459
Residential						
Community typology	1	9	4.63	0.057	4	2.533
Year moved in	1922	2020	1996.81	0.399	2000	17.880
Spatial						
Number of adults	1	6	2.22	0.021	2	0.920
Number of children	0	5	0.47	0.019	0	0.868
Satisfaction						
Satisfaction with accommodation	0	10	8.51	0.031	9	1.379
Accommodation: Noisy external environment	1	2	1.80	0.009	2	0.398
Accommodation: Problems with pollution etc.	1	2	1.92	0.006	2	0.265
Social and political						
Contact with neighbors	0	6	2.82	0.036	3	1.602
Participation in clubs/groups	1	2	1.51	0.011	2	0.500
Political position	0	10	4.74	0.050	5	2.221

Table 2: Descriptive statistics Wave 21, 2019

(data sources: SHP Household Questionnaire Wave 21, 2019; SHP Individual Questionnaire Wave 21, 2019; [a] SHP Imputed Wealth Household, 2016); S.E. = Standard error of mean, * log (household wealth) and log (household income), Std. Dev. = Standard deviation; weights WI19CSS applied, n total = 2,009

the mean, which is confirmed by the positive value of skewness. Moreover, the broad span between minimum and maximum of 81 years is mirrored in the large standard deviation. A look at the histogram shows a sizeable number of respondents between 20 and 35, but also some strong cohorts in the 60 to 80 age group.

'Household income' and '*household wealth'* cover a wide range. While median income and mean income are comparably close together, the same indicators for wealth demonstrate that some very wealthy respondents far exceed the average, which is also reflected in the large value of the standard deviation. For cross-checking purposes, the most recent available median of the gross household income (for 2018, including pension and social benefits, before taxes) for the entire Swiss population was annualized, which gave a figure of CHF 121,368 (BFS/FSO, 2020b), which is reasonably close to the sample value of CHF 132,000. Already explained in the previous chapter in the description of the variables, the asymmetric shape of the household income and wealth data distributions were fitted closer to the preferred normal distribution curve in the model by transformation with the natural logarithm without altering or diminishing their information content.

For '*community typology'*, the distribution clearly emphasizes the intermediate region in between center and countryside. Although the most widespread single category is the 'suburban commune', the observations which originate from urban peripheral municipalities to rural commuter municipalities add up to a majority. A comparison with figures from 2019 for the total Swiss population, based on a three-part classification of urban – intermediate (defined as dense peri-urban area and rural centers) – rural, shows a division of 63/21/16% (BFS/FSO, 2020c). Rearranging the nine-part municipality typology used in this model according to the above-mentioned three categories, a split of 36/47/17% is obtained. Even if the classification is ambiguous, it is still possible to speak of an overweighting of the intermediate region against the center in the data sample.

'Year moved in' includes a similar wide range as '*age'* and a thus an almost equally large standard deviation. Due to its inherent characteristic that the number of relocations increases as the year 2019 approaches (with a peak in 2000 and a subsequent drop followed by a recovery), the distribution shows a negative skewness value and is left-skewed.

Both distributions of '*number of adults in household'* and *'number of children in household'* feature a higher mean than the median and a positive skewness value and are therefore clearly right-skewed. The reason for this is that in each of them one particular category was mentioned most often, surpassing all others: In the case of number of adults, most households reported *two* adults, and in the case of number of children, *zero* children. Aggregating the five categories in the sample into the three categories ranging from one to two to more than two adults in the household, it allows comparison with the structural survey of Swiss private households BFS/FSO (a yearly average from 2017-2019). Here, the 32/56/12% split from the sample contrasts with that of 42/54/4% from the population (BFS/FSO, 2021), which would suggest that in *'number of adults in household'*, households with more than two adults are overrepresented and one-person households are underrepresented, whereas the observations for two-adults-households are fairly close to the population. If the same is performed with the figures for the ratio of households without children to households with children, the result is 74 to 26% for the sample against 65 to 35% in the structural survey, indicating that there is a certain bias in the sample in favor of households without children (BFS/FSO, 2020).

In *'satisfaction with accommodation'*, the distribution is definitely left-skewed, as the vast majority of respondents in the questionnaire indicate a high level of satisfaction, with the most mentions of scale points 8 to 10.

Examining the distribution of values for the variable '*political position'* allows to draw the following conclusions: The median of the ten-point scale is 5, which can likewise be described in the political spectrum as 'center'. Furthermore, the mean of 4.74 is marginally below the median, which together with the negative skewness value indicates the geometric attribute of a left-skewed distribution. Optical evidence in this case also from the histogram, which clearly shows how the distribution is clustered around the highest value 5 in the center, with a slight dominance of observations from 1 to 4 on the left side tail. Another finding, albeit on a low number of around 150 samples, is that there are roughly more than twice as many respondents in the data sample that identify themselves as strictly left equals 0 compared to strictly right equals 10 scale points. From the circumstance that the scale conveniently starts on the left hand side with *zero*/politically 'left' and the reading direction runs from left to right, this division also corresponds to the common arrangement of the political spectrum and thus the idea that the distribution of political orientation in the sample is 'leaning slightly to the left' results in a suitable picture in a double sense.

Considering that SHP income and wealth data are thoroughly checked for plausibility (Voorpostel et al., 2021, p. 56-60), the given sample distribution is adopted as an intrinsic feature and entered in the logit regression model as received. Overall, the standard errors of the means – including income and wealth after logarithmic transformation – are comparatively small thanks to the amount of valid observations and thereby prove a certain consistent accuracy of the parameter estimates (Wooldridge, 2020, p. 50). Two variables, however, stand out with a less small standard error: *'age'* and *'year moved in'*, whose deviation from the average of a standard normal distribution is related to the wide range they span, implied by the question itself. Subsequently, all selected variables are transferred to the logit regression model.

3.3.2 Regression Results Wave 21, 2019

After the selected data are examined and validated, the logit regression is performed. The results are summarized in Table 3 on the following page.

Usually, statistical software first determines the significance of the overall logit regression model by means of an omnibus test of the model coefficients and continues the analysis only if the outcome is positive (Schwarz et al., 2020). This will be briefly addressed in the next section which discusses the logit regression model goodness-of-fit.

In the results table from the statistical software, B (for β) labels the regression coefficients, whereas S.E. denotes their standard error. As mentioned earlier, the standard error is a statement about the accuracy of the parameter estimation (Wooldridge, 2020, p. 50). Test statistics require the standard error of the coefficients to detect the coefficients' significance (Wooldridge, 2020, p. 121).

The next step of the analysis is to establish whether the regression coefficients B (for beta) are individually significant or not. To evaluate the significance, a hypothesis test is the standard procedure. Prior to this, a confidence interval has to be constructed containing the 'true' population mean with a prespecified probability between a lower and an upper limit, which in turn represents the confidence level (Stock & Watson, 2020, p. 117). After defining the eponymous null hypothesis that X has *no* effect on Y and an alternative hypothesis against, the so-called p-value is obtained by calculating a test statistic. If the p-value is lower than the critical value of the confidence level, the null hypothesis can be rejected and the coefficient becomes significant, in other words there is a statistical relationship between X and Y (Stock & Watson, 2020, p. 115-116).

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for Exp(B) Lower	95% C.I. for Exp(B) Upper
Demographic							
Age	0.015	0.005	18.877	0.001**	1.015	1.006	1.025
Sex	0.066	0.116	0.326	0.568	1.069	0.851	1.342
Civil status	0.107	0.061	3.065	0.080	1.113	0.987	1.256
Highest level of education achieved	-0.017	0.013	1.538	0.215	0.983	0.958	1.010
Swiss since birth	0.112	0.195	0.333	0.564	1.119	0.764	1.639
Financial							
Household income	0.648	0.130	27.508	0.000**	1.982	1.535	2.559
Household wealth [a]	0.352	0.036	96.456	0.000**	1.421	1.325	1.525
Household finance management by whom	-0.139	0.040	11.941	0.001**	0.870	0.804	0.942
Residential							
Community typology	0.144	0.023	40.471	0.000**	1.155	1.105	1.207
Year moved in	-0.012	0.004	9.822	0.002**	0.988	0.980	0.995
Spatial							
Number of adults	0.830	0.092	81.815	0.000**	2.294	1.916	2.746
Number of children	0.233	0.072	10.622	0.001**	1.263	1.097	1.453
Satisfaction							
Satisfaction with accommodation	0.453	0.046	97.097	0.000**	1.572	1.437	1.720
Accommodation: Noisy external environment	0.191	0.150	1.611	0.204	1.210	0.901	1.624
Accommodation: Problems with pollution, environment, traffic etc.	0.303	0.230	1.732	0.188	1.354	0.862	2.127
Social and political							
Contact with neighbors	0.175	0.037	22.474	0.000**	1.191	1.108	1.280
Participation in clubs or other groups	0.156	0.113	1.920	0.166	1.169	0.937	1.458
Political position	0.036	0.026	1.879	0.170	1.036	0.985	1.091
Constant	3.663	7.718	0.225	0.635	38.964		
Dependent variable: Accommodation: Tenant or homeowner							

Table 3: Logit regression results Wave 21, 2019

(data sources: SHP Household Questionnaire Wave 21, 2019; SHP Individual Questionnaire Wave 21, 2019; [a] SHP Imputed Wealth Household, 2016); S.E. = Standard error of coefficient B, Wald = Wald test statistic, Sig. = Significance, ** statistically significant at the 1% level, Exp(B) = odds ratio of coefficient B; weights WI19CSS applied, n valid = 2,009

In the case of logit regression, the Wald[16] statistic is chosen as test statistic, based on a asymptotic chi-square distribution (Wooldridge, 2020, p. 564). According to its properties, a chi-square distribution with a large number of n approaches the t-distribution, which itself resembles the standard normal distribution under the same condition (Wooldridge, 2020, p. 708-709). Noting that the critical value for large degrees of freedom is c = 2.576 at 1% confidence level and c = 1.960 at 5% confidence level, and the null hypothesis rejection rule states that the Wald statistic value[17] must be larger than the critical value c to assume significance (Wooldridge, 2020, p. 127, 786), it follows that *ten* coefficients exhibit significance at the 1% level: *'Age', 'household income*', *'household wealth'*, *'household finance management by whom'*, '*community typology'*, *'year moved in'*, *'number of adults in household'* and *'number of children in household'*, *'satisfaction with accommodation'*, and *'contact with neighbors'*. Two significant coefficients show negative signs.

Before interpreting the regression coefficients, an basic issue needs to be clarified: When applying a logistic regression model, not the values of the dependent variable Y are predicted, but the *probability of occurrence of* Y is estimated. More precisely, a value close to *zero* means that the occurrence of Y ($Y = 1$) is very unlikely, while a value close to *one* means that the occurrence of Y is very likely.

What can be transferred from the interpretation of linear regression coefficients for the logit coefficients is the direction of their sign. A coefficient B with positive sign means that an increase in the independent variable X in question causes an increase in the probability that $Y = 1$. Conversely, a coefficient B with negative sign marks a decrease in the probability that $Y = 1$, given an increase in the independent variable X (Schwarz et al., 2020).

However, for the interpretation of a statistical relationship between an independent variable and the dependent variable from a logit regression a different procedure is required, which involves the so-called odds ratio. To first obtain the odds, the probability of occurrence of the event ($Y = 1$) is compared to its non-occurrence:

$$odds = \frac{P(Y\ occurs)}{1 - P(Y\ occurs)}$$

[16] named after the mathematician Abraham Wald
[17] The statistical software presents the Wald test statistic value raised to the power of two.

If the odds after the increase of X by one unit are related to the odds before the increase of X by one unit, the odds ratio is derived:

$$odds\ ratio = \frac{odds\ after\ increase\ of\ X\ by\ one\ unit}{odds\ before\ increase\ of\ X\ by\ one\ unit} = \frac{odds_{after}}{odds_{before}}$$

The odds ratio is expressed by the term e^{β} [18] and referred to in the statistical software as $Exp(B)$, representing the factor by which the odds change. In virtue of the relationship

$$odds_{after} = e^{\beta} \cdot odds_{before}$$

it can be quantified how much the probability of $Y = 1$ alters when the independent variable increases by one unit, given all other variables in the model are held constant i.e. remain unchanged[19] (Schwarz et al., 2020).

As a further validation, the lower and upper confidence intervals are taken to test the significance of $Exp(B)$ at the 5% level. Here, the rule stipulates that a significant influence is assumed if the prespecified confidence interval of $Exp(B)$ does *not* include the value *one* (Schwarz et al., 2020), which as expected proves to be consistent for all significant coefficients derived from the Wald test.

Two aspects are important for the quantification and interpretation of the individual significant logit regression coefficients: The direction of the sign of B and the value of $Exp(B)$. Yet, in order to measure their individual contributions to the model and thus compare the strength of their effect relative to each other, the coefficient values have to be related to a given reference level, i.e. to be standardized. For this reason, Menard (2004) proposes a method similar to Agresti (1996), suggesting

$$b_A^* = (b)(s_X),$$

where b is the sample estimate of the unstandardized logistic regression coefficient, s_X denotes the sample standard deviation of the variable X, and b_A^* stands for the standardized logistic regression coefficient (Menard, 2004, p. 219; Agresti, 1996, p. 129). The results of this conversion are presented in Table 4 on the following page.

[18] Where e is Euler's number, the base of the natural logarithm, and β the regression coefficient.
[19] An example for the concept of 'ceteris paribus', Latin for 'all other things being equal'.

Variables	b	s_X	b_A^*	Exp(b)	Sig.
Number of adults in household	0.830	0.920	0.764	2.294	0.000**
Satisfaction with accommodation	0.453	1.379	0.625	1.572	0.000**
Household wealth [a]	0.352	1.772	0.624	1.421	0.000**
Household income	0.684	0.596	0.408	1.982	0.000**
Community typology	0.144	2.533	0.365	1.155	0.000**
Age	0.015	19.673	0.295	1.015	0.001**
Contact with neighbors	0.175	1.602	0.280	1.191	0.000**
Year moved in	-0.012	17.880	0.215	0.988	0.002**
Household finance management by whom	-0.139	1.459	0.203	0.870	0.001**
Number of children in household	0.233	0.868	0.202	1.263	0.001**
Civil status	0.107	1.095	0.117	1.113	0.080
Accommodation: Problems with pollution, environment, traffic or industry	0.303	0.265	0.080	1.354	0.188
Political position	0.036	2.221	0.080	1.036	0.170
Highest level of education achieved	-0.017	4.687	0.080	0.983	0.215
Participation in clubs or other groups	0.156	0.500	0.078	1.169	0.166
Accommodation: Noisy external environment	0.191	0.398	0.076	1.210	0.204
Sex	0.066	0.498	0.033	1.069	0.568
Swiss since birth	0.112	0.290	0.032	1.119	0.564

Table 4: Standardized logit regression results Wave 21, 2019

(data sources: SHP Household Questionnaire Wave 21, 2019; SHP Individual Questionnaire Wave 21, 2019; [a] SHP Imputed Wealth Household, 2016); b = unstandardized logistic regression coefficient, s_X = standard deviation of variable X, b_A^* = standardized logistic regression coefficient, Exp(b) = odds ratio of coefficient b, Sig. = Significance, ** statistically significant at the 1% level; weights WI19CSS applied, n valid = 2,009

First and foremost, political orientation turns out *not* to be significant in the model. Methodologically, applying the statement for statistical significance i.e. the null hypothesis, that regressor X has no effect on Y, *cannot* be rejected with the required significance level of 5% or less (Stock & Watson, 2020, pp. 115-116). Nevertheless, lack of significance is still an essential outcome – it proves that political affiliation is not a crucial factor in estimating the probability of homeownership compared to tenancy when the other variables are taken into account. With reference to the second part of the research question of a *causal* relationship between homeownership and political orientation, this cannot be claimed either. Thus, the hypothesis of a connection between homeownership and political affiliation has to remain open.

From this realization, an important question ensues: If '*political position'* does *not* account significantly for the model's estimation of homeownership probability, which variables *do*?

And here is the answer: The variables that yield the highest absolute standardized coefficient values signal that they contribute most to the estimation of the probability that $Y = 1$, meaning being a homeowner. Therefore, these coefficients are subsequently analyzed according to their values in descending order.

Ranked first in the list, it can be noted for the variable *'number of adults in household'* that with one adult person increase in household size, the probability of living in an owned home or apartment increases by 129.4%, that is, it more than doubles. This seems reasonable, since more people in a household need more space, thus there may be a propensity to buy a more roomy home or apartment, considering the possibility that there are two or even more contributors to household income and wealth. Even if a larger apartment or house could be rented instead of purchased, the evidence that there are cumulatively more respondents from suburban and peripheral municipalities in the data sample than from central locations with comparably tight property markets may also play a role and could explain the high share of the coefficient on the probability of being homeowner. Another reason why the estimate is sizeable could be because the data sample contains a relatively large proportion of two-person households. Recalling that the next largest fraction of the sample concerning household size is composed of one-person households, it might be assumed that the comparison of household size from one person to two persons may involve the purchase of houses or apartments.

After this, the variable *'satisfaction with accommodation'* is on second place. Based on the survey mode of the SHP questionnaire, which provides self-assessment on a ten-point Likert scale[20] for this question, the following conclusion is drawn: With one scale point increase in a respondent's satisfaction compared to another participant of the survey, the probability of being a homeowner increases by 57.2%. Since the close and possibly inextricable causal connection of the variable *'satisfaction with accommodation'* with the variables satisfaction due to high income or wealth was already referred to in the selection of suitable variables for this model, it is not surprising that this variable, together with two of the 'financial' variables measuring wealth and income is found among the top four of the list.

Regarding the position of the 'financial' variables, for *'household wealth'* it becomes clear that a 1% increase in wealth increases the probability of a household occupying an owned home or apartment by 0.42%, whereas for *'household income'*, it can be stated that for a 1% increase in income, the probability of a household residing in an owned home or apartment by increases by 0.98%. When comparing the respective coefficients, it is remarkable that household wealth contributes more to the probability than household income, which seems logical by acknowledging that with rising prices for residential property in Switzerland because of high demand and inadequate supply partly due to shortage of building land (Bourassa & Hoesli, 2010, p. 306) and other factors (Martel, 2021, p. 17), financial resources are essential for a real estate purchase. More specifically, the ability to make a down payment of at least 20% of the appraised value (for single-family homes) is a prerequisite for obtaining mortgage loans, thereby limiting eligibility for prospective ownership to households with a certain amount of savings. The relative importance of household income, in turn, may be justified by the circumstance that respondents with a smaller fortune require a constant income for regular payment of mortgage installments.

Another decisive factor appears to be the spatial environment in which the accommodation is located, captured by the variable *'community typology'*: A change in place of residence of a respondent by one municipality category, the probability of being a homeowner increases by 15.5%. With focus on the order of the municipality typologies that serve as units in the question regarding place of residence, it is apparent that the categories are organized according to a spatial property, namely growing distance from the city center. Evoking the concept of a concentric zone model (Burgess,

[20] based on the research of economist and sociologist Rensis Likert

1925; cit. in Burgess, 2008, p. 71), in the case of the survey, a division into nine distinct zones can be imagined, eight of which, containing municipality types from the suburbs to the periphery, extend in a ring shape from the city center. This configuration allows to claim that if a respondent's place of residence is one municipality category further from the city center than another respondent's, the probability of being a homeowner increases by 15.8%. As mentioned before in the context of 'financial' variables and *'number of adults in household'*, high demand and insufficient supply in the housing market may also play a role, as perhaps do the characteristics of the data sample with cumulatively more respondents from suburban and peripheral communities.

'Age' of the respondent has a coefficient that contributes to the probability of the model as well. Its result can be expressed like this: With one year increase in age, the probability of being a homeowner increases by 1.4%. If supported by the generalization that people become wealthier with age for various reasons such as increasing income, savings or inheritance, some of which they may invest in property, the *'age'* aspect offers a causal link with homeownership.

What also seems to be a substantial issue is the variable *'contact with neighbors'*. The classification used in the interviews is a scale with six categories for the number of neighbors with whom the respondent enjoys a friendly relationship: including the case of no neighbors, it proceeds from *none*, *one*, *two*, *three to five*, *six to ten*, to *more than ten neighbors*. Hence, what the model indicates can be understood in following terms: With classification of the respondent one step higher regarding contact with an increasing number of neighbors, the probability of being a homeowner increases by 19.1%. This insight also goes in line with previous reasoning and therefore comes across as plausible, since taking into account the higher investment and therefore the planned longer residence time of a homeowner, there seems to be a greater incentive to invest in social connections in the neighborhood compared to a tenant.

A further variable with significant coefficient, albeit on the 5% level, *'year of moving in'* is worth highlighting. Being one of two exceptions, the sign of the coefficient is negative, besides, the units are consecutive calendar years. Thus it can be concluded that if the respondent is moved in one year later compared to a different participant of the survey, the probability of being a homeowner decreases by 1.20%. Again, this seems logical, reflecting the assumption that homeowners are likely to stay longer in their place of residence compared to tenants, not only because they face higher transaction costs in the case of relocation, but also because they make higher investments and

consequently take on higher risk. Conversely, the shorter a respondent lives in a place, the higher the specific year of relocation, and hence the probability of ownership is lower.

The third variable in the 'financial' group, defined as *'household finance management by whom'*, is also relevant in the outcome of this model. Here, the answers were divided in six categories beginning with *'person of reference'*, *'partner of person of reference'*, and ranging from *'another member of the household'* to *'together'*, *'separately'*, and *'other arrangement'*. Once again, given that the sign is negative, the change from one responsibility class for household finance management to another is coupled with a decrease in probability living in a owned house or apartment by 13.0%. For the interpretation of this outcome it is assumed that 'financial management' does not only include book keeping but also decision taking. Since more than half of the respondents or their partners in the sample have household finance management under their own control – another person in the household being in charge is a minority – this can be considered an usual model. In contrast, when the task is handled in a different constellation, namely *'together'*, which is the model of choice for about a quarter of the participants, it may be argued that if the more common model of household finance management is not the preferred one, the likelihood of the household inhabiting an owned house or apartment decreases.

The last variable in the list is defined as *'number of children in household'*, whose coefficient reveals that with one child increase in household size, the probability of living in an owned home or apartment increases by 26.3%. This is related to the reasoning in the case of the other 'spatial' variable *'number of adults in household'* that larger households require more space, but the fact that the standardized coefficient is much lower in comparison can probably be explained by the circumstance that only about a quarter of the households in the sample have children.

3.3.3 Regression Results Wave 18, 2016

In order to compare the results from the 2019 SHP survey (Wave 21) and to identify any similarities or differences, a second logit regression of the same model is performed using the data sample from Wave 18 of the 2016 SHP survey. 2016 is the closest past year in which, under the rotation calendar, responses to the same questionnaire modules as 2019 were collected. This has the additional advantage that Wave 18 was conducted in the same year in which the household wealth data were collected. Therefore, more observations are available than in the combination with Wave 21, where effects of

attrition[21] can be witnessed in direct comparison. The descriptive analysis of the variables is given in table 5 on the following page, while the results of the second logit regression are displayed in tables 6 and 7 on the two pages after the next.

Applying the data sample from Wave 18 raises the number of observations from 2,009 to 4,737. In accordance with the law of large numbers, it is possible to get "arbitrarily" close to the 'true' population mean by using an adequately large sample (Wooldridge, 2020, p. 722), whereas the central limit theorem proves that the standardized average from a random sample is well approximated by a standard normal distribution if the number of observations is large[22] (Stock and Watson, 2020, p. 86-89). As a corollary, it is not surprising that with more than twice as many observations in the second data sample, more coefficients become significant.

Regarding the descriptive statistics, there are only minor changes in comparison. The average age is slightly higher, while the average number of adults and the number of children per household are marginally lower. Most strikingly, for the *'community typology'* variable, the median is 'suburban commune', additionally the 'center' community type includes more observations, suggesting more weight in the distribution toward the city center. Interestingly, this has little effect on *'political position'*, where the mean is 4.99, almost equal to the median of 5.

Despite a larger data sample and consequently more information, there is no evidence to be found that political orientation does contribute significantly to the probability estimation that a respondent is a homeowner or a tenant. After all, no significance is nevertheless a substantial finding – even more so since the outcome from testing the regression model with data from Wave 18 lends additional weight to the previous conclusion from running the Wave 21 sample that political affiliation is not a decisive factor in estimating the probability of homeownership compared to tenancy if the other variables are controlled for.

Moreover, a remarkable finding for *'community typology'* is that the different sample distribution with more emphasis on central and suburban locations may accentuate the disparities between center and intermediate regions, so that change in place of residence of a respondent by one municipality category, the probability of being a homeowner increases from 15.5% to 32.8%.

---

[21] loss of respondents in panel surveys over the years for various reasons (Voorpostel et al., 2021, p. 26)

[22] The sample from Wave 21 is considered to be 'large' as measured by the threshold of $n \geq 100$, which Stock and Watson (2020) refer to as a "very good" approximation (Stock & Watson, 2020, p. 89).

Variables	Min.	Max.	Mean	S.E.	Median	Std. Dev.
Dependent variable						
Accommodation: Tenant or homeowner	1	2	1.58	0.007	2	0.493
Independent variable						
Demographic						
Age	18	96	50.02	0.275	50	18.939
Sex	1	2	1.46	0.007	1	0.499
Civil status	1	7	2.02	0.016	2	1.097
Highest level of education achieved	0	16	8.14	0.067	6	4.596
Swiss since birth	1	2	1.09	0.004	1	0.280
Financial						
Household income	110	1,504,500	138,121.68	0.008*	123,229.44	83,081.660
Household wealth [a]	100	100,000,000	509,972.40	0.024*	150,000.00	2,760,828.010
Hh finance management	1	6	2.03	0.021	2	1.416
Residential						
Community typology	1	9	3.35	0.035	2	2.401
Year moved in	1922	2016	1993.25	0.269	1997	18.495
Spatial						
Number of adults	1	7	2.16	0.013	2	0.901
Number of children	0	8	0.46	0.013	0	0.861
Satisfaction						
Satisfaction with accommodation	0	10	8.39	0.021	8	1.449
Accommodation: Noisy external environment	1	2	1.81	0.006	2	0.393
Accommodation: Problems with pollution etc.	1	2	1.93	0.004	2	0.248
Social and political						
Contact with neighbors	0	6	2.73	0.024	3	1.637
Participation in clubs/groups	1	2	1.52	0.007	2	0.500
Political position	0	10	4.99	0.031	5	2.138

Table 5: Descriptive statistics Wave 18, 2016

(data sources: SHP Household Questionnaire Wave 18, 2016; SHP Individual Questionnaire Wave 18, 2016; [a] SHP Imputed Wealth Household, 2016); S.E. = Standard error of mean, * log (household wealth) and log (household income), Std. Dev. = Standard deviation; weights WI16CSS applied, n total = 4,737

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for Exp(B) Lower	95% C.I. for Exp(B) Upper
Demographic							
Age	0.017	0.003	31.646	0.000**	1.017	1.011	1.023
Sex	0.038	0.075	0.252	0.615	1.038	0.897	1.202
Civil status	0.025	0.039	0.434	0.510	1.026	0.951	1.107
Highest level of education achieved	-0.008	0.009	0.798	0.372	0.992	0.975	1.009
Swiss since birth	0.157	0.128	1.494	0.222	1.169	0.910	1.503
Financial							
Household income	0.553	0.087	40.154	0.000**	1.738	1.465	2.062
Household wealth [a]	0.408	0.024	278.089	0.000**	1.504	1.434	1.578
Household finance management by whom	-0.132	0.026	25.938	0.000**	0.877	0.833	0.922
Residential							
Community typology	0.284	0.017	284.089	0.000**	1.328	1.285	1.373
Year moved in	-0.005	0.002	3.844	0.050*	0.995	0.991	1.000
Spatial							
Number of adults	0.637	0.056	130.107	0.000**	1.891	1.695	2.019
Number of children	0.335	0.046	52.323	0.000**	1.398	1.276	1.530
Satisfaction							
Satisfaction with accommodation	0.323	0.027	144.635	0.000**	1.381	1.310	1.456
Accommodation: Noisy external environment	0.314	0.097	10.397	0.001**	1.369	1.131	1.656
Accommodation: Problems with pollution, environment, traffic etc.	-0.103	0.151	0.465	0.495	0.902	0.671	1.213
Social and political							
Contact with neighbors	0.124	0.023	28.727	0.000**	1.132	1.082	1.184
Participation in clubs or other groups	0.185	0.073	6.432	0.011*	1.203	1.043	1.388
Political position	0.003	0.017	0.026	0.871	1.003	0.969	1.038
Constant	-8.450	4.841	3.047	0.081	0.000		
Dependent variable: Accommodation: Tenant or homeowner							

Table 6: Logit regression results Wave 18, 2016

(data sources: SHP Household Questionnaire Wave 18, 2016; SHP Individual Questionnaire Wave 18, 2016; [a] SHP Imputed Wealth Household, 2016); S.E. = Standard error of coefficient B, Wald = Wald test statistic, Sig. = Significance, ** statistically significant at the 1% level, * statistically significant at the 5% level, Exp(B) = odds ratio of coefficient B; weights WI16CSS applied, n valid = 4,737

Variables	b	s_X	b_A^*	Exp(b)	Sig.
Household Wealth [a]	0.408	1.762	0.719	1.504	0.000**
Community typology	0.284	2.401	0.682	1.328	0.000**
Number of adults in household	0.637	0.901	0.574	1.891	0.000**
Satisfaction with accommodation	0.323	1.449	0.468	1.381	0.000**
Household income	0.553	0.593	0.328	1.738	0.000**
Age	0.017	18.939	0.322	1.017	0.000**
Number of children in household	0.335	0.861	0.288	1.398	0.000**
Contact with neighbors	0.124	1.637	0.203	1.132	0.000**
Household finance management by whom	-0.132	1.416	0.187	0.877	0.000**
Accommodation: Noisy external environment	0.314	0.393	0.123	1.369	0.001**
Participation in clubs or other groups	0.185	0.500	0.093	1.203	0.011*
Year moved in	-0.005	18.495	0.092	0.995	0.050*
Swiss since birth	0.157	0.280	0.044	1.169	0.222
Highest level of education achieved	-0.008	4.596	0.037	0.992	0.372
Civil status	0.025	1.097	0.027	1.026	0.510
Accommodation: Problems with pollution, environment, traffic or industry	-0.103	0.248	0.026	0.902	0.495
Sex	0.038	0.499	0.019	1.038	0.615
Political position	0.003	2.138	0.006	1.003	0.871

Table 7: Standardized logit regression results Wave 18, 2016

(data sources: SHP Household Questionnaire Wave 18, 2016; SHP Individual Questionnaire Wave 18, 2016; [a] SHP Imputed Wealth Household, 2016); b = unstandardized logistic regression coefficient, s_X = standard deviation of variable X, b_A^* = standardized logistic regression coefficient, Exp(b) = odds ratio of coefficient b, Sig. = Significance, ** statistically significant at the 1% level, * statistically significant at the 5% level; weights WI16CSS applied, n valid = 4,737

When examining the rankings of the standardized coefficients from Wave 18 and 21 samples side by side, for Wave 18 *'community typology'*, *'household wealth'*, *'number of children in household'* and '*age'* are more important, while the share of *'number of adults in household'*, *'satisfaction with accommodation'*, *'household income'*, *'contact with neighbors'*, *'year moved in'* and *'household finance management by whom'* is smaller. Notably, *'household wealth'* and *'community typology'* are more relevant than *'satisfaction with accommodation'*. *'Year moved in'* is close to the 5% significance threshold. As expected, the direction of the signs of the significant coefficients does not alter, yet two more coefficients join the existing set, leading to a total of *twelve* variables that are significant in the model.

The suggestion that two supplementary 'satisfaction' variables may contribute to the probability estimation in the model is confirmed by the Wave 18 data sample, at least for the variable *'accommodation: Noisy external environment'*. Based on the coding of the variable as a dummy, the coefficient value can be interpreted as follows: living in a quiet neighborhood, the probability of being a homeowner increases by 36.9%. Again, due to the considerably higher investment costs of homeownership compared to tenancy, it can be concluded that homeowners choose their residence carefully and thus reject lesser quiet locations, hypothesizing that this is one reason why there are hardly any owner-occupied homes in certain noisy locations. On the other hand, tenants are perhaps – economically speaking – less susceptible to noisy surroundings, thanks to quickly available better alternatives in a functioning rental market and the comparably lower transaction costs in the case of relocation. Besides, any greater sensitivity of homeowners to noise because of their higher investment risk may likely play a subordinate role.

Furthermore, the two newcomers include also the dummy variable *'participating in clubs or other groups',* whose coefficient indicates that given the respondent's membership of a group of people who meets together regularly for a particular activity, the probability of being a homeowner increases by 20.3%. Recalling the significant result of the question of contact with neighbors, this could be understood the same way for obvious reasons, adding another dimension of social engagement and corroborating the potentially greater incentive for a homeowner to make social contacts due to higher transaction cost, higher investment and therefore longer planned residence time in comparison to a tenant.

In conclusion, the remaining non-significant variables *'civil status'*, *'accommodation: Problems with pollution, environment, traffic or industry'*, *'highest level of education achieved'*, *'sex'* and *'Swiss since birth'* share the same statement with *'political position'* that all these variables do not make an important contribution to the probability estimation of being a homeowner in Switzerland.

3.3.4 Measures of Fit

To measure and assess the accuracy of the model, it is common to perform various statistical tests. In defining accuracy, the term 'goodness-of-fit' refers to how well the calculated regression line fits the sample data. This can be judged, for instance, by the coefficient of determination R^2, which is typically used for linear regression and captures the fraction of the sample variation in Y that is explained or predicted by X or simply, how good the regressors X_i are at predicting Y_i (Stock & Watson, 2020, p. 153-154). However, the coefficient of determination R^2 provides weak results for a probability model because in a regression based on a binary dependent variable, the Y values are either *zero* or *one* and therefore the data can never fully match the regression line[23], making it necessary to implement other methods (Stock & Watson, 2020, p. 395, 406).

For cross-checking the regression results of this study, different statistical test were carried out, the summary of which can be found in Table 8 on the following page. First of all, the issue of multicollinearity has to be addressed, after pointing out the consequences of a possible weakening of the model in the previous chapter. Naturally, this analysis was already taken into account while selecting the variables.

Multicollinearity detection as proposed by Midi et al. (2010) suggests specifying the collinearity diagnosis of the 'equivalent' linear model (Midi et al., 2010, p. 266). Resuming that in the equation

$$P(Y = 1|X_1, X_2, \dots, X_k) = \frac{1}{1+e^{-(\beta_0+\beta_1 X_1+\beta_2 X_2+\cdots+\beta_k X_k)}},$$

the term $\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k$ denotes a linear regression model (Schwarz et al., 2020), the collinearity analysis by the statistical software is utilized to test the similar term $\beta_0 + \sum_{i=1}^{n} \beta_i X_i$ from the proposed model, generating a variance inflation factor VIF for each coefficient. It indicates how much the variance of one regression

[23] only if X is also binary (Stock & Watson, 2020, p. 395)

	Wave 21, 2019	Wave 18, 2016
Number of valid observations n	2,009	4,737
Variance Inflation Factor VIF, highest value [a]	2.709	2.452
-2 log likelihood	1,969.608	4,723.528
Chi-square omnibus test	689.282	1,715.725
Significance omnibus test	0.000**	0.000**
Pseudo R^2 Cox and Snell	0.290	0.304
Pseudo R^2 Nagelkerke	0.396	0.409
Chi-square Hosmer and Lemeshow test	6.078	19.472
Significance Hosmer and Lemeshow test	0.638	0.013*
Overall percent correctly predicted	76.3	76.2

Table 8: Statistical test results logit regressions Wave 18, 2016 and Wave 21, 2019

(data sources: SHP Household Questionnaire Wave 18, 2016 and Wave 21, 2019; SHP Individual Questionnaire Wave 18, 2016 and Wave 21, 2019; SHP Imputed Wealth Household, 2016); a = variable *'age'* , ** statistically significant at the 1% level, * statistically significant at the 5% level

coefficient "has been inflated by the lack of independence" from another regression coefficient, all others things being equal (O'Brien, 2007, p. 684).The highest VIF value for the model concerns the variable '*age'* and is below 3 for both data samples. Tellingly, there is no consensus on the level at which problematic multicollinearity can occur. O'Brien (2007) mentions two different rules with the value 4 and the value 10, respectively (O'Brien, 2007, p. 684), whereas Midi et al. (2010) prefer 2.5 for "weaker"[24] models (Midi et al., 2010, p. 259).

On the other hand, Wooldridge (2020) notes that for considering multicollinearity as a "problem", "sometimes the value 10 is chosen" but calls this random and therefore less meaningful (Wooldridge, 2020, p. 92). Consequently, all arguments weighed against each other leads to the conclusion that multicollinearity does not seem to reach an overly critical size in the proposed model.

[24] "..., which is often the case in logit regression." (Midi et al., 2010, p. 259)

The second test to which the model is subjected in this study is called an omnibus test in the statistical software, which is performed to verify its overall significance. It uses a likelihood ratio statistic, where the logarithm of the likelihood function value is taken from the maximum likelihood estimation MLE. This -2 log likelihood value of the suggested regression model is compared to that of a base model that contains no coefficients and only the intercept. If the test statistic is checked against the critical value of a chi-square distribution defined by the appropriate number of exclusion restrictions, significance can be determined, which is satisfied in the present case (Wooldridge, 2020, p. 564-565).

As mentioned earlier, the linear coefficient of determination R^2 is unsuitable for binary response models, therefore several other measures exist called $pseudo\ R^2$ in reference to the linear R^2 (Stock & Watson, 2020, p. 395, 406). 'Pseudo', as they take different approaches in contrast to linear R^2 which utilizes variance (Stock and Watson, 2020, p. 233, 407). In the case of the statistical software, two $pseudo\ R^2$ are part of the package, the Cox and Snell R^2 and the Nagelkerke R^2. The Cox and Snell R^2 employs the -2 log likelihood value from the MLE for a model including all regressors and compares it to a model with the intercept only. Calculating the improvement in likelihood in this way measures how close the calculated regression line matches the sample data (Stock & Watson, 2020, p. 407).

Furthermore, the Nagelkerke R^2 is a standardized version of the Cox and Snell R^2 which has the consequence that it can only assume values between *zero* and *one*. From both $pseudo\ R^2$ it follows, the higher the R^2 value, the better the fit between the model and the data (Schwarz et al., 2020). However, Wooldridge (2020) notes when discussing $pseudo\ R^2$: "In any case, goodness-of-fit is usually less important than trying to obtain convincing estimates of the ceteris paribus effects of the explanatory variables" (Wooldridge, 2020, p. 566).

To further validate the accuracy of the model, the statistical software provides a Hosmer and Lemeshow test, which divides the observations into ten subgroups comparing observed versus estimated expected frequencies on a contingency table. Afterwards, the p-value derived from the test statistic is set against the critical value of a chi-square distribution with corresponding degrees of freedom, albeit in this situation, conversely, *no* significance indicates a good fit of the model (Lemeshow & Hosmer, 1982, p. 96-

97), a requirement which is met for the regression based on the data sample from Wave 21, but not for the regression with the data sample from Wave 18.

As demonstrated in a statistical simulation from the clinical field[25], the Hosmer and Lemeshow test statistic has a propensity to become significant with increasing sample size if the model is not perfectly calibrated, meaning that the observed outcome does not exactly equal the expected outcome, which is very likely in practice (Kramer & Zimmermann, 2007, p. 2052-2056). However, the authors conclude that this does not imply that a significant Hosmer and Lemeshow test renders a prediction model "useless or suspect" (Kramer & Zimmermann, 2007, p. 2052).

The last two parameters in the table concern the 'percent correctly predicted', that denotes the share of observations for which the value *zero* for tenant and *one* for homeowner was guessed right by the maximum likelihood estimator MLE. This is computed as follows: assuming a cut value of 50% by default, Y_i can be called correctly predicted on the one hand, if $Y = 1$ and the predicted probability is above 50% and on the other hand, if $Y = 0$ and the predicted probability is below 50%. Although the classification table is easy to understand, it must be taken into account that the term 'correctly predicted' covers a wide range (it does not matter whether the probability is 51 or 90%) and is therefore not an indicator of the *quality* of the prediction (Stock & Watson, 2020, p. 406-407).

[25] where the application of logit regression originates from (Lemeshow & Hosmer, 1982, p. 92)

3.3.5 Application of Weights

In order to obtain correct estimates of the underlying population in the regressions, the appropriate individual weights constructed by SHP were applied. The main reasons given for using weights are compensation for nonresponse due to attrition, i.e. the loss of respondents in panel surveys over the years for various reasons, classification of new participants in relation to existing ones (Voorpostel et al., 2021, p. 26, 29-35), and the complex sample design of the SHP survey (Graf, 2009, p. 62). As a further indication, if the variables in the proposed regression model are the same as those used to calculate the weights, the analysis can be performed with unweighted data[26]. Since this is true for eight of the nineteen variables (Graf, 2009, p. 65-67), the weights were retained. To test the effect of unweighted data on the estimation, the two regressions were carried out with and without weighting. The resulting values reveal only minor differences. Presumably, the larger numbers of valid observations in the case of the unweighted data samples lead to the fact that in the Wave 21 regression exactly the same two variables become significant that were also observed in the Wave 18 regression with weighted data. Concerning the ranking of the standardized coefficient values, the table for Wave 21 shows the same order as its unweighted counterpart, while there are two alterations in the ranking to be noted for wave 18. Yet the most remarkable result from this test is the finding that the variable '*political position'* does not contribute significantly to the probability in the model even without any weighting.

There is an important caveat to be aware of. In the report of the weighting methodology of SHP data, Graf (2009) concludes that the standard procedures in the predominantly used statistical software programs do not do justice to the complex specifications of the SHP survey design when estimating variance[27]. More specifically, the variance is underestimated and thus the confidence intervals are too narrow, resulting in spurious significance values for certain variables that are in effect not significant (Graf, 2009, p. 61-62). Nevertheless, Graf (2009) recommends computing the variance with weighting, because "... if a difference or variable already proves not to be significant in such a calculation, it is not necessary to investigate further" (Graf, 2009, p. 62). With regard to the logit regression model suggested in this study, the above reasoning provides additional evidence that the variable *'political position'* has no relevant part in the probability estimation of whether an individual is homeowner or not.

[26] E-Mail answer from Marieke Voorpostel, SHP/FORS Université de Lausanne, July 27th, 2021
[27] Graf (2009) proposes the application of the SPSS Complex Sample Module (Graf, 2009, p. 62).

4. Conclusion

4.1 Summary

This research attempts to identify a possible statistical correlation between homeownership and political position in Switzerland, applying a logit regression model. For the estimation of the probability model, data samples from two different waves of the SHP survey are used.

However, the hypothesis, that there is an inherent connection between homeownership and political orientation, cannot be established with the proposed model, because the estimation for the variable political position turns out *not* to be significant in the model results. To return to the presuppositional question, 'does it really matter if you are left or right' when it comes to homeownership, the answer would be '*not significantly'*, according to the findings of the suggested probability model. It should also be noted that as long as the hypothesis of a link between homeownership and political orientation cannot be confirmed, it will remain open.

Nevertheless, lack of significance is still essential – it proves in this case that political affiliation is not a crucial factor in estimating the likelihood of homeownership compared to tenancy when the other variables are taken into account. Apart from that, the six variables of *'household wealth'*, *'number of adults in household'*, *'satisfaction with accommodation'*, *'community typology'*, *'household income'* and *'age'* have, in descending order, the strongest influence. Based on the regression model estimations, it can be shown that household wealth is the most relevant determinant of homeownership in Switzerland, followed by the number of adults living in a household and the kind of municipality in which a household resides, while household income, satisfaction with accommodation and age are further contributing factors.

Moreover, it is remarkable that the 'financial' variables have two significant coefficients in the group of the first six decisive variables, hence the role of wealth and income should not be underestimated, even more so when, for reasons of inextricable causal linkage, the variable *'satisfaction with accommodation'* is associated with them.

In any case, and this is the tentative finding of this study, political orientation is not a crucial factor in estimating the probability of being a homeowner in Switzerland.

4.2 Reflection and Outlook

Recognizing that the analyses presented here are not definitive, the following suggestions for future research should be made.

A persistent concern is how reliable the political leanings reported in a survey are. In particular, there is the issue of whether a political self-assessment in a questionnaire or in a telephone interview is an expression of a honest and deep conviction or whether other spontaneous factors play a role and, if so, to what extent. Another challenge lies in verifying this assumption. Performing a neuroscience experiment, Kaplan, Gimbel and Harris (2016) tested political attitudes: Forty participants who identified themselves as left-wing were shown political and non-political statements on a screen and had to indicate the strength of their agreement. Afterwards, exaggerated counterarguments on the same topics were played and the participants had to give their opinion on the original sentences again. As a result, the political statements demonstrated the lowest degree of change in beliefs (Kaplan, Gimbel & Harris, 2016, p. 4), which can be interpreted as a certain strength of conviction. Obviously, a household panel survey does not contain counterarguments, but experiments should be conducted to examine the influence of different survey instruments on political self-assessment.

As another approach, Brennan and Lomasky (1993) develop a theory of electoral preference, dividing voter choice into an instrumental and an expressive element. The instrumental part is the value of one vote as measured by contribution to achieve the desired election result, whereas the expressive part is the value the voter attaches to expressing a preference for a particular outcome regardless of its impact on the election result. Because the probability of a vote being decisive is very low, the importance of the expressive part for the voter is inversely proportional to the expected instrumental part (Brennan & Lomasky, 1993, p. 22-31). An example would be the fan whose cheering in front of the television has no effect on the victory of ‘his’ or ‘her’ team. However, fully aware of this, his or her benefit comes purely from expression (Brennan & Lomasky, 1993, p. 33). In a similar way, everyday communication is characterized by some instrumental and many expressive statements (Brennan & Lomasky, 1993, p. 35).

If voting is described as an expression of preference, it would be useful to analyze if a survey response is perceived similarly. Although the situation on the phone is different than in a voting booth, filling out a form at home is more similar to the latter, which hints at desirable additional research on survey methods.

The same reservations regarding the accuracy of the statement apply to wealth and income. For more precise estimations, additional double checks with other data sources and increased statistical research would be advisable. In addition, as suggested in the model of Bourassa and Hoesli (2010), various financial aspects should be included, such as interest rates, taxes and house prices. As touched on in thematic demarcation, it might be worthwhile to look at the influence of housing cooperatives on urban rental markets. Likewise, the connection between wealth, income and political alignment should be examined more closely.

Moreover, there are also suggestions concerning econometric analysis. Designed as a panel study, the SHP survey allows for longitudinal analyses. The annual interview of participating households signifies methodologically, that data from the same units are collected at multiple points in time, which means that changes over time can be detected (Voorpostel et al., 2021, p. 5). To take advantage of this data sample feature, a pooled cross-sectional regression or a fixed effects regression[28] is recommended.

The principle of fixed effects regression is described as follows: Analyzing changes in Y and X over a time period enables controlling for variables that are constant ('fixed') over time. In this way, their hidden influence is excluded from the model (Stock & Watson, 2020, p. 365-366).

Concerning political orientation, a fixed effects regression would permit the elimination of omitted variable bias, since it is intuitively assumed that political attitudes do not alter remarkably, at least over a 20-year period since the start of the SHP survey. Nevertheless, it would be revealing to see similarities or differences in the estimations of a fixed effects regression model compared to the results of the present study. If certain variables are observed over a longer period of time, it seems conceivable to gain deeper insights into the formation of the status quo.

[28] Due to the given dependent binary variable, a fixed effects logit regression.

Bibliography

Agresti, A. (1996). *An Introduction to Categorical Data* Analysis, 1st edition. Hoboken, New Jersey: John Wiley & Sons, Inc.

Baron, J. B. (2014). Rescuing the Bundle-of-Rights Metaphor in Property Law. *University of Cincinnati Law Review – Temple University Legal Studies Research Paper No. 2013-22*, *82*(1), 57–101.

BFS/FSO (2020a). *Medianalter der ständigen Wohnbevölkerung nach Geschlecht und Staatsangehörigkeitskategorie, 1971-2019, su-d-01.02.03.08.* Bundesamt für Statistik BFS – Sektion Demografie und Migration. Retrieved from https://www.bfs.admin.ch/bfs/de/home/statistiken/bevoelkerung/stand-entwicklung/alter-zivilstand-staatsangehoerigkeit.assetdetail.13707275.html

BFS/FSO (2020b). *Haushaltsbudgeterhebung 2015-2017 und 2018, T20.02.01.00.0.* Bundesamt für Statistik BFS – Haushaltsbudgeterhebung HABE. Retrieved from https://www.bfs.admin.ch/bfs/de/home/statistiken/wirtschaftliche-soziale-situation-bevoelkerung/einkommen-verbrauchvermoegen/haushaltsbudget.assetdetail.14877602.html

BFS/FSO (2020c). *Urbane Schweiz: Ausgewählte Variablen nach der Stadt/Land-Typologie nach Stadt/Land-Typologie, Variable, Resultat und Jahr, px-x-2105000000_404_20210825-201402.xlsx.* Bundesamt für Statistik BFS – Sektion Umwelt, Nachhaltigkeit, Raum. Retrieved from https://www.pxweb.bfs.admin.ch/pxweb/de/px-x-2105000000_404/px-x-2105000000_404/px-x-2105000000_404.px

BFS/FSO (2021). *Privathaushalte nach Haushaltstyp 2107-2019 kumuliert, T40.02.01.02.02.* Bundesamt für Statistik BFS – Sektion POP. Retrieved from https://www.bfs.admin.ch/bfs/de/home/statistiken/kataloge-datenbanken/tabellen.assetdetail.16005650.html

Bourassa, S. C., & Hoesli, M. (2010). Why Do the Swiss Rent? *The Journal of Real Estate Finance and Economics*, *40*(3), 286–309.

Brennan, G., & Lomasky, L. (1993). *Democracy and Decision: The Pure Theory of Electoral Preference.* Cambridge, New York: Cambridge University Press.

Burgess, E. W. (2008). The Growth of the City: An Introduction to a Research Project. In J. M., Marzluff, E., Shulenberger, W., Endlicher, M., Alberti, G., Bradley, C., Ryan, U., Simon, & C., ZumBrunnen (Eds.). *Urban Ecology – An International Perspective on the Interaction Between Humans and Nature* (pp. 71–78). Boston, Massachusetts: Springer.

Burgess, E. W. (1925). The Growth of the City: An Introduction to a Research Project. *The Trend of Population – Publications of the American Sociological Society, 18*(?), 85–97.

Childe, V. G. (1951). *Man Makes Himself*. New American Library, 1st edition. New York: Mentor Book.

Coase, R. H. (1960). The Problem of Social Cost. *The Journal of Law and Economics, 3*(3), 1–69.

DiPasquale, D., & Glaeser, E. L. (1999). Incentives and Social Capital: Are Homeowners Better Citizens? *Journal of Urban Economics*, *45*(2), 354–384.

Emerton, E. (1891). *An Introduction to the Study of the Middle Ages (375-814)*. Boston: Ginn & Company.

Engels, F. (1884). *Der Ursprung der Familie, des Privateigentums und des Staats. In Anschluss an Lewis H. Morgan's Forschungen*. Hottingen-Zürich: Verlag der Schweizerischen Volksbuchhandlung.

Engels, F. (1975). *The Housing Question*. Moscow: Progress Publishers.

ESTV (2015). Die Besteuerung des Eigenmietwerts. Eidgenössische Steuerverwaltung ESTV. Retrieved from https://www.estv.admin.ch/estv/de/home/suche.html#Die%20Besteuerung%20der%20Eigenmietwerte

Falkenstein, A. (1956). Die neusumerischen Gerichtsurkunden. Band 1: Einleitung und systematische Darstellung. In Bayerische Akademie der Wissenschaften, philosophisch-historische Klasse (ed.). *Abhandlungen Neue Folge Heft 39, Veröffentlichungen der Kommission zur Erschliessung von Keilschrifttexten*. Serie A, *2*(1).

Garcia, M. T. M., & Figueira, R. (2021). Determinants of homeownership in Europe – an empirical analysis based on SHARE. *International Journal of Housing Markets and Analysis*, *14*(1), 14–38.

Gilderbloom, J. I., & Markham, J. P. (1995). The Impact of Homeownership on Political Beliefs. *Social Forces*, *73*(4), 1589–1607.

Goldberger, A. S. (1991). *A Course in Econometrics*. Cambridge, Massachusetts and London, England: Harvard University Press.

Graf, E. (2009). *Weightings of the Swiss Household Panel: SHP_I wave 9, SHP_II wave 4, SHP_I and SHP_II combined*. Neuchâtel: Swiss Federal Statistical Office (FSO).

Greene, K. (1999). V. Gordon Childe and the vocabulary of revolutionary change. *Antiquity*, *73*(279), 97–109.

Harper, R. F. (1999). *The Code of Hammurabi King of Babylon about 2250 B.C.* 2nd edition. Union, New Jersey: The Lawbook Exchange, LTD.

Hilber, C. A. L. (2010). New housing supply and the dilution of social capital. *Journal of Urban Economics*, *67*(3), 419–437.

Hofmann, R., & Umbricht, R. (2019). Homeownership and Happiness: Evidence for Switzerland. *Swiss Real Estate Journal*, *11*(19), 4–12.

Horsch, A., Meinhövel, H., & Paul, S. (2005). *Institutenökonomie und Betriebswirtschaftslehre*. München: Franz Vahlen Verlag GmbH.

Kaplan, J. T., Gimbel, S. I., & Harris, S. (2016). Neural correlates of maintaining one's political beliefs in the face of counterevidence. *Scientific Reports*, *6*(1), 39589, 2–11.

Kiefer, N. M. (1989). The ET Interview: Arthur S. Goldberger. *Econometric Theory*, *5*(1), 133–160.

Kohl, S. (2018). The political economy of homeownership: A comparative analysis of homeownership ideology through party manifestos. *Socio-Economic Review*, *18*(4), 913–940.

Kramer, A. A., & Zimmerman, J. E. (2007). Assessing the calibration of mortality benchmarks in critical care: The Hosmer-Lemeshow test revisited. *Critical Care Medicine*, *35*(9), 2052–2056.

Kraus, F. R. (1960). Ein zentrales Problem des altmesopotamischen Rechtes: Was ist der Codex Hammu-Rabi? *Genava: revue d'histoire de l'art et de l'archéologie*, 8(1-4), 283–296.

Kuhn, U., & Grabka, M. (2018). Homeownership and Wealth in Switzerland and Germany. In R. Tillmann, M. Voorpostel, & P. Farago (Eds.), *Social Dynamics in Swiss Society, Life Course Research and Social Policies* (Vol. 9, pp. 175–185). Cham: Springer International Publishing.

Laird, J. (1919). The Law of Parsimony. *The Monist, 29*(3), 321–344.

Leacock, E. (1952). *The Montagnais "Hunting Territory" and the Fur Trade.* New York: Columbia University (thesis typescript). Retrieved from https://www.proquest.com/dissertations-theses/montagnais-hunting-territoryfurtrade/docview/301997402/se-2? accountid=14796

Lemeshow, S., & Hosmer, D. W. (1982). A Review of Goodness of Fit Statistics fo Use in the Development of Logistic Regression Models. *American Journal of Epidemiology*, *115*(1), 92–106.

Locke, J. (1698). *Two Treatises of Government. Book II – An Essay Concerning the True Original, Extent, and End of Civil Government*. London: Awnsham and John Churchill.

Martel, A. (2021, August 27th). Häuserpreise, wollt ihr ewig steigen? *Neue Zürcher Zeitung,* P. 17.

Menard, S. (2004). Six Approaches to Calculating Standardized Logistic Regression Coefficients. *The American Statistician*, *58*(3), 218–223.

Midi, H., Sarkar, S. K., & Rana, S. (2010). Collinearity diagnostics of binary logistic regression model. *Journal of Interdisciplinary Mathematics*, *13*(3), 253–267.

Morgan, L. H. (1877). *Ancient Society or Researches in the Lines of Human Progress from Savagery through Barbarism to Civilization*. Boston: Charles H. Kerr & Company Co-Operative.

Munch, J. R., Rosholm, M., & Svarer, M. (2006). Are Homeowners Really More Unemployed? *The Economic Journal*, *116*(514), 991–1013.

North, D. C., & Thomas, R. P. (1977). The First Economic Revolution. *The Economic History Review*, *30*(2), 229–241.

O'Brien, R. M. (2007). A Caution Regarding Rules of Thumb for Variance Inflation Factors. *Quality & Quantity*, *41*(5), 673–690.

OECD (2019). *Worksheet HM 1.3.1 Housing Tenure Distribution, HM 1.3. Housing Tenures.* OECD Affordable Housing Database. Retrieved from https://www.oecd.org/housing/data/affordable-housing-database/housing-market.htm

OR (2021). *Bundesgesetz betreffend Ergänzung des Schweizerischen Zivilgesetzbuches (Fünfter Teil: Obligationenrecht), achter Titel: Die Miete.* Systematische Rechtssammlung des Bundesrechts, 220. Retrieved from https://www.fedlex.admin.ch/eli/cc/27/317_321_377/de#part_2/tit_8

Oswald, A. J. (1996). *A Conjecture on the Explanation for High Unemployment in the Industrialized Nations: Part I.* Warwick Economic Research Papers. Retrieved from https://ageconsearch.umn.edu/record/268744

Rose, C. M. (1985). Possession as the Origin of Property. *The University of Chicago Law Review*, *52*(1), 73–88.

Schöchli, H. (2021, August 19th). Kontroverse um Eigenmietwert. *Neue Zürcher Zeitung*. Retrieved from https://www.nzz.ch/wirtschaft/eigenmietwert-kuenftig-keine-besteuerung-mehr-auf-wohneigentum-ld.1641087?reduced=true

Schuler, M., Dessemontet, P., & Joye, D. (2005). *Die Raumgliederungen der Schweiz*. Neuchâtel: Bundesamt für Statistik BFS/Swiss Federal Statistical Office FSO.

Schwarz, J., Bruderer Enzler, H., & Käch, W. (2020). *Datenanalyse mit SPSS*. Universität Zürich UZH Methodenberatung. Retrieved from: https://methoden beratung. uzh.ch/de/.html

Shiller, R. (2008). *The Subprime Solution: How's Today's Global Financial Crisis Happened, and What to Do about It.* Princeton, Oxford: Princeton University Press.

Smith, B., & Zaibert, L. (2003). Real Estate: Foundations of the Ontology of Property. In H., Stuckenschmidt, E., Stubkjær & C., Schlieder (Eds.). *The Ontology and Modelling of Real Estate Transactions* (1st edition, pp. 51–67). Aldershot: Ashgate Publishing.

SNB (2021). *Inländische Hypothekarforderungen nach Standort der Pfandobjekte für ausgewählte Bankengruppen – Jährlich*. Datenportal der Schweizerischen Nationalbank. Retrieved from https://data.snb.ch/de/topics/banken#!/cube/babilhypisdpua?fromDate=2011&toDate=2020&dimSel=INLANDAUSLAND(I,CHE1),BANKENGRUPPE(S10,G10,G15,G20,G25)

Speck, F. G. (1915). The Family Hunting Band as the Basis of Algonkian Social Organization. *American Anthropologist*, *17*(2), 289–305.

Stiglitz, J. E., & Walsh, C. E. (2006). *Economics* (4th edition). New York and London: W. W. Norton & Company Inc.

Stock, J. H., & Watson, M. W. (2020). *Introduction to Econometrics* (4th edition). Harlow: Pearson Education Limited.

Straumann, T. (2010). *Die UBS-Krise aus wirtschaftshistorischer Sicht – Expertenbericht erstellt zu Handen der UBS AG*. Zürich: Institut für empirische Wirtschaftsforschung, Abteilung Wirtschaftsgeschichte (manuscript). Retrieved from http://nzz-files-prod.s3-website-eu-west-1.amazonaws.com

Thalmann, P., & Favarger, P. (2002). *Locataires ou propriétaires? Enjeux et mythes de l'accession à la propriété en Suisse.* Lausanne: Presses polytechniques et universitaires romandes.

Voorpostel, M., Tillmann, R, Lebert, F., Kuhn, U., Lipps, O., Ryser, V.-A., Antal, E., Monsch, G.-A., Dasoki, N., Klaas, H.S. & Wernli, B. (2021). *Swiss Household Panel User Guide (1999-2019) Wave 21*. Lausanne: FORS.

Weisdorf, J. L. (2005). From Foraging To Farming: Explaining The Neolithic Revolution. *Journal of Economic Surveys*, *19*(4), 561–586.

Werczberger, E. (1997). Home Ownership and Rent Control in Switzerland. *Housing Studies*, *12*(3), 337–353.

Williamson, O. E. (1988). Corporate Finance and Corporate Governance. *The Journal of Finance*, *43*(3), 567–591.

Wooldridge, J. M. (2020). *Introductory Econometrics – A Modern Approach* (7th edition). Boston: Cengage Learning Inc.

World Bank (2021). *Data Bank – World Development Indicators. International Comparison Program, World Bank/World Development Indicators database, World Bank/Eurostat-OECD PPP Programme*. Retrieved from https://databank.world bank.org/ reports.aspx?source=2&series=NY.GDP.PCAP.PP.CD&country=CHE#

ZGB (2021). *Schweizerisches Zivilgesetzbuch, neunzehnter Titel: Das Grundeigentum.* Systematische Rechtssammlung des Bundesrechts, 210. Retrieved from https:// www.fedlex.admin.ch/eli/cc/24/233_245_233/de#book_4/part_1/tit_19

Appendix

Descriptive Statistics Wave 21, 2019

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Accommodation: Tenant or owner	2009	1	1	2	1.62	.011	.484	.235	-.514	.055	-1.737	.109
Age in year of interview	2009	81	18	99	49.60	.439	19.673	387.026	.051	.055	-1.177	.109
Sex	2009	1	1	2	1.45	.011	.498	.248	.192	.055	-1.965	.109
Civil status in year of interview	2009	5	1	6	2.00	.024	1.095	1.199	1.504	.055	1.818	.109
Highest level of education achieved, grid + individual 17 codes	2009	16.00	.00	16.00	8.3124	.10458	4.68709	21.969	.160	.055	-1.258	.109
Swiss since birth	2009	1	1	2	1.09	.006	.290	.084	2.817	.055	5.944	.109
Yearly household income, gross	2009	5	9	14	11.75	.013	.596	.355	-.197	.055	.670	.109
wealth other than house	2009	13.12	5.30	18.42	11.8742	.03954	1.77226	3.141	-.228	.055	.519	.109
HH finance management by whom	2009	5	1	6	2.13	.033	1.459	2.128	.838	.055	-.900	.109
Community typology 2	2009	8	1	9	4.63	.057	2.533	6.415	.043	.055	-1.408	.109
Year moved into current place of residence.	2009	98	1922	2020	1996.81	.399	17.880	319.705	-1.096	.055	.834	.109
Number of adults in household: >= 18 years	2009	5	1	6	2.22	.021	.920	.846	1.181	.055	1.515	.109
Number of children in household: 0 to 17 years	2009	5	0	5	.47	.019	.868	.754	1.745	.055	2.127	.109
Satisfaction with accommodation	2009	10	0	10	8.51	.031	1.379	1.902	-1.264	.055	2.688	.109
Accommodation: Noisy external environment	2009	1	1	2	1.80	.009	.398	.158	-1.525	.055	.326	.109
Accommodation: Problems with pollution, environment, traffic or industry	2009	1	1	2	1.92	.006	.265	.070	-3.205	.055	8.279	.109
Contact with neighbours: Number of neighbours	2009	6	0	6	2.82	.036	1.602	2.565	.075	.055	-1.161	.109
Participation in clubs or other groups	2009	1	1	2	1.51	.011	.500	.250	-.038	.055	-2.001	.109
Political position: Left, right	2009	10	0	10	4.74	.050	2.221	4.932	-.035	.055	-.162	.109
Valid N (listwise)	2009											

Results logit regression Wave 21, 2019

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Age in year of interview	.015	.005	10.877	1	.001	1.015	1.006	1.025
	Sex	.066	.116	.326	1	.568	1.069	.851	1.342
	Civil status in year of interview	.107	.061	3.065	1	.080	1.113	.987	1.256
	Highest level of education achieved, grid + individual 17 codes	-.017	.013	1.538	1	.215	.983	.958	1.010
	Swiss since birth	.112	.195	.333	1	.564	1.119	.764	1.639
	Yearly household income, gross	.684	.130	27.508	1	.000	1.982	1.535	2.559
	wealth other than house	.352	.036	96.456	1	.000	1.421	1.325	1.525
	HH finance management by whom	-.139	.040	11.941	1	.001	.870	.804	.942
	Community typology 2	.144	.023	40.471	1	.000	1.155	1.105	1.207
	Year moved into current place of residence.	-.012	.004	9.822	1	.002	.988	.980	.995
	Number of adults in household: >= 18 years	.830	.092	81.815	1	.000	2.294	1.916	2.746
	Number of children in household: 0 to 17 years	.233	.072	10.622	1	.001	1.263	1.097	1.453
	Satisfaction with accommodation	.453	.046	97.097	1	.000	1.572	1.437	1.720
	Accommodation: Noisy external environment	.191	.150	1.611	1	.204	1.210	.901	1.624
	Accommodation: Problems with pollution, environment, traffic or industry	.303	.230	1.732	1	.188	1.354	.862	2.127
	Contact with neighbours: Number of neighbours	.175	.037	22.474	1	.000	1.191	1.108	1.280
	Participation in clubs or other groups	.156	.113	1.920	1	.166	1.169	.937	1.458
	Political position: Left, right	.036	.026	1.879	1	.170	1.036	.985	1.091
	Constant	3.663	7.718	.225	1	.635	38.964		

a. Variable(s) entered on step 1: Age in year of interview, Sex, Civil status in year of interview, Highest level of education achieved, grid + individual 17 codes, Swiss since birth, Yearly household income, gross, wealth other than house, HH finance management by whom, Community typology 2, Year moved into current place of residence., Number of adults in household: >= 18 years, Number of children in household: 0 to 17 years, Satisfaction with accommodation, Accommodation: Noisy external environment, Accommodation: Problems with pollution, environment, traffic or industry, Contact with neighbours: Number of neighbours, Participation in clubs or other groups, Political position: Left, right.

Descriptive Statistics Wave 18, 2016

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Accommodation: Tenant or owner	4737	1	1	2	1.58	.007	.493	.243	-.333	.036	-1.890	.071
Age in year of interview	4737	78	18	96	50.02	.275	18.939	358.704	.084	.036	-1.024	.071
Sex	4737	1	1	2	1.46	.007	.499	.249	.152	.036	-1.978	.071
Civil status in year of interview	4737	6	1	7	2.02	.016	1.097	1.203	1.436	.036	1.532	.071
Highest level of education achieved, grid + individual 17 codes	4737	16	0	16	8.14	.067	4.596	21.123	.251	.036	-1.180	.071
Swiss since birth	4737	1	1	2	1.09	.004	.280	.078	2.962	.036	6.775	.071
Yearly household income, gross	4737	9.52	4.70	14.22	11.6761	.00862	.59338	.352	-.903	.036	6.022	.071
wealth other than house	4737	13.82	4.61	18.42	11.8363	.02559	1.76161	3.103	-.274	.036	.508	.071
HH finance management by whom	4737	5	1	6	2.03	.021	1.416	2.006	.921	.036	-.789	.071
Community typology 2	4737	8	1	9	3.35	.035	2.401	5.765	.763	.036	-.813	.071
Year moved into current place of residence.	4737	94	1922	2016	1993.25	.269	18.495	342.049	-.979	.036	.514	.071
Number of adults in household: >= 18 years	4737	6	1	7	2.16	.013	.901	.811	1.198	.036	2.050	.071
Number of children in household: 0 to 17 years	4737	8	0	8	.46	.013	.861	.741	1.788	.036	2.358	.071
Satisfaction with accommodation	4737	10	0	10	8.39	.021	1.449	2.099	-1.189	.036	2.288	.071
Accommodation: Noisy external environment	4737	1	1	2	1.81	.006	.393	.155	-1.573	.036	.475	.071
Accommodation: Problems with pollution, environment, traffic or industry	4737	1	1	2	1.93	.004	.248	.062	-3.500	.036	10.257	.071
Contact with neighbours: Number of neighbours	4737	6	0	6	2.73	.024	1.637	2.681	.140	.036	-1.165	.071
Participation in clubs or other groups	4737	1	1	2	1.52	.007	.500	.250	-.060	.036	-1.997	.071
Political position: Left, right	4737	10	0	10	4.99	.031	2.138	4.573	-.070	.036	.086	.071
Valid N (listwise)	4737											

Results logit regression Wave 18, 2016

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Age in year of interview	.017	.003	31.646	1	.000	1.017	1.011	1.023
	Sex	.038	.075	.252	1	.615	1.038	.897	1.202
	Civil status in year of interview	.025	.039	.434	1	.510	1.026	.951	1.107
	Highest level of education achieved, grid + individual 17 codes	-.008	.009	.798	1	.372	.992	.975	1.009
	Swiss since birth	.157	.128	1.494	1	.222	1.169	.910	1.503
	Yearly household income, gross	.553	.087	40.154	1	.000	1.738	1.465	2.062
	wealth other than house	.408	.024	278.069	1	.000	1.504	1.434	1.578
	HH finance management by whom	-.132	.026	25.938	1	.000	.877	.833	.922
	Community typology 2	.284	.017	284.089	1	.000	1.328	1.285	1.373
	Year moved into current place of residence.	-.005	.002	3.844	1	.050	.995	.991	1.000
	Number of adults in household: >= 18 years	.637	.056	130.107	1	.000	1.891	1.695	2.109
	Number of children in household: 0 to 17 years	.335	.046	52.323	1	.000	1.398	1.276	1.530
	Satisfaction with accommodation	.323	.027	144.635	1	.000	1.381	1.310	1.456
	Accommodation: Noisy external environment	.314	.097	10.397	1	.001	1.369	1.131	1.656
	Accommodation: Problems with pollution, environment, traffic or industry	-.103	.151	.465	1	.495	.902	.671	1.213
	Contact with neighbours: Number of neighbours	.124	.023	28.727	1	.000	1.132	1.082	1.184
	Participation in clubs or other groups	.185	.073	6.432	1	.011	1.203	1.043	1.388
	Political position: Left, right	.003	.017	.026	1	.871	1.003	.969	1.038
	Constant	-8.450	4.841	3.047	1	.081	.000		

a. Variable(s) entered on step 1: Age in year of interview, Sex, Civil status in year of interview, Highest level of education achieved, grid + individual 17 codes, Swiss since birth, Yearly household income, gross, wealth other than house, HH finance management by whom, Community typology 2, Year moved into current place of residence., Number of adults in household: >= 18 years, Number of children in household: 0 to 17 years, Satisfaction with accommodation, Accommodation: Noisy external environment, Accommodation: Problems with pollution, environment, traffic or industry, Contact with neighbours: Number of neighbours, Participation in clubs or other groups, Political position: Left, right.

Statistical tests logit regression Wave 21, 2019

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	689.282	18	.000
	Block	689.282	18	.000
	Model	689.282	18	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1969.608[a]	.290	.396

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than ,001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.078	8	.638

Classification Table[a]

			Predicted		
			Accommodation: Tenant or owner		
	Observed		tenant	owner/co-owner	Percentage Correct
Step 1	Accommodation: Tenant or owner	tenant	444	310	58.9
		owner/co-owner	166	1089	86.8
	Overall Percentage				76.3

a. The cut value is ,500

Statistical tests logit regression Wave 18, 2016

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	1715.725	18	.000
	Block	1715.725	18	.000
	Model	1715.725	18	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	4723.528[a]	.304	.409

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than ,001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	19.472	8	.013

Classification Table[a]

			Predicted		
			Accommodation: Tenant or owner		
	Observed		tenant	owner/co-owner	Percentage Correct
Step 1	Accommodation: Tenant or owner	tenant	1288	692	65.0
		owner/co-owner	437	2321	84.2
	Overall Percentage				76.2

a. The cut value is ,500

Results logit regression Wave 21, 2019 (without weights)

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Age in year of interview	.018	.004	18.509	1	.000	1.019	1.010	1.027
	Sex	.051	.104	.238	1	.625	1.052	.858	1.291
	Civil status in year of interview	.087	.054	2.611	1	.106	1.091	.982	1.213
	Highest level of education achieved, grid + individual 17 codes	-.016	.012	1.642	1	.200	.984	.961	1.008
	Swiss since birth	.087	.175	.249	1	.618	1.091	.774	1.537
	Yearly household income, gross	.614	.117	27.714	1	.000	1.848	1.470	2.322
	wealth other than house	.319	.032	98.981	1	.000	1.375	1.292	1.464
	HH finance management by whom	-.150	.036	17.478	1	.000	.860	.802	.923
	Community typology 2	.118	.020	33.972	1	.000	1.126	1.082	1.171
	Year moved into current place of residence.	-.013	.004	13.010	1	.000	.987	.981	.994
	Number of adults in household: >= 18 years	.920	.086	114.723	1	.000	2.508	2.120	2.968
	Number of children in household: 0 to 17 years	.251	.061	16.851	1	.000	1.286	1.140	1.450
	Satisfaction with accommodation	.443	.041	116.615	1	.000	1.558	1.438	1.689
	Accommodation: Noisy external environment	.323	.133	5.907	1	.015	1.382	1.065	1.793
	Accommodation: Problems with pollution, environment, traffic or industry	.148	.205	.517	1	.472	1.159	.775	1.732
	Contact with neighbours: Number of neighbours	.158	.033	22.824	1	.000	1.172	1.098	1.250
	Participation in clubs or other groups	.211	.102	4.320	1	.038	1.235	1.012	1.507
	Political position: Left, right	.043	.023	3.319	1	.068	1.044	.997	1.093
	Constant	5.999	7.050	.724	1	.395	402.830		

a. Variable(s) entered on step 1: Age in year of interview, Sex, Civil status in year of interview, Highest level of education achieved, grid + individual 17 codes, Swiss since birth, Yearly household income, gross, wealth other than house, HH finance management by whom, Community typology 2, Year moved into current place of residence., Number of adults in household: >= 18 years, Number of children in household: 0 to 17 years, Satisfaction with accommodation, Accommodation: Noisy external environment, Accommodation: Problems with pollution, environment, traffic or industry, Contact with neighbours: Number of neighbours, Participation in clubs or other groups, Political position: Left, right.

Results logit regression Wave 18, 2016 (without weights)

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Age in year of interview	.026	.003	85.555	1	.000	1.026	1.021	1.032
	Sex	.106	.068	2.399	1	.121	1.112	.972	1.272
	Civil status in year of interview	-.016	.035	.216	1	.642	.984	.919	1.053
	Highest level of education achieved, grid + individual 17 codes	-.006	.008	.522	1	.470	.994	.978	1.010
	Swiss since birth	.144	.115	1.576	1	.209	1.155	.922	1.447
	Yearly household income, gross	.607	.079	59.660	1	.000	1.835	1.573	2.140
	wealth other than house	.386	.022	298.253	1	.000	1.472	1.409	1.538
	HH finance management by whom	-.163	.024	46.331	1	.000	.850	.811	.890
	Community typology 2	.279	.016	321.998	1	.000	1.321	1.282	1.362
	Year moved into current place of residence.	-.004	.002	2.910	1	.088	.996	.992	1.001
	Number of adults in household: >= 18 years	.667	.053	156.736	1	.000	1.949	1.756	2.163
	Number of children in household: 0 to 17 years	.388	.043	81.676	1	.000	1.474	1.355	1.604
	Satisfaction with accommodation	.318	.025	166.772	1	.000	1.375	1.310	1.443
	Accommodation: Noisy external environment	.300	.090	11.022	1	.001	1.350	1.131	1.613
	Accommodation: Problems with pollution, environment, traffic or industry	-.047	.136	.117	1	.732	.954	.731	1.247
	Contact with neighbours: Number of neighbours	.127	.021	36.116	1	.000	1.135	1.089	1.183
	Participation in clubs or other groups	.223	.067	11.181	1	.001	1.250	1.097	1.425
	Political position: Left, right	.001	.016	.005	1	.943	1.001	.970	1.033
	Constant	-11.329	4.408	6.605	1	.010	.000		

a. Variable(s) entered on step 1: Age in year of interview, Sex, Civil status in year of interview, Highest level of education achieved, grid + individual 17 codes, Swiss since birth, Yearly household income, gross, wealth other than house, HH finance management by whom, Community typology 2, Year moved into current place of residence., Number of adults in household: >= 18 years, Number of children in household: 0 to 17 years, Satisfaction with accommodation, Accommodation: Noisy external environment, Accommodation: Problems with pollution, environment, traffic or industry, Contact with neighbours: Number of neighbours, Participation in clubs or other groups, Political position: Left, right.

Statutory Declaration/Affidavit

I hereby declare that the thesis with the title

"Does It Really Matter if You Are Left or Right?
– Homeownership and Political Position in Switzerland"

has been composed by myself autonomously and that no means other than those declared were used. In every single case, I have marked parts that were taken out of published or unpublished works, including secondary literature, either verbatim or in a paraphrased manner, as such trough a quotation.

This thesis has not been handed in or published before in the same or similar form.

Zurich, September 6th, 2021

_____

Signature
Michael Reber