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## Home equity, fiscal policy and the demand for housing
## The case of the Netherlands

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### Abstract

In the owner- occupied sector the demand for housing is not only determined by the price of the house and the income of the consumer but also by the amount of home equity. When the owner-occupier is moving upward the amount of home equity expands his possibilities at the market. This may result in further price increases. In times of price decreases as is nowadays the case, the amount of home equity is relatively strong diminishing, which may result in further price decreases. So home equity may play a destabilizing factor in the owner-occupied sector.

In the Netherlands the fiscal treatment of the owner-occupied sector strengthens the role of home equity. The interest payments on the mortgage are tax deductible, so it is advantageous to have a loan and to invest one's equity elsewhere. Since 2004 a fiscal measure is taken that there is no longer a deductibility of the interest payments on the amount which is equal to the home equity in the house which one is moving out. So there is a strong fiscal incentive to completely reinvest the home equity in the house.

The paper will deal with the influence of home equity in the housing market. Using the Housing Needs Survey first differences in the amount of own equity are explained. Secondly the influence of the own equity on the housing choice is estimated. The results of the econometric estimations show that in the Netherlands, partly caused by the fiscal policy, own equity indeed has a destabilizing effect on the housing market.

Keywords: homeownership, home equity, housing demand

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## 1. Introduction

Home equity is the largest share of total wealth for most households. In most countries house prices have increased strongly in the past decennia (Girouard e.a., 2006). This has resulted in a strong increase in home equity. Due to the current crisis on the housing market in many countries home equity is decreasing again at a fast pace. Home equity is very volatile and the change in home equity has a large impact on the housing market and on the rest of the economy. With this paper we intend to increase knowledge on the size of home equity and its impact on housing demand. Within this paper the liquidity of home equity plays an important role.

The first part of this paper deals with the size of home equity in the Netherlands. The data on home equity are taken from a database with data from 2008. The decrease in house prices in the Netherlands has only partly been taken into account in this dataset. The house price decrease in the Netherlands, however, is limited to an average of 5%. We will explain the size of home equity in the Netherlands based on household characteristics. In the second part of this paper we will show that home equity plays an important role in housing demand. We shall test two hypotheses in this part. In the one hypothesis we assume that the consumer treats home equity like other financial assets. In this scenario the net return on home equity is part of disposable income; this definition of disposable income is then used to explain housing demand. According to this definition home equity is liquid and not tied to the home. In the other hypothesis we assume the consumer to use home equity as an asset that is used only for housing consumption. This choice may partly be the result of the fiscal treatment of home ownership. In this scenario housing demand is a function of disposable income (thus excluding the net return on home equity), and the level of home equity. According to this definition home equity is illiquid and tied to the dwelling.

Before turning to the analysis we will shortly describe the fiscal treatment of owner-occupied housing in the Netherlands, as the fiscal treatment has a large impact on home equity (and thus potentially also on housing demand).

## 2. Fiscal policy and home ownership

The size of home equity, the degree of liquidity and the impact that home equity has on the demand for housing are very dependent on the fiscal treatment of owner-occupied housing. In the Netherlands there is a significant fiscal benefit to the owner-occupier. The fiscal treatment of the owner-occupied dwelling has become less liberal in recent years causing home equity to become less liquid. In this paragraph we shall briefly review the fiscal treatment of owner-occupied housing (see also Rouwendal, 2006).

The Dutch tax system differentiates tax on income and tax on income (box 1) from equity (box 3). In this box 3 the net tax levied over equity is 1.2%. This percentage is based on an attributed (fictitious) return on equity of 4% and a tax rate of 30%. The owner-occupied dwelling and the mortgage, however, are not situated in box 3, but in box 1. The owner-occupied dwelling has long been labeled as an investment good by the tax law. On the one hand are the costs associated with the owner-occupied dwelling, such as the mortgage interest, deductible from income tax. On the other hand is the income associated with the dwelling, reflected in an imputed rent, taxed. This has lead to the point where the mortgage interest is fully deductible from income tax for the course of 30 years. The effect of this deductibility is dependent on the marginal tax rate, which varies between 33.5% for the lowest tariff (until € 17.789 annually) and 52% for the highest tariff (above € 54.777). This results in the highest income groups to pay only 48% of the interest payments. The height of the imputed rent is set net of the costs (i.e. management and maintenance): the net imputed rent is taxed. This net imputed rent is 0.55% of the value of the property. For properties below € 75.000 this percentage is lower, for properties with a value in excess of € 1 million the net imputed rent is higher and will increase in the coming years to 2.35% for the share over € 1 million. The majority of all housing falls within these boundaries and for these dwellings a net imputed rent of 0.55% applies. The effect of this tax also depends on the marginal tax rate: the added tax due for higher income groups for the net imputed rent is (52% over 0.55%) 0.286% over the value of the property.

As stated the fiscal treatment of the owner-occupied house has become less generous in the last few years. An important example of the decrease in subsidization to owner-occupiers relates to the core issue in this paper: the introduction of the additional loan act in 2004. The additional loan act states that newly acquired debt is only eligible for mortgage interest deductibility if the newly acquired debt is used for purchasing a new house (or improving the current dwelling). Before this act households were able to refinance their home equity and consume it freely; the additional loan act does not disable refinancing, but it does make refinancing more costly. This act thus makes consuming from home equity less attractive, and therefore, makes home equity less liquid.

### 3. Database: WoON2009

In this study we use the dataset from the housing survey of the Dutch Ministry of Housing, Communities and Integration, "WoON 2009". The survey is conducted by Statistics Netherlands and contains a large number of questions on a wide range of topics related to housing, such as house values, mortgages and rents paid, house and household characteristics, information on previously occupied dwellings and future potential housing market behavior. Home equity, however, is not an observed variable in this database: we obtain a value for equity by subtracting the remaining value of the mortgage ultimo 2008 from the house value ultimo 2008. This has some important consequences for our study which we will discuss later.

The dataset contains a total number of 78.071 records, which represent the 7.3 million households of the Netherlands. This study is limited to the owner-occupied sector. We also disregard households that do not live in an independent dwelling (such as dormitories) or live in institutions (e.g. homes for the elderly). We further exclude observations with missing or extreme values on either house value or home equity. The boundary values are set as wide as possible, only to exclude those extreme values which are not plausible. We end up excluding only those houses that have house values smaller than or equal to zero. We also exclude observations that have a relative equity ratio (home equity to house value) of less than -50 %. This results in a total sample of 36.309 observations.

In our analyses we also study in more detail recently moved households. The selection of these households reduces the sample further. Some sample statistics are given in table 1. The table summarizes in three panes the key statistics for all households, all owner-occupiers and the recently moved owner-occupiers. The latter group is a subsample of the group of owner-occupiers: this subsample consists of households that have moved in the last 2 years into an independent owner-occupied house (i.e. all of the earlier mentioned filters apply here as well).

Table 1: Sample statistics

| | All households | Owner-occupiers | Recently moved owner-occupiers |
|---|---|---|---|
| | | | |
| Gross income | 48254 | 61667 | 60637 |
| | | | |
| House value | 245188 | 290767 | 304531 |
| Mortgage | 171451 | 163213 | 197666 |
| | | | |
| Age head of household | 51 | 51 | 44 |
| Occupation duration | 13 | 14 | 1 |
| | | | |
| Household composition | | | |
| Single or single + child(ren) | 42% | 25% | 27% |
| Couple | 29% | 35% | 36% |
| Couple + child(ren) | 27% | 39% | 35% |
| Other | 2% | 1% | 1% |
| | | | |
| Housing market behavior | | | |
| Not moved | 82% | 87% | 0% |
| Moved within owner-occupied sector | 5% | 7% | 65% |
| Moved from rental sector | 7% | 4% | 21% |
| Moved as a starter | 6% | 2% | 14% |
| | | | |
| Income source | | | |
| Salary | 54% | 62% | 71% |
| Business - entrepreneur | 12% | 15% | 14% |
| Pension | 24% | 21% | 11% |
| Social security | 10% | 3% | 3% |
| | | | |
| N (weighted) | 7312579 | 3831323 | 275995 |
| n (unweighted) | 69149 | 36309 | 2651 |

Table 1 shows that owner-occupiers have on average a higher income and more expensive housing than households in the rental sector. Furthermore, owner-occupiers are on average older and are relatively often households consisting of couples or couples with children. Other important observations from table 1 are the relative young age of recent movers and the high percentage of (steady) income from salaries among recent movers.

The group of recent movers is further subdivided into four subgroups (as can be seen in table 1 under Housing market behavior). The categories into which the recent movers have been divided are "within owner-occupied sector", "from rental sector" and "starter" ("not moved" is the reference dummy in the later sections' regression models). These groups display strong differences among one another, which is displayed in table 2:

Table 2: summary statistics of three groups of recent movers (the non-movers are not included in this table)

| | Moved within owner-occupied sector | Moved from rental sector | Moved as starter |
|---|---|---|---|
| | | | |
| Gross income | 65178 | 56377 | 46307 |
| | | | |
| House value | 334079 | 253216 | 246357 |
| Mortgage | 208732 | 189474 | 161286 |
| | | | |
| Age head of household | 48 | 38 | 32 |
| Occupation duration | 1 | 1 | 1 |
| | | | |
| Household composition | | | |
| Single or single + child(ren) | 24% | 29% | 42% |
| Couple | 35% | 35% | 42% |
| Couple + child(ren) | 41% | 33% | 12% |
| Other | 0% | 3% | 4% |
| | | | |
| Income source | | | |
| Salary | 65% | 82% | 82% |
| Business - entrepreneur | 16% | 13% | 11% |
| Pension | 15% | 3% | 4% |
| Social security | 3% | 2% | 3% |
| | | | |
| N (weighted) | 178480 | 58183 | 39333 |
| n (unweighted) | 1712 | 552 | 387 |

Starters have the lowest average incomes, bought the cheapest houses and are youngest. Moreover, in line with the younger age, the starters are more often single (with or without children) or couples without children. Most differences within categories from table 2 can be explained by the difference in age: lower income, smaller house (in terms of value), smaller home equity all relate to age. We therefore present a more elaborate picture on age per category of housing market behavior in figure 1.

Figure 1: Distribution of age across groups of households with different housing market behavior
Shown are: minimum, 1$^{st}$ quartile, median, 3$^{rd}$ quartile and maximum.
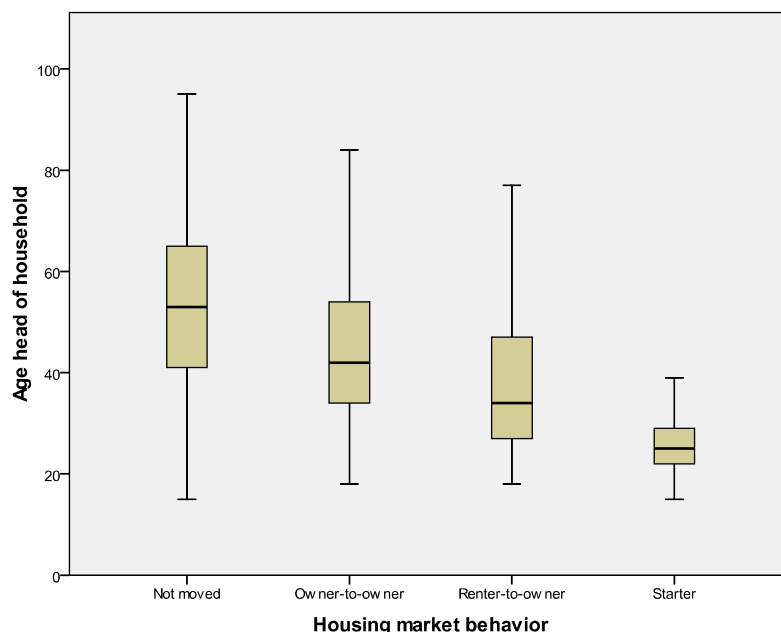
## 4. Home equity

Before turning to the empirical results of the paper we need to clarify a few things. First of all, we deduce home equity from the value of the dwelling and the mortgage: we do not observe home equity. One of the objectives of this paper is to explain the effect of home equity on housing demand: this is the second hypothesis we will be testing. This can be problematic to model, as the key independent variable is estimated using the dependent variable. We therefore need to make an assumption: we assume home equity is illiquid (which we try to prove in the first empirical part) and rolled over into the new dwelling. By taking a sample of recent movers this implies that current equity is equal to the previous equity (in levels). It is this previous equity (proxied by current equity) that is used to explain current consumption.

A second point we wish to clarify beforehand is with respect to the use of different measures for income. In hypothesis 1 and hypothesis 2 we use different measures for income, namely gross income (hypothesis 1) and disposable income (hypothesis 2). We do this because we believe that in explaining the financing ratio it is the relative benefit a household enjoys from having debt is important, hence gross income. In explaining housing consumption, however, we wish to explain consumption behavior, which may be best explained using disposable income.

### 4.1 Hypothesis 1: the size of home equity

We wish to investigate the impact of home equity on housing demand in the owner-occupied sector. Our expectation is that home equity is strongly illiquid and mostly rolled-over into new housing (see introduction). In line with this expectation we investigate the size of home equity; after all, if home equity is rolled over one might expect that household characteristics as age (head of household), occupation duration and income have a positive relationship with home equity.

In table 1 in the previous section we summarized some basic statistics. From table 1 it can be seen that the average dwelling in the Netherlands is worth around € 290.000 and that households hold, on average, just under 50% of that value in equity. Figure 2 summarizes the relationship between income and home equity. It is clear from figure 2 that income does not have a very strong positive relationship with home equity: on average households have roughly 45% of the house financed with equity. This share, however, is larger in the low-end income groups. We also observe that the middle income groups seem to have slightly lower equity stakes in their homes.

Figure 2: Average debt and equity per income decile
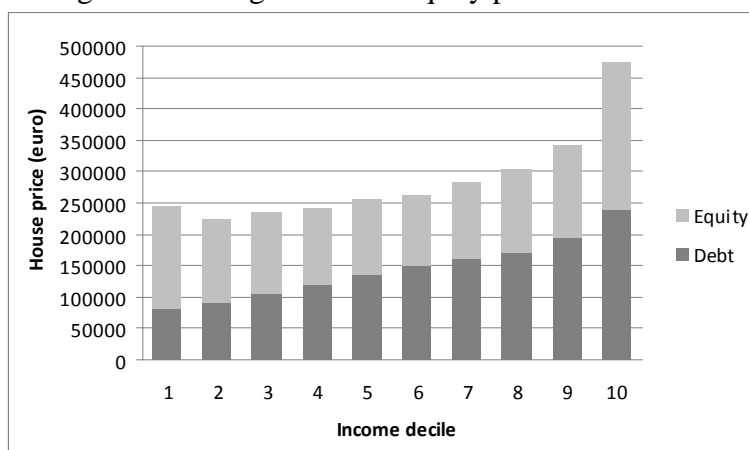
We have seen that from table 1 and figure 2 that the average equity share is around 45% of the value of the dwelling. There are, however, large differences between individual households with respect to the share of home equity. In figure 3 we summarize these individual differences according to households' housing market behavior (i.e. whether and how they have moved in the past 2 years).

Figure 3: Relative equity and housing market activity
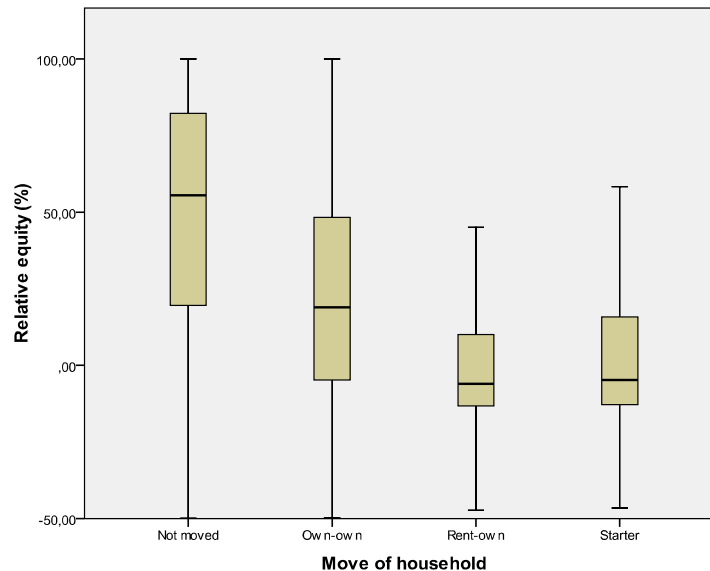Shown are: minimum, 1$^{st}$ quartile, median, 3$^{rd}$ quartile and maximum.



Figure 3 shows boxplots of relative equity according to housing market activity. The boxplot is built up displaying the minimum, the first quartile, the median, the third quartile and the maximum. Relative equity is always higher than -50% resulting from selection procedures and naturally topped at 100%. The lines in the boxes represent the median within each category. The largest group of households has not moved in the last two years; the median value for relative equity in this group is thus close to the sample average of just under 50%. For households that have moved, however, we observe significantly lower relative home equity shares. In the case of households that have moved within the owner-occupied sector the home equity is generally positive; for households moving from the rental sector or starters this is very often not the case.

In figure 1 we observed a high level of home equity in the lowest income decile. This might be caused by the large share of pensioners represented in the lower income deciles. We therefore also summarize the relationship between source of income and equity. The dominant source of income among owner-occupiers is salary, which is the main source of income for 62% of all households in our sample. Just over 21% of households have pensions as their main source of income, 14% have an income from business/entrepreneurship and just 3% have income from social security. Figure 4 summarizes home equity across these different groups of households:
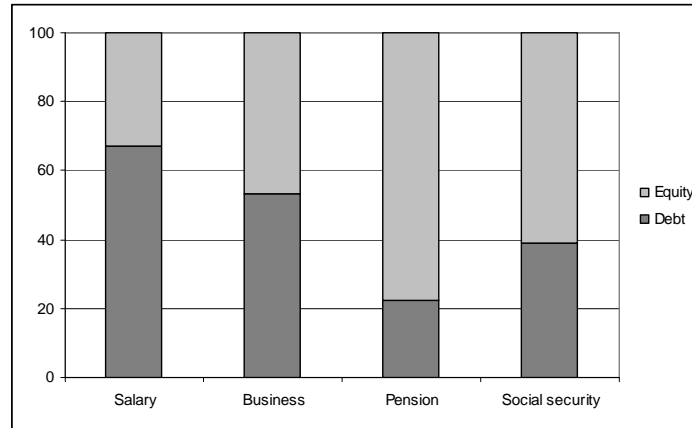
Figure 4: Relative equity per source of income



Figure 4 summarizes what may be expected from the incentives that the fiscal treatment of home ownership gives to households: households with high marginal tax rates have larger shares of debt as these households benefit most from having debt. Households whose main income is based on pensions thus, in line with expectations, have the largest equity shares and households with salaries have the smallest equity shares. This figure coincides with the pattern in figure 2, where low income groups (such as pensioners, but also households with lower marginal tax rates) have larger equity shares in their homes than households with middle incomes.

Finally we summarize the relationship between home equity and age and home equity and occupation duration. Figure 5 displays an increasing relationship between home equity and both variables: households seem to accumulate home equity over time.

Figure 5: average home equity at: progressive age (a) and occupation duration (b)
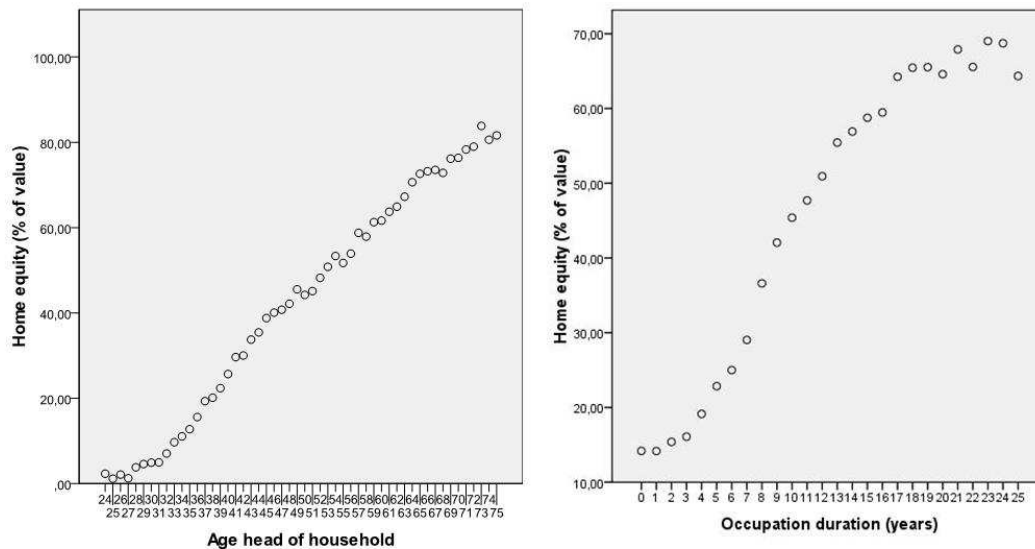
### 4.1.1. Empirical results hypothesis 1

So far we presented a general overview of the size of home equity and some household characteristics. In order to create further insight in what drives the size of home equity in owner-occupied housing we run a regression model on home equity. We use several household characteristics to help explain how home equity is influenced by household characteristics.

We use several variables directly from our dataset. There are a few variables that we have recoded. Here we will shortly describe the variables we used in the model. Then we will return and describe shortly the total model in order to then proceed to the results.

Home equity is our dependent variable and is defined as the difference between the tax assessed value (observed) and the outstanding mortgage (observed). As the level of equity is strongly dependent on the value of the house we use relative equity as our dependent variable. Relative home equity is defined as equity divided by value:

*Home equity = (tax assessed value – outstanding mortgage) / tax assessed value*

The tax assessed value of the property is a good proxy for actual value of the house. We use several household characteristics as explanatory variables: gross income and age of the head of the household (both observed), housing market activity and source of income (both created dummy variables), and occupation duration (estimated as the differences between the year of the survey and the year of entering the house; both variables observed). Housing market activity is a set of dummy variables that indicate whether or not a household is non-mover, own-to-own mover, rent-to-own mover or a starter. Source of income is a set of dummy variables that indicates whether the households' main source of income is from salary, business/entrepreneurial, pensions or social security.

The model is an OLS that is estimated on the total sample of owner-occupiers described earlier (i.e. 36309 observations). The non-movers are the reference group for the housing market activity dummies, and income from salary is the reference category for the source of income dummies:

$$\textit{Home equity} = \textit{constant} + b_1 \textit{*gross income} + b_2 \textit{*age} + b_3 \textit{*occupancy duration}$$
$$+ b_4 \textit{*own-to-own} + b_5 \textit{*rent-to-own} + b_6 \textit{*starter} + b_7 \textit{*business}$$
$$+ b_8 \textit{*pension} + b_9 \textit{*social security} + e$$

The model explains variance reasonably well; we obtain an R-squared of 47%. The results of this regression are summarized in table 3:

Table 3: Coefficients

| | Coeff. | | Std.Err. |
|---|---|---|---|
| Gross income (1000's of euro) | 0.02 | *** | 0.00 |
| Age head of household | 1.15 | *** | 0.02 |
| Occupancy duration | 0.86 | *** | 0.02 |
| | | | |
| Move dummies (ref. = not moved) | | | |
| Moved from owner-occupied sector | -3.20 | *** | 0.62 |
| Moved from rental sector | -13.98 | *** | 0.79 |
| Moved from household / starter | -1.63 | | 1.02 |
| | | | |
| Income source dummies (ref. = salary) | | | |
| Income from business / entrepreneur | 5.00 | *** | 0.45 |
| Income from pension | 2.53 | *** | 0.55 |
| Income from social security | 8.04 | *** | 0.91 |
| | | | |
| Constant | -27.91 | *** | 0.75 |
| | | | |
| R-squared | 0.472 | | |
| n | 36308 | | |

*** indicates significance at 1%

All of the above presented coefficients have the expected signs. Most of the presented coefficients are statistically significant by the normal standards and most variables show coefficients that seem mutually coherent.

We find a small but positive effect of income on home equity. The relative independence of home equity of income is remarkable, and cannot be explained by the fact that we estimate the model on relative equity. In other specifications of the model (e.g. including absolute levels of equity, excluding other variables from the model) we find that the impact of income is very limited. This finding is in line with figure 2 from the descriptive statistics, where we observed that households in the middle income segments tend to hold larger shares of debt. We further observe from that same figure that debt levels increase over the income deciles, as well as house value. The relative independence of home equity from income therefore proves that households try to maximize their fiscal benefits from mortgage interest deductibility.

We further find that the age of the head of the household as well as the tenancy spell are much more important predictors for the size of home equity. The relationship of these variables with home equity are strongly positive, as expected: for every year the head of the household increases in age, the home equity rises with 1.15 percent. Similarly, not moving for 10 years increases home equity, ceteris paribus, by 8.6 percentage points. We expected home equity to be illiquid, especially because there is a tax incentive to roll over home equity. The results presented in table 3 are in line with this expectation: home equity increases strongly by progression of age and of duration of occupancy, as could already be seen in the descriptive statistics we presented in figure 5.

The coefficients on the housing market activity dummies are all negative. This may be explained by the fact that moving costs money (roughly 10% of the house value, based on 6% stamp duty, and the fees for the realtor and the notary). Moreover, moves are generally up the housing ladder; i.e. moving households have decreasing equity shares as the absolute amount of equity remains the same, where the value of the house increases in the move. As expected households moving within the owner-occupied sector have a lesser negative effect with respect to home equity than households that have moved from the rental sector (and thus did not have any home equity beforehand). Surprising is the coefficient for starters; this coefficient implies a higher home equity for starters than for households that move from a different owner-occupied house keeping all other factors constant. This implies that starter households bring substantial equity into their homes. Figure 3 in the descriptive statistics shows a pattern that is largely in line with these results: indeed a fair share of starters do have significant home equity in their dwellings.

The results on the income source dummies are also as expected: households in the reference category, salary, have the highest incentive to hold large sums of debt. Entrepreneurs often use their homes to save up some pension money and therefore have a positive coefficient. The same applies for pensioners and households on welfare (although this is just a marginal group in our sample): the incentive to hold large sums of debt is small, as the tax benefit is small (given little income). Therefore, all groups of households have positive coefficients compared to the reference group.

### 4.2 Hypothesis 2: the effect of home equity on housing demand

The second question we are looking to answer in this paper is to what extent home equity impacts housing consumption. As we stated earlier there is a tax driven incentive to roll over home equity into the new home. The result of this incentive is that household will move into larger and more expensive housing, rolling over their full equity and optimizing (in case of steady income: maximizing) their debt. In this paragraph we will continue our investigation on the impact of home equity on the housing market by taking a look into the relation between housing demand and home equity.

In this section of the paper we use a sample of recently moved households that have moved into the owner-occupied sector. Table 4 summarizes the number of households that have moved in the past 2 years.

Table 4: Moves of households into owner-occupied market

| Move | Number of households | Sample (unweighted) |
|------|---------------------|---------------------|
| Own-own | 178480 | 1712 |
| Rent-own | 58183 | 552 |
| Start-own | 39333 | 387 |

The majority of moves into the owner-occupied sector are from households that were already owner-occupiers. This phenomenon is frequently reported in Dutch literature and is caused by the high prices in the owner-occupied sector.

Earlier we presented house values over income deciles in figure 3. In figure 6 we break down our sample over types of households:

Figure 6: house value per type of household
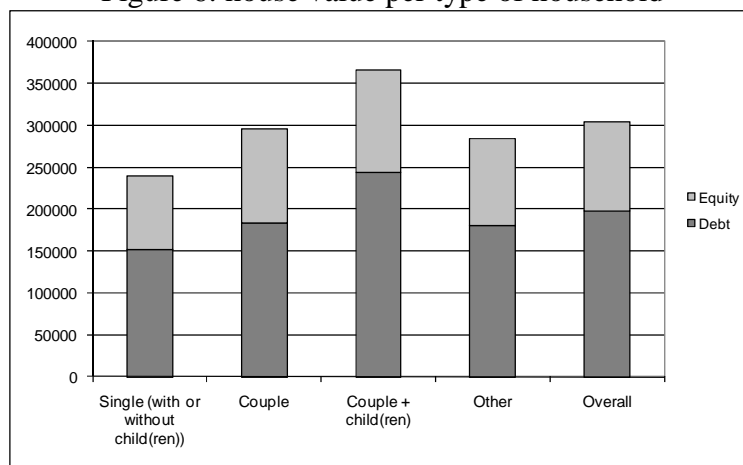


There are significant differences between the levels of housing consumption for different types of households. The differences with respect to the share of equity, however, are far smaller. The large difference in consumption is therefore mostly funded with debt. As expected, couples with children have the largest demand for housing and singles the least.

4.2.1. Empirical results hypothesis 2

The models presented in this paragraph are run on the subsample of recently moved households. We run the model on this subsample of households because only in the recently moved households we may assume that the current debt and equity levels are reflecting the households preferred levels: it is therefore only in this subsample that we can correctly infer the impact of home equity on housing demand. A second reason for using a subsample of recently moved owner-occupiers is that we assume that the home equity has not changed since the move: i.e. the home equity in the current home is brought into the current financing of the dwelling independently of the current value of the house. This assumption is justified as we have seen in the previous paragraph that households do not extract from home equity.

The variables we use in this paragraph are largely the same as in the previous paragraph. We will therefore not describe these variables again. The only new variable we will use is a set of dummy variables indicating household composition. These dummies indicate whether or not a household is single person (with or without child(ren)), multiple persons without children, multiple persons with child(ren) or other.

The basic setup of this paragraph is that we compare two identical models with different ways to model the impact of home equity. In one model we use a specification in which we attribute a return over home equity to disposable income; in the other model we use home equity as it is – an amount of money for investment in a new dwelling. The important distinction between both specifications is that the first specification implies that home equity is liquid: the effect of home equity is measured by the elasticity of disposable income. The second specification implies that home equity has its own elasticity and is independent of the households' disposable income. Our a priori expectation is that the model with equity modeled as a dedicated amount to be invested in the new dwelling outperforms the model with the attributed return on home equity. This has implications especially for forecasting housing demand.

First we model the impact of home equity by attributing a return on home equity to income. This is done as follows:

$$Income = disposable\ income + 0.048*home\ equity$$

This definition of income states that a 4.8% return on home equity is added to the disposable income[2]. The impact of home equity in this definition is via an increase in disposable income. The increase in disposable income, however, is limited to only 4.8% of the level of equity.

The alternative model to which we compare the above is a model that contains disposable income as well as the level of home equity. The expectation is that, in line with tax incentives, home equity is rolled over and therefore impacts consumption: the demand for housing services from income is therefore smaller.

The two models we compare are:

$$Tax\ assessed\ value = constant + b_1*Income + b_2*couple\ no\ child +$$
$$b_3*couple\ plus\ child + b_4*other\ household +$$
$$b_5*own\text{-}to\text{-}own + b_6*rent\text{-}to\text{-}own + b_7*starter + b_8*business$$
$$+ b_9*pension + b_{10}*social\ security + e$$

$$Tax\ assessed\ value = constant + b_1*disposable\ income + b_2*home\ equity + b_3*couple\ no$$
$$child + b_4*couple\ plus\ child +$$
$$b_5*other\ household + b_6*own\text{-}to\text{-}own + b_7*rent\text{-}to\text{-}own + b_8*starter +$$
$$b_9*business + b_{10}*pension + b_{11}*social\ security + e$$

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[2] Rate of return is net of taxes and is built up as follows: 4% risk-free + 2% risk premium – 1.2% tax

The results are presented in tables 5 and 6 below:

Table 5: model with return on equity in income

| | Coeff. | | Std.Err. |
|---|---|---|---|
| | | | |
| Income (incl. return on equity) | 3.41 | *** | 0.57 |
| | | | |
| Household composition | | | |
| (ref. = single with/without child(ren)) | | | |
| Couple | -8559.88 | | 7337.55 |
| Couple with child(ren) | 26556.91 | *** | 7884.08 |
| Other | -24249.27 | | 17769.57 |
| | | | |
| Move dummies (ref. = moved from rental) | | | |
| Moved from owner-occupied sector | 35229.22 | *** | 6949.52 |
| Moved from household / starter | -4904.01 | | 9135.60 |
| | | | |
| Income source dummies (ref. = salary) | | | |
| Income from business / entrepreneur | 45588.21 | *** | 8038.98 |
| Income from pension | 46714.55 | *** | 8944.19 |
| Income from social security | 20541.86 | | 15011.27 |
| | | | |
| Constant | 95178.48 | *** | 8082.47 |
| | | | |
| R-squared | 0.408 | | |
| n | 2651 | | |

*** indicates significance at 1%
** indicates significance at 5%

Table 6: model with equity as nominal amount

| | Coeff. | | Std.Err. |
|---|---|---|---|
| | | | |
| Disposable income | 1.76 | *** | 0.08 |
| Home equity | 0.77 | *** | 0.01 |
| | | | |
| Household composition | | | |
| (ref. = single with/without child(ren)) | | | |
| Couple | 10555.74 | ** | 5158.23 |
| Couple with child(ren) | 47732.04 | *** | 5543.31 |
| Other | -36409.56 | *** | 12462.58 |
| | | | |
| Move dummies (ref. = moved from rental) | | | |
| Moved from owner-occupied sector | 9799.95 | ** | 4897.39 |
| Moved from household / starter | -15848.15 | ** | 6409.50 |
| | | | |
| Income source dummies (ref. = salary) | | | |
| Income from business / entrepreneur | 13319.60 | ** | 5670.82 |
| Income from pension | -44844.22 | *** | 6511.97 |
| Income from social security | -34274.99 | *** | 10578.36 |
| | | | |
| Constant | 104949.49 | *** | 5670.68 |
| | | | |
| R-squared | | 0.709 | |
| n | | 2651 | |

*** indicates significance at 1%
** indicates significance at 5%

It is clear from tables 5 and 6 that the model with levels of equity outperforms the model with equity as part of the income with respect to explained variance: the R-squared of the model with equity modeled separately is 30 percentage points higher.

There are a few interesting differences between both models that are the result of in- or excluding home equity from the model. The sign for household composition "couple" is negative when excluding home equity, implying that a couple would have a lower demand for housing than single person household (with or without children) keeping all else rest constant. By including home equity in the model the sign flips to its anticipated form. Something similar happens with the dummy for income from social security. Modeling home equity thus contributes to the model's performance for explaining variance in housing demand between households.

The second objective of the comparison of both models was to create insight into the consequences of modeling home equity as a part of income or separately. Table 6 shows that the reported coefficient on home equity is significant, both statistically, but also economically. Demand for housing is therefore importantly affected by home equity. The impact of choosing either model is significant: the coefficient for income reported in table 5 is about twice the coefficient when home equity is modeled separately. The result therefore of modeling home equity as part of income is that the demand for households with little or no home equity is severely overestimated.

### 5. Conclusion

We find evidence that supports our view that home equity is illiquid and that households predominantly use home equity to roll over into a new dwelling. Home equity increases strongly with the age of the head of household and the occupation duration: households do not seem to withdraw equity from their homes. Debt, however, is maximized via, among other things, mobility and non-amortizing mortgages. We further find that home equity significantly impacts demand for housing. Not taking into account home equity in estimating housing demand could lead to significant overestimation of demand in predictions of housing demand for households with little or no home equity. This is caused by the fact that home equity is less liquid than other assets, such as income.