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Till debt do us part: strategic divorces and a test of moral hazard

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Till debt do us part: strategic divorces and a test of moral hazard

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Till debt do us part:

strategic divorces and a test of moral hazard

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Abstract

We test whether households that face prospective home equity losses during a house price downturn use divorce to shed debt. We study the Dutch context, where qualifying homeowners can buy into a mortgage guarantee scheme that insures the lender against borrower default and transfers the risk to the public. Divorce is one of the major events that obliges the guarantor to repay outstanding residual debt after (foreclosure) sale. We argue in this paper that divorce is endogenous to holding underwater mortgages, and hence constitutes a choice that can be used for strategic use of the insurance. Using administrative data, we find a significant, 44% increase in the probability to divorce for households with an underwater mortgage. This effect is causal to being insured. The identification relies on a regression discontinuity design, that exploits the fact that the insurance is only available for properties with values below a legislated qualification threshold. The house price crisis (2008-2013) provides an unexpected shock to house values, leaving about 40% of owners with an underwater mortgage. Their home equity averages to about €-50.000. Couples with similar characteristics just above the qualification threshold experienced significantly less often a divorce than couples just below the threshold. We interpret this behavioral response as moral hazard, also because the induced divorcees reunite at a higher rate than other divorcees.

Keywords: moral hazard, mortgage insurance, divorce

JEL codes: D10, G21, G52, J12

1. Introduction

Divorces or marital dissolutions are common. The economic theory of the family (Becker, 1991; Browning et al., 2014) suggests that divorces and separations respond to unforeseen changes in economic circumstances. Available empirical studies suggest that individual income shocks (affecting the spousal intra-household income ratio), business cycle fluctuations (Hellerstein and Sandler, 2011; Hellerstein et al., 2013), or changes in legislation affecting post-divorce property division, alimony or custody, matter for divorce decisions (e.g. Peters, 1986; Borenstein and Courant, 1989; Allen, 1992; Stevenson and Wolfers, 2006; Allen, 2007). We consider the particular interaction with house price shocks.

Housing wealth is on aggregate the most important asset component of individual couples' asset portfolios in western countries, with average home ownership rates in the order of two thirds. Accordingly, housing equity investment constitutes the largest flow of resources channeled into net wealth accumulation during marriage. In turn, household asset portfolios that are dominated by housing wealth tend to be underdiversified, exposing households to large risks since house prices are very volatile (Ferreira et al., 2010, and Catte et al., 2004), and transaction costs associated with purchase, sale, and relocation tend to be significant.[1]

While it is intuitive that in the face of large transaction costs house-price-induced fluctuations in home equity may be associated with lock-in effects restricting residential mobility (Engelhardt, 2003; Van Veldhuizen et al., 2020), additional effects can be expected. Two recent strands of literature focus on either mortgage default decisions (Bajari et al., 2011, Gerardi et al., 2018, and Guiso et al., 2013), or on the propensity to divorce (Farnham et al. , 2011, Rainer and Smith, 2010, and Klein 2017).

The institutional context is first-order relevant for default decisions of (married) households, in particular concerning underwater mortgages or negative home equity (i.e., outstanding mortgage debt exceeding the market value of the housing collateral). Underwater mortgages surged during the financial crisis at a global scale, but may have offered opportunities for strategic choices by affected home owners, as a number of research papers investigates. Guiso et al. (2013), for instance, show that it is likely that moral hazard plays a role in the US for those with large absolute values of negative home equity. They estimate that between 26% and 35% of mortgage defaults in the aftermath of the US

[1] A common estimate for transaction costs used in the academic literature is in the order of magnitude of 10% of the house value (Weinberg et al.(1981), Venti & Wise (1984), Linneman (1986), Goodman (1995), Haurin & Grill (2002), Engelhardt (2003), etc.).

subprime mortgage crisis and house price meltdown can be classified as 'strategic'. In their context, strategic default means to walk away from one's liabilities (forfeiting the underlying asset), even though income receipts may still be large enough to service mortgage repayment plans. Bajari et al. (2011), using a structural model, predict that a house price fall of 20% makes borrowers, who bought their house one year earlier, more than 15% more likely to default. Gerardi et al. (2018), using household survey data from the Panel Study of Income Dynamics, estimate that 38% of defaulters would have had the funds to keep repaying their loans.

European countries experienced similarly precipitous falls in house prices as the US,[2] but the different legal system often does not allow households to be easily relieved from negative equity. There is at least one interesting exception: the Dutch case. The Netherlands has a nation-wide mortgage guarantee program (*Nationale Hypotheek Garantie*, henceforth NHG), originally intended to make home ownership more accessible to the middle classes (see Francke and Schilder, 2014, for institutional description and analysis of defaults).[3] The program is available to first-time buyers of a house with value below a legislated threshold, and is intended to provide debt relief upon major shocks that trigger the sale of the property. Given high leverage ratios, many affected households would keep residual debt upon a sale. The NHG guarantee program may cancel residual debt when the property sale was induced by disability, unemployment or death of a spouse. Important for our study is the fact that also divorce is a qualifying event for the guarantee to be effected.

We argue in this paper that strategic default may occur among those covered by the guarantee scheme, as couples may choose to divorce in order to shed negative equity. The asymmetric information we focus on is not between the divorcing spouses[4] but between covered households and the insurance program, and may in this sense be classified as a form of moral hazard. Our raw data suggests that the relative difference in divorce rates shot up among those couples that qualified for the guarantee scheme compared to the non-insured group when house prices tumbled.

We investigate in this paper the particular impact of housing wealth revaluation on couples' divorce decisions during the house price crash following the Great Recession. The negative wealth shocks can in theory have an effect on the marital stability of couples through a number of channels. One mechanism pertains to lower house prices implying decreased cost of living separately, as well as

[2] For instance, from 2008 to 2013, house prices in the Netherlands plummeted by approximately 20% from their 2008 peak and bounced back only after 2013.

[3] See BIS (2013) for institutional descriptions of similar programs around the globe.

[4] The economics of divorce literature sometimes uses the term strategic divorce for cases where, for instance, unilateral divorces can be strategically induced because one spouse may be able to extract an additional surplus upon arrival of private information (e.g., Borenstein and Courant, 1989). Our notion differs from that one.

to higher opportunity costs including those from financial stress (Rainer and Smith, 2010; Farnham et al., 2011; Klein, 2017). Divorces are typically associated with new housing for the departing spouses, implying individual housing costs for both spouses.[5] These are partly offset by lower down-payments when house prices drop, while at the same time less equity will be extracted from the previously jointly-owned house. Additionally, couples are subjected to more (financial) stress due to a contraction of their household wealth or even home equity turning negative. The reduced cost-of-living and stress arguments are two factors which potentially lead to a higher risk of divorce.

One mechanism working in the opposite direction is a transaction costs channel. Housing markets typically exhibit positive correlation between price appreciation and transaction volume (Genesove and Mayer, 2001), and tend to freeze up during a downturn. In case that owners are loss averse, they may be reluctant to sell their home when the market is in a slump (Ferreira et al., 2010; Farnham et al., 2011). Genesove and Mayer (2001) show that nominal loss aversion is a more crucial factor than liquidity constraints to explain why there are fewer houses on the market when prices fall. These authors find that loss-averse sellers set relatively high asking prices, obtain high selling prices, but have a low hazard of sale. Engelhardt (2003) studies US metropolitan areas and finds that loss aversion reduces residential mobility. On the other hand, underwater mortgages hinder residential mobility, as couples are subject to a "housing equity constraint" (Farnham et al., 2011, p.616). Chan (2001) shows convincing evidence that low home equity limits residential mobility because of residual mortgage debt and new down payments. She also shows more pronounced lock-in effects for high loan-to-value (LTV) mortgage owners.

Farnham et al. (2011) find a significant effect of declining house prices reducing divorce risks in the US. On the contrary, Rainer and Smith (2010) show that negative house price shocks in the UK significantly increase divorces, especially for couples with high mortgage debt, with children, and with low income. More recently, Klein (2017) shows that positive house price changes enhance marital stability. She finds no significant effect of negative house price shocks on divorces.

We make a couple of contributions. First, relative to the specific empirical literature on divorce and house prices, we add an additional source of identification, namely an institutional discontinuity within the aforementioned mortgage guarantee program. This is important, because the identification of the causal effect in the existing studies only relies on the crisis as a source of exogenous variation. The crisis, however, was a multifaceted macro shock with repercussions along many dimensions in housing, financial, and labor markets, and may have hit different types of households differentially.

[5] Divorce legislation sometimes requires divorcing spouses to live at separate addresses.

Our approach allows controlling for a group whose behavior may have been affected by the onset of negative home equity triggered by the house price crash but not by the divorce incentive.

Second, our paper contributes to understanding a fundamental issue, namely the identification and quantification of moral hazard in public insurance schemes that are not very sharp in terms of monitoring but allow the insured to choose their risk behavior (Chetty and Finkelstein, 2013; and Cohen and Siegelman, 2010, for private insurance contracts). An important consideration is an empirical distinction between moral hazard and adverse selection effects that are both associated with a positive correlation between insurance cover and risk taking. For instance, Ejrnæs & Hochguertel (2013) exploit a policy reform that provided orthogonal incentives for self-employed entrepreneurs to choose unemployment insurance cover and to subsequently take on more risk. Bajari et al. (2014) provide an econometric method to disentangle moral hazard from adverse selection effects in health insurance claim data.[6]

One additional contribution of our paper is that we can study the isolated effect of moral hazard, as we do not need to disentangle it from the effect of adverse selection. This is because, in the specific case of the Dutch NHG that we study, adverse selection can be excluded as the insurance is bought virtually by all those who qualify for it so that the whole causal effect on strategic defaults can be attributed solely to moral hazard.

Our findings suggest a strong effect of the house price meltdown on divorce rates of insured households. In particular, we find that insured underwater mortgage holders experienced a 44% higher divorce hazard than the non-insured. This finding is consistent with Farnham et al.'s (2011) statement that "policies to speed the foreclosure process [...], by relieving housing lock-in, may increase divorce rates among foreclosed-upon couples" (2011, p.618).

The structure of the paper is as follows. In the next section, we discuss salient institutional details of the Dutch mortgage market and of the guarantee scheme. In section 3, we derive optimality conditions in a model for the participation in the NHG plan and the choice of marital status in the presence of negative home equity. In Section 4, we discuss the data and in Section 5, we test the predictions of the theoretical framework using a regression discontinuity design. Section 6 summarizes and concludes.

[6] Brown and Finkelstein (2008) allow for moral hazard when assessing willingness to pay for private insurance in relation to the public Medicaid program.

2. Institutions

In order to understand the incentives that are offered to households to deal with debt in the Dutch context, we clarify the functioning of some specific institutions. These are key to understanding our identification strategy later on.

2.1 Mortgage market

Mortgages are wide-spread. Almost all homeowners will finance their first home using such a loan that is partially covered by the collateral value of the house, and whose size is also determined by the repayment capacity of the household. Couples regularly have joint ownership of the property and are jointly liable to service the loan contract. Mortgage holders also enjoy particular tax incentives. As in other countries, mortgage markets are subjected to particular financial, macro-prudential and consumer protection regulation.

Of particular relevance is the rather high loan-to-value (LTV) ratio of first-time buyers, regularly exceeding 100% of the value of the home. As recently as 2009, initial LTV ratios of up to 120% were not uncommon.[7] This feature results in Dutch home owners belonging to the most heavily indebted owners in the world. Only in the wake of the financial crisis, macro-prudential regulation started to cap the LTV ratios, now allowing a leverage of not more than 100%.

In addition to LTV caps, loan-to-income ratios were the main instrument for lenders to control borrower risk exposure, in particular caps on the debt-service-to-income (DSTI) ratio. Depending on their income and current interest rates, households can borrow amounts between 4 and 5.5 times their annual earned income. These caps are only checked at mortgage inception. Part of secondary-earner income is also considered when determining household earnings. This implies that following a divorce, spouses could be forced to either sell the house or keep joint responsibility of the mortgage if the income of one spouse alone is no longer enough to qualify under the DSTI cap regulation. The tax treatment of mortgage payments arguably contributed to the high leverage ratios of Dutch households, but also to the popularity of particular mortgage types. Specifically, interest payments were fully tax-deductible from the income tax base, prompting households to choose so-called interest-only mortgages on a large scale before the post-2009 regulation set in.

[7] Mortgages exceeding home values could hence be used to finance realtor and notary fees, taxes, and other transaction costs, as well as remodeling, or furnishing expenses. Banks were eager to lend during times of increasing house prices.

Two more aspects are worth mentioning. First, residual debt is portable. If a household moves from an underwater mortgaged home to a rental home, there will still be residual debt, even though no collateral exists anymore after sale. Second, as of 2013, only interest on new linear and annuity mortgages is tax-deductible. However, there is a large legacy from the past in terms of interest-only loans (about 60%), investment loans (about 7%), and saving loans (about 25%)[8].

2.2 Residual debt insurance

Residual debt insurance (NHG – Nationale Hypotheek Garantie) creates a guarantee at inception of a mortgage loan. Essentially, it takes over outstanding debt that cannot be recovered from collateral, upon sales triggered by adverse shocks to the borrower. NHG is a nation-wide program, enjoying large popularity among first-time home buyers.[9]

If the borrower is unable to keep servicing the repayment plan and is about to default, the insurance can step in by acting as a guarantor and limit or eliminate the loss for the lender. Borrowers pay a one-off commission or fee (e.g., 0.70% in 2012) for this insurance. Banks give borrowers with NHG guarantee a discount on mortgage interest of typically between 30 and 60 basis points. This discount can be higher when the borrower has a higher LTV ratio at the time of origination. When the borrower sells the property and retains residual debt, the NHG fund will repay the bank if conditions are met. The borrower continues to be liable but now has the NHG foundation as creditor. At going interest rates and mortgage terms, it was advantageous for the borrower to pay the commission and buy the guarantee. Due to the high leverage ratios and low housing prices during the credit crisis, residual debts became very common. If the reason for default is either divorce,[10] disability, unemployment, or death, the fund may unilaterally cancel the debt.[11]

The NHG guarantee can be bought on properties up to a ceiling amount. This ceiling is chosen to normally match median house prices. It was €240,000[12] in 2005 and was lifted step by step to

[8] Investment loans, savings loans or life-insurance loans are deferred amortization loans. Contrary to an annuity there is no per-period debt reduction. The amortization is either saved or invested in a separate account and will be transferred to the lender at maturity.

[9] At year-end 2016, the aggregate balance of mortgage loan guarantees covered by the NHG program amounted to approximately €193 billion, for a total of 1,309,000 active guarantees. In 2016 the NHG guarantee fund reimbursed a total of €109 million of losses, an average of €34,000 per case. The net assets of the fund then amounted to €960 million.

[10] In order to simplify the exposition, we refer to divorces when couples are officially married and legally separated afterwards, which is registered in the administrative data. Separations of cohabiting adults are not registered, yet these would also qualify for NHG reimbursement. In most OECD and EU countries, where divorce is possible, more than a third of individual marriages end in divorce, and aggregate divorce-to-marriage ratios are in the order of 40-50% (Eurostat: Marriage and Divorce Statistics). Insightful descriptives are provided in Stevenson and Wolfers (2007).

[11] As from 2014, an affordability test is carried out. Our study focuses, however, on the years before that.

[12] The average purchase price of the house in the Netherlands are as follows. The corresponding years are shown in parentheses: €222,706 (2005), €254,918 (2008), €238,259 (2009), €230,194 (2013), and €263,295 (2017).

€265,000 in 2008. In the wake of the crisis in 2009 when house prices tumbled and housing demand faltered, the ceiling was incidentally and abruptly lifted to €350,000, and then lowered back in steps to €245,000 in 2015. At present (2022), this erratic development has stopped and the ceiling follows the development of average house prices and stands at €265,000. Neither the ceiling nor the premiums depend on the household composition, location or other property features, or on the riskiness of the loan. Once a bank agrees to a loan, the NHG will guarantee it if its original value is below the ceiling amount.

The guarantee covers not only the principal mortgage, but also additional loans that are used either for quality improvements (such as remodeling) or for the purchase of the land or ground lease (typically for a period longer than ten years)[13].

The number of households that made use of the NHG guarantee due to forced sale at a loss increased considerably during the crisis, mostly in the years 2010 and 2011. Approximately 80% of annual guarantee requests are honored. In 2011 for instance, more than 1,700 households applied for reimbursement (50% due to divorce, 2% disability, 20% unemployment and 28% for general arrears), which was more than twice the number of requests in 2007. The increase was the direct result of two effects: a household income loss, which led to higher default rates during the crisis, and the sharp drop in house prices, which increased the chance that in case of forced sale the value of a house would be lower than the remaining mortgage balance.

[13] More information on the NHG system is in Appendix.

3. Theoretical background

3.1 Mortgage problem

The previous section sketched the important institutional feature of the mortgage guarantee plan, NHG. Our very stylized approach captures the main features of this specific arrangement, and we keep referring to it as NHG in the sequel. We consider the choice to buy a NHG plan for a new home owner who finances the home acquisition solely using a mortgage loan in a multiperiod setting. We also consider the choice to strategically divorce for NHG-covered owners. In principle, both choices may be interdependent. We will argue that it is realistic to assume that everyone who buys a house that qualifies for NHG coverage, will buy the plan. As strategic divorce only applies to NHG holders, we treat both decision problems sequentially.

In the first choice problem, we assume that a house of a given value is bought at the beginning of the first period, and that the house is financed using mortgage debt without downpayment (corresponding to an initial LTV ratio of 100%). Every consumer has initial savings at the beginning (enough to pay the NHG fee) and buys either a linear or an annuity mortgage. Even though NHG acts as insurance, we will show that even risk neutral agents purchase the insurance. So, there is little scope for heterogeneous risk attitudes driving demand for insurance, hence mitigating potential adverse selection channels.

In the second choice problem, we show that strategic divorce—a notion to be defined exactly below—can occur for NHG-owners. Here, we assume that the value of the house will drop at some point, to capture the impact of a financial crisis on home equity. This implies that some households will then exceed the 100% LTV, thus experiencing negative home equity. We allow for uncertainty along two margins: home equity may or may not turn negative, divorce may or may not occur for exogenous reasons. Over and above those, we then consider the role of strategic divorce for shedding debt.

3.2 The NHG choice

Consider first a household buying a house of price A_1 with a linear mortgage with principal D_1 that has fixed term T, and a fixed interest rate r. Let τ indicate time. $\tau = 1$ is the contracting period, when the loan principal at origination is equal to the cost of the house ($D_1 = A_1$). The loan will be fully paid back by the end of period T. With D_1 (debt at the beginning of the first period) nominally fixed, outstanding mortgage debt D_τ (debt at the end of each period) falls deterministically over time as the

loan is being serviced periodically according to a fixed repayment plan. The linearity refers to constancy of repayment of the principal, $\frac{D_1}{T}$, whereas interest payments decrease over time, $rD_{\tau-1}$. Annual payments consist of annual principal repayment and annual interest payments, $D_1 r\left(1-\frac{\tau-1}{T}\right)$.

Next, suppose that a guarantee scheme is in place for houses with values up to a threshold $\bar{A}$, such that $D_1 \leq \bar{A}$. Mortgage owners that have bought houses above the threshold ($D_1 > \bar{A}$) are subject to the risk of carrying residual debt upon defaulting. They do not qualify for the guarantee. Those with $D_1 \leq \bar{A}$, that do qualify, have their default risk eliminated from the lender's perspective when they participate in the NHG guarantee. This results in NHG-covered loans enjoying an interest rate reduction. Thus, mortgage owners with $D_1 \leq \bar{A}$ may choose to sign up for the plan, pay a fee αD_1 upfront, and receive a discount (δ) on the interest rate for the entire duration of their loan. Therefore, the annual payments for NHG participants become $\frac{D_1}{T} + D_1(r-\delta)\left(1-\frac{\tau-1}{T}\right)$.

For qualifying borrowers (with $D_1 \leq \bar{A}$) the decision to participate or not in NHG is largely driven by the difference in per-period payments arising from the interest part. Borrowers will compare the present value of the insurance, from $\tau = 1$ to T, with the initial fee paid at $\tau = 1$.

At a discount rate of ρ, the present value at $\tau = 1$ of the interest rate advantage $\delta D_1\left(1-\frac{\tau-1}{T}\right)$, is $D_1\delta\sum_{\tau=1}^{T}(1+\rho)^{1-\tau}\left(1-\frac{\tau-1}{T}\right)$. A risk-neutral consumer will therefore buy the insurance if

$$D_1\delta\sum_{\tau=1}^{T}(1+\rho)^{1-\tau}\left(1-\frac{\tau-1}{T}\right) \geq D_1\alpha. \quad (1)$$

For commonly used values of δ (0.5%) and α (1%), the insurance will not be bought if

$$\rho > 93.1\%, \quad \text{when} \quad T = 30$$

$$\rho > 89.4\%, \quad \text{when} \quad T = 20.$$

These are implausibly high values for ρ. Similar conclusions apply to an annuity mortgage. For instance, with $T = 30$ years ρ should exceed 38% before the risk-neutral consumer refrains from finding the insurance attractive.

Conversely, when we take commonly used discount rates (for example 2% or 3%) the condition above implies that T must be smaller than 3 years in order for NHG not to be chosen. This implies that borrowers will not buy the insurance if they plan to redeem their mortgage within three years, which is a lot less than the average length (of ten years) of a moving spell in the Netherlands, where more

than 95% of households borrow for at least 20 years. This implies that for risk neutral borrowers it is beneficial to buy the NHG if they are willing to keep their mortgage for at least three years, since within the first three years of their mortgage contract the benefits of the insurance in terms of the interest rate reduction outweigh the initial cost of the insurance. Since the NHG contract is portable for new qualifying dwellings, even moving houses does not entail losing insurance. Thus, NHG is in essence an offer you cannot refuse for risk-neutral borrowers. Risk-averse borrowers will find it even more attractive because of the additional insurance value. Therefore, we conclude that borrowers always buy the insurance if they qualify.

3.3 Strategic divorce under NHG

Define home equity a_τ as the difference between the current value of the house and current debt. Whereas we kept the house value initially fixed at A_1, assume now that an asset price shock hits the housing market at the beginning of period t such that,

$$A_\tau \begin{Bmatrix} = \\ < \end{Bmatrix} A_1 \quad \text{if} \quad \begin{cases} \tau < t \\ \tau \geq t \end{cases}.$$

The price drop may result in the home being underwater (negative home equity) and potentially lead to realizing a loss upon sale (residual debt). An insured household may have recourse to reimbursement from the NHG fund. To keep the exposition transparent, we shall assume that divorce is the only event upon which covered households can qualify for an NHG reimbursement (so we ignore unemployment, death and disability). Let η be the exogenous probability that the household divorces at any time. In economic models of divorce, a couple divorces if due to a shock the match value of marriage drops below the value of being single for at least one couple member. A drop in the house value can be such a shock and can occur both to insured and uninsured couples. But only insured couples have the additional moral hazard incentive to claim the NHG, even if otherwise they would not have divorced. It is this additional incentive mechanism that we demonstrate with the following analysis.

We simplify modelling the event of divorce by assuming that a shock decreases divorce cost k (inversely related to the match value) which in turn increases the divorce probability $\eta_k = \eta(k)$ (with $\eta'(k) < 0$). If the shock is not sufficiently large, the marriage remains intact in the absence of NHG. If the house price shock is large enough to render home equity negative, the choice to divorce strategically within the NHG scheme can become important. Introduce a binary variable I_t^{SD} to indicate whether (1) or not (0) divorce is strategic, should it take place. The index t on I_t^{SD} indicates that the strategic divorce decision is taken at the beginning of period t as well, once it is clear that the

house price drop has occurred. Focusing on the (expected) home equity at the beginning of period $\tau = t+1$, at given the parameters, NHG owners decide at the beginning of period $\tau = t$ to initiate a strategic divorce according to the following maximization problem,

$$\max_{I_t^{SD}} \{E(a_{t+1}|I_t^{SD}=0), E(a_{t+1}|I_t^{SD}=1)\}. \quad (2)$$

Two cases can be distinguished, depending on whether or not home equity at beginning of period t is non-negative. In the first case, when $a_t \geq 0$, indemnification will never apply. Therefore, there is no incentive to strategically divorce, because such action only carries divorce cost k, that otherwise would not be incurred. Thus, $I_t^{SD} = 0$. Divorce may nonetheless occur as a random exogenous event with expected divorce cost $\eta_k k$. The expected pay-off is then:

$$E(a_{t+1}|a_t \geq 0) = a_t - \eta_k k.$$

Next consider the case of an underwater mortgage, $a_t < 0$. Here, the choice of I_t^{SD} may become relevant. The problem is:

$$\max_{I_t^{SD}} \{E(a_{t+1}|a_t < 0, I_t^{SD}=0), E(a_{t+1}|a_t < 0, I_t^{SD}=1)\}. \quad (3)$$

With probability η_k, the household divorces anyway, and residual debt will be discharged, implying $a_t = 0$. With probability $1-\eta_k$ the household remains intact, but with insurance even an intact marriage can be dissolved for strategic reasons: the households profits from shedding debt, but pays the strategic divorce cost k. In summary, we have

$$E(a_{t+1}|a_t < 0) = -\eta_k k + (1-\eta_k)\{-I_t^{SD} k + (1-I_t^{SD})a_t\}. \quad (4)$$

To determine whether strategic divorce will occur, the expectation in (4) can be computed per case when strategic divorce is or is not chosen, respectively:

$$E(a_{t+1}|a_t < 0, I_t^{SD}=1) = -\eta_k k - (1-\eta_k)k, \quad (5)$$

$$E(a_{t+1}|a_t < 0, I_t^{SD}=0) = -\eta_k k + (1-\eta_k)a_t. \quad (6)$$

Comparison of those two expressions reveals a positive incentive for a strategic divorce as long as divorce costs do not exceed (negative) home equity, $-a_t \geq k$. Therefore, to maximize their expected home equity at $t+1$, NHG owners strategically divorce ($I_t^{SD}=1$) in t if $-(a_t+k) \geq 0$. Otherwise, they do not choose to strategically divorce ($I_t^{SD}=0$). This implies that NHG participants have a positive incentive to divorce strategically when the size of their negative home equity is larger

than the costs of a strategic divorce. Such a situation might have presented itself right after the crisis in the Netherlands, when almost 40% of mortgage owners were underwater, and their negative home equity was on average about 50,000 euro (the median value was 37,000 euro). In the next section we test this prediction empirically.

4. Data and summary statistics

4.1 Data

For our empirical work, we use a number of datasets made available by Statistics Netherlands (CBS): the Dutch Income Panel Study (IPO), the Land Registry and address data of Dutch municipalities.[14] The IPO is a yearly panel that we use to study couples who divorced during the credit crisis. It is representative of the Dutch population and allows measuring a number of crucial covariates and divorces at the micro level. In addition, it spans the pre-2008 and post-2008 periods. The IPO was collected in the period 1989-2014 and contains 250 thousands individuals and about 90 thousands households in each (yearly) wave. As NHG participation is not available in the IPO data, we impute NHG qualification through transaction data in the Land Registry and address data, that we link to the IPO data. Using the house price at purchase and the recorded transaction year in the data we can identify which borrowers did (or did not) qualify for the NHG scheme. The long time dimension of the IPO is essential to this purpose. We believe that here qualification is a close proxy of participation because the insurance, as we show in Figure 1, and mostly in the years that we study, was an offer that one could not refuse. We select couples who bought their houses before the crash of the housing market, in the time period between 2001 and 2008, when annual house house price growth varied from 2 to 10%, but we also merge information for subsequent years to this base sample.[15] In the end, the combination of these datasets delivers a perfect merge for 7,903 couples in the period 2001-2013. The estimation sample reduces to 7,200 couples after excluding households who have some missing control variables.[16]

[14] These datasets are respectively the *Inkomenspanelonderzoek* (IPO), the *Transactiebestand Bestaande Koopwoningen* (TBK) and *Gbaadresobjectbus* (GBA). We refer to Bernstein and Struyven (2017) for the construction of the sample. For more information on data, please refer to CBS (2016), CBS (2020), and CBS (2021), respectively.

[15] This is calculated by taking an average at municipality level of house price changes in our sample and from CBS.

[16] From the sample with 7,903 couples we also draw the subsample used in Figure 3, where we look at 4,712 couples. The sample reduces in size mostly because, for reasons of exposition, we remove there all households who are too far away from the threshold.

When we discuss tail events, such as couple reunions after separation, we ideally need population data due to the small incidence of reunions (split couples or divorcees joining again at the same address). The IPO data is drawn from population datasets that only became available with the 2011 release to the users of the micro data of CBS. So, to check the evolution of marital status over time we will use the shorter series of data covering the entire population.

We also use two ancillary datasets on mortgage loans and NHG reimbursements. As explained, NHG participation is not observed in the IPO, but we have access to the 2017 loan-level data (LLD)[17] of De Nederlandsche Bank (DNB), the Dutch central bank. When we compare our proxy for qualification for year 2017, with information on NHG participation, we notice that little above 80% of the NHG qualifiers in our data also participate in the NHG. This is the only year that allows the comparison, but we suspect that the matching is even higher during our sample period, that is more in the past, when expectations of future price developments (Caloia and Mastrogiacomo, 2022) were lower (participation in an insurance against underwater mortgages makes less sense when price expectations are increasing).

Finally, we use aggregate balance sheet information published in the annual reports of the NHG foundation, in order to support the relevance of our identification strategy.

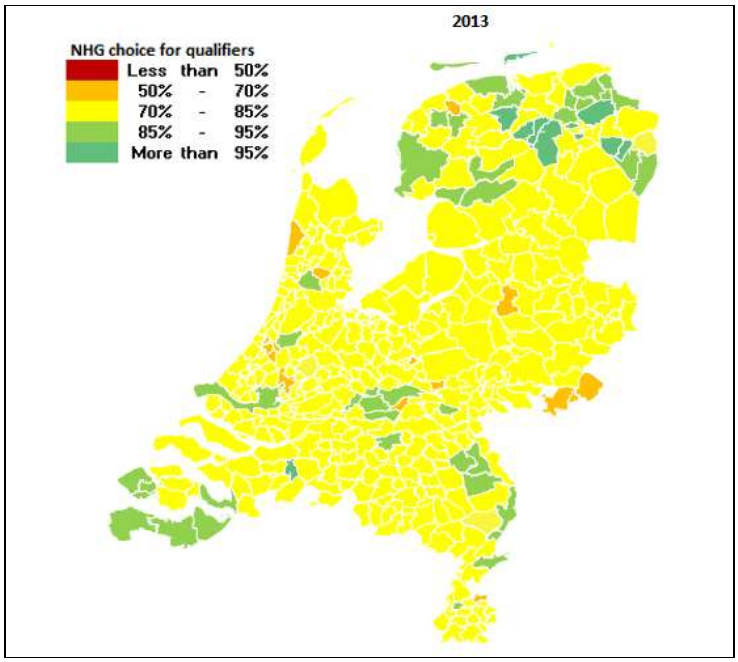
4.2 Descriptive analysis and summary statistics

In order to support our empirical strategy, we illustrate some relevant aspects discussed above. The residual debt insurance in the Netherlands is very popular. We use the LLD data where we observe NHG participation directly. Figure 1 shows that those who qualify for the insurance, also participate in it. About 80% does, and this is so in most Dutch municipalities. This is relevant to our study, as such high take-up rates imply little role for adverse selection.[18]

[17] We use these data in the descriptive analysis in the next section. This LLD is a micro dataset based on the register of mortgage contracts that commercial lenders must deposit with DNB. This register was established in 2012 and is available on a quarterly basis. For more details see Mastrogiacomo and Van der Molen (2015).

[18] In a companion paper to this study (Kim et al., 2019) we show that recently, after the period studied here, qualification for NHG has diminished a lot. The reduced coverage is of main concern to policy makers because of the high exposure of Dutch households to mortgage debt.

Figure 1: Take-up rate among NHG qualifiers, by municipality

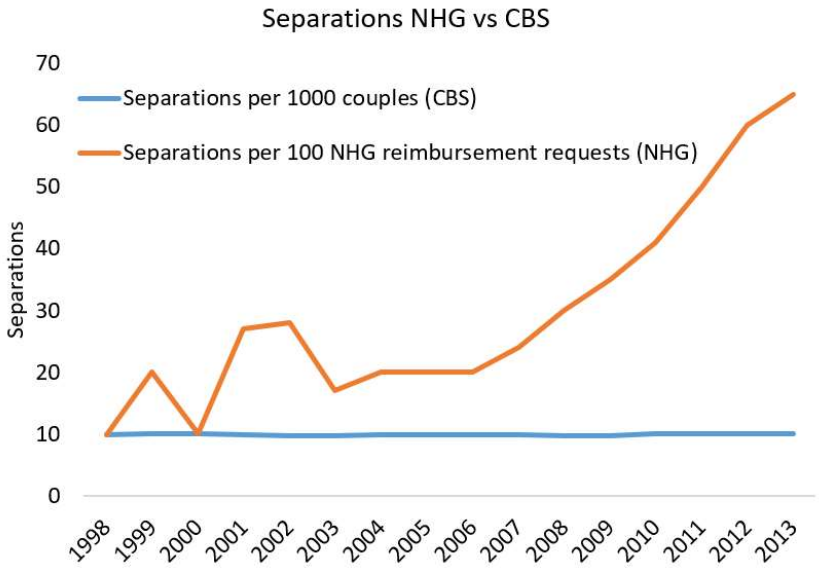


Explanatory note: Source: LLD, 2013 (DNB), own computations

In recent years, divorces have become the primary cause of NHG reimbursements. Figure 2 shows the development of divorces per 100 NHG reimbursement requests along with the nation-wide divorce rate. The figure normalizes rates for both series in base year 1998 and follows their development through 2013. While the nation-wide statistics show no increase in the divorce rate, the number of divorces that motivates a reimbursement request increased almost exponentially during the house price crisis.

Figure 2 is suggestive of a strong differential effect within the pool of insured households, although it actually is based on two very different populations. Those who qualify for mortgage insurance are households that may in general suffer more during a period of asset price crisis, while the nation-wide figure also includes tenants, for instance, who have no home equity.

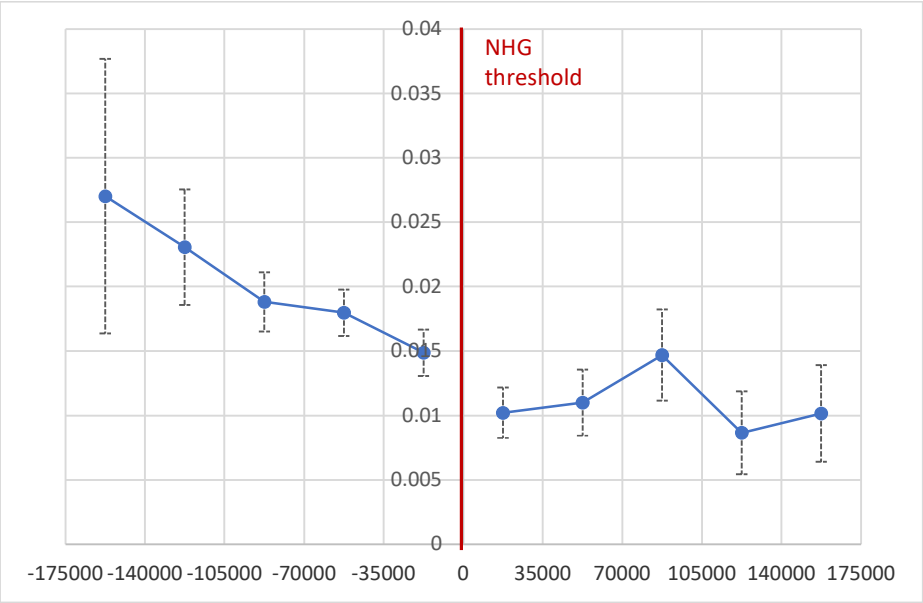
Figure 2. Divorces/separations among NHG reimbursements and nation-wide



Explanatory note: In this descriptive figure we use both separations and divorces, as in the NHG reports the two concepts are used together. In CBS macro statistics presented here we use a similar definition as in the NHG reports. This way we deviate from the definition in the CBS micro data used in the regression analysis, where only divorces and no separations of cohabiting adults can clearly be identified. Source: NHG annual reports, various years, and Statistics Netherlands (CBS).

In order to gauge the causal effect of debt insurance on divorces, we can look at the divorce behavior of households above and below, but close to the NHG threshold. In Figure 3 we show the divorce hazard of households with an underwater mortgage along their distance from the NHG threshold (value of house at purchase minus the NHG threshold). Couples to the right of the threshold cannot buy the insurance, while those to the left can. The figure shows a clear discontinuity around the threshold. Close to the threshold the house values are closely comparable, and the households that can buy insurance have a 45% higher divorce rate (0.0148) than those that cannot (0.0102). This is a first indication that a moral hazard effect on divorces may be at work in the data.

Figure 3. Divorce hazard among underwater households by the distance from NHG threshold



Explanatory note: The figure shows different divorce hazard around the insurance qualification threshold. Source, IPO (CBS), own computations. 95% Confidence bands as black dashed vertical lines.

To investigate whether the data are randomized to the left and right of the threshold, in Table 1 we also show that the estimation sample is composed of individuals who are quite similar in terms of observed characteristics irrespective of whether or not they participate in the NHG. Some differences, though, are worth discussing. Background characteristics are listed and compared in order to check whether there is a sizable difference between the two groups. Most of the characteristics of the two groups are similar in terms of means and standard deviations. An exception is disposable income, which correlates positively with the value of the property. Couples in the NHG non-qualifier group have more expensive houses and are more likely to have higher incomes. The marriage-relevant variables, such as marriage duration and age at start of the current marriage, indicate that NHG non-qualifiers get married at a somewhat later age and stay married somewhat longer. The adult child indicator is 1 if couples have a child above the age of 17, and 0 otherwise. These two events do not sum up to one because some couples have both under-18 and above-17 children. Both groups are on average similar in terms of family composition, employment status, and whether they live in one of the four largest cities in the Netherlands (Amsterdam, Rotterdam, The Hague, and Utrecht). Financial assets of housholds, reported in the last row of Table 1, will not be included as control variable in our regression model, as they are only available for a sub-period (since 2005), but shown here to compare the two groups. Couples with NHG have financial assets of lower value.

Table 1: Summary statistics of NHG qualifiers and NHG non-qualifiers in the estimation sample: means and standard deviations

Background Characteristics	NHG qualifier	NHG non-qualifier
Log of Marriage duration	1.43 (0.75)	1.60 (0.76)
(Log of Marriage duration) squared	2.62 (1.98)	3.13 (2.14)
Age at start of current marriage	35.02 (8.03)	38.45 (8.07)
Non-Adult Child (0/1)	0.78 (0.42)	0.79 (0.41)
Adult Child (0/1)	0.09 (0.29)	0.12 (0.33)
Disposable income household ($\times 10^5$)	0.23 (0.09)	0.38 (0.3)
Difference between household and personal income ($\times 10^5$)	0.13 (0.1)	0.16 (0.14)
Log of Age	3.65 (0.21)	3.76 (0.17)
(Log of Age) squared	13.38 (1.51)	14.19 (1.31)
Employment (0/1)	0.97 (0.17)	0.98 (0.14)
Log of Purchase Price	12.08 (0.23)	12.73 (0.36)
(Log of Purchase Price) squared	145.93 (5.5)	162.18 (9.3)
Regional house price growth rates	-0.01 (0.06)	-0.01 (0.07)
Live in four largest cities (0/1)	0.07 (0.26)	0.06 (0.24)
Financial Asset household ($\times 10^5$)	0.22 (0.58)	1.36 (5.8)
Number of observations (NxT)	22,944	22,456
Number of unique couples	7,200	

Explanatory note: Standard deviations in parentheses, Source, IPO (CBS), own computations

5 Empirical results

5.1 Empirical test of moral hazard

We formally test whether NHG participation induced strategic divorce among couples with negative home equity. Our sample includes couples that are married in year $t-1$. The regression discontinuity approach translates into the following linear probability model for divorce:

$$y_{i,t} = \beta_0 + \beta_1 NHG_{i,t-1} + \beta_2 UW_{i,t-1} +$$

$$\beta_3 (NHG_{i,t-1} * UW_{i,t-1}) +$$

$$\beta_4 Log\ of\ Purchase\ Price_i + \beta_5 (Log\ of\ Purchase\ Price)_i^2 +$$

$$\beta_6' X_{i,t-1} + \beta_7' Z_i + \gamma_{m,t} + \varepsilon_{i,t}. \quad (7)$$

Here, $y_{i,t}$ is an indicator variable that signifies whether (1) or not (0) couple i divorces or separates in year t. The hazard rate into divorce includes different elements. $NHG_{i,t-1}$ is an indicator for the NHG qualification in $t-1$, included to control for potential differences between borrowers that take out the insurance, and those that do not. There are many reasons why the insured and the uninsured may display differences in the propensity to divorce even in the absence of an underwater mortgage, and even when not making an insurance claim. Possible reasons could be differential risk aversion and demand for insurance, or different lifecycle risks associated with early career stages and family formation. $UW_{i,t-1}$ is an indicator variable for households whose outstanding mortgage debt in $t-1$ exceeds the market value of the housing collateral, the so called underwater (UW) status. Negative home equity may put couples under stress and threaten marital stability, but conversely it may also lock two partners into a marriage that would otherwise dissolve. Of particular interest is the interaction term, $NHG_{i,t-1} * UW_{i,t-1}$, where β_3 captures the effect on divorces of couples with an underwater mortgage but who are able to request a bail-out from the NHG. The NHG status cannot be manipulated by the household after having signed the NHG contract, while the UW position in principle could (by prepaying the mortgage), but we observe in the data that this in practice hardly ever happens. Using lagged values for these variables mitigates potential endogeneity problems, as it makes sure that divorce and value loss occur after qualifying for NHG insurance. We thus interpret β_3 as a causal effect of insurance on divorces. It is therefore an indicator of strategic behavior (either moral hazard or absence of lock-in effects during a downward cycle).

To reduce potential contamination of important correlated variables, we control for a range of other observable factors. $Log\ of\ Purchase\ Price_{\,i}$ denotes the natural logarithm of the house value at the time of purchase. It is fixed over time. This variable is relevant because it measures the proximity to the point of discontinuity (the threshold). We include also its squared term.

Divorces will in important ways be a function of individual and match-specific characteristics that we wish to control for. We add regressors $X_{i,t-1}$ consisting of a set of time-varying characteristics of couples in year $t-1$, as well as regressors Z_i denoting time-invariant variables. In X, we include indicator variables for adult and non-adult children, the log of age of the head of the household and its square, and the log duration of the current marriage and its square. In Z, we include the age at the start of the current marriage. These are meant to control for life cycle position, duration dependence, and initial condition of the marriage. It is also important to control for a measure of the household's total disposable income, and the intra-household distribution of resources (the difference between household and personal income), as the latter may directly influence intra-household bargaining weights that can be an important driver of marital dissolution. In addition, we include an employment

indicator that is equal to 1 if the household head is active on the labor market and zero otherwise. We also have an indicator identifying those living in one of the four largest cities in the Netherlands, where housing markets experienced more severe downturns during the crisis.

Lastly, the growth rate of regional house prices at municipality level, $\gamma_{m,t}$ (where m stands for municipality) is included in our model to capture generic time effects. $\varepsilon_{i,t}$ is a composite error term that also allows for individual-specific time-invariant heterogeneity through a random effects component. The main indicator in the analysis, NHG qualification, is indeed time-invariant.

Table 2 shows OLS results for equation (7). The table shows the importance of demographic determinants of divorce. In particular, the hazard rate into divorce correlates positively with log marriage duration and log of age of the household head and negatively with the age at the start of marriage, (non) adult children, and the difference between household disposable income and personal income. Having a child is negatively correlated with the divorce hazard. Couples with only non-adult children are less likely to divorce than those with both non-adult and adult children or with only adult children. Ceteris paribus, the divorce hazard rate of couples with only adult children would be estimated higher than that of couples without children. In larger municipalities, where house price drops had been larger, couple are less likely to divorce.

Table 2: Estimation results of divorce hazard at current time (t)

Dependent variable: dummy for divorcing couples	
NHG Qualification Indicator$_{t-1}$	0.0003
	(0.0022)
Underwater Households$_{t-1}$	-0.0004
	(0.0011)
NHG Qualification$_{t-1}$ × Underwater Households$_{t-1}$ **(β_3)**	0.0036**
	(0.0016)
Log of Marriage duration$_{t-1}$	0.0094***
	(0.0015)
(Log of Marriage duration) squared$_{t-1}$	-0.0044**
	(0.0021)
Age at start of current marriage	-0.0021**
	(0.001)
Non-Adult Child$_{t-1}$	-0.014***
	(0.0025)

Adult Child$_{t-1}$	-0.0047*
	(0.0026)
Non-Adult Child$_{t-1}$ × Adult Child$_{t-1}$	0.0073**
	(0.003)
Disposable household income$_{t-1}$	-0.0025
	(0.0022)
Difference between household and personal income$_{t-1}$	-0.0157***
	(0.0048)
Log of Age$_{t-1}$	0.2699*
	(0.1455)
(Log of Age) squared$_{t-1}$	-0.0254
	(0.0245)
Employment$_{t-1}$	-0.0031
	(0.0037)
Log of Purchase Price$_{t-1}$	-0.064
	(0.0581)
(Log of Purchase Price) squared$_{t-1}$	0.0025
	(0.0023)
Live in four largest cities dummy$_{t-1}$	-0.0051**
	(0.0024)
Regional house price growth rates	0.0024
	(0.0051)
Constant	-0.142
	(0.4172)
Number of Observations (NxT)	45,400
Number of Couples (N)	7,200

Explanatory note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10

The marginal effects of marriage duration and age of the head of household suggest that the chance to divorce increases by 0.001 for each additional year being married and by 0.0055 for each year that heads get older.[19]

The effects for NHG and having an underwater mortgage are positive and significant, meaning that we find that NHG participation had a positive effect on divorces for the group of underwater borrowers. This is consistent with either moral hazard or absence of standard lock-in effects, that point to the presence of strategic divorces.

Based on our estimates, we simulate divorces within sample for households with underwater mortgages when these qualify for the insurance and when they do not. Participation in the insurance

[19] The marginal effect of marriage duration derives from both log duration of the current marriage and quadratic term in the log duration of the current marriage. The former is calculated as its coefficient in Table 2 multiplied by a reciprocal of the sample mean of the marriage duration, which is 0.009*(1/5.81) =0.0015. The latter (quadratic term) is estimated as follows: -.0004*2*log(5.81)*(1/5.81) =-0.0005. Therefore, the marginal effect of the marriage duration would be the sum of those two estimated numbers (0.0015-0.0005=0.001). The marginal effect of the age of the head of the household is also produced in the same way, even though the coefficient of the latter one (quadratic term in the log age of household head) was not statistically significant.: (0.27*(1/41.53) - 0.025*2*log(41.53)*(1/41.53)= 0.0055).

has increased the hazard rate into divorce by about 0.36 percentage points (a relative effect of about 44%). This number is also in line with our earlier observation in Figure 3. In Table 3 we perform a range of robustness checks and placebo tests. As a first robustness check, in Specification A (Panel A in Table 3), we make the sample more homogeneous by selecting observations that are closer to the NHG threshold. Whereas in the baseline model of Table 2, the distance from that threshold is solely controlled via original valuation and its square, in specification A1 we limit the sample to those couples that are within 50% of the threshold on either side. Specifications A2 narrows the range even further, to the nearest 35% of the threshold value. In those two cases, we have fewer observations than the baseline sample (79% for A1 and 65% for A2 compared to the baseline, see Table 3). Specification A3 drops the top 5% of participants whose house values were just below the threshold in order to avoid contamination by those aiming at insurance qualification.

For the placebo tests, in specification B (see Panel B, Table 3) we make the NHG threshold equal to the median house value (thus including more home owners in the treatment group). We focus solely on β_3 and all deviations are relative to the baseline in Table 2. We see that the baseline effect stays (or becomes even higher) when we use the smaller sample in Specification A1 and A2. Specification A3 shows an estimate that is slightly higher than the baseline. This all suggests that our baseline results are robust and not driven by adverse selection.

Table 3: Different specifications for robustness checks and placebo effects

Coefficient of NHG qualification × Underwater households (β3)	Coefficient β_3	NxT
Baseline Estimation	0.0036**	45,400
Panel A: NHG qualification with range		
A1. within 50% of threshold	0.0044**	35,673
A2. within 35% of threshold	0.0048**	29,364
A3. drop top 5% from the NHG qualifiers	0.0038**	42,815
Panel B: Placebo effect		
would have NHG if the house value at purchase is above the median house value of that year	-0.003*	45,400

Explanatory note: *** p<0.01, ** p<0.05, * p<0.10

Specification B shows a negative coefficient when we create an artificial treatment group based on median house prices alone, a finding that in itself is not surprising.

5.2 Reunions

In the context of strategic divorce it is also interesting to check whether couples with insurance reunite more frequently after separating. The question is interesting because if divorces are strategically chosen to shed debt, then reunions may be more likely to happen after debt has been canceled, compared to the case that divorces during the crisis were closer to what they would have been had there been no lock-in effect. Reunions are a rare event, so we examine the entire population of divorcees without conditioning on being underwater. For this analysis, we use population data, where we look at those who divorced in 2009 or 2010 and observe their marital status and address three years later. We count those that had the same partner (matching the unique personal identification number) and we divide the set of households into separate subsamples by their NHG status and address.

Both groups in Table 4 show that about 1/3 of those who had divorced in 2009-2010 were no longer single three years later. About 1.2% of the NHG qualifiers (second column) had rejoined the same partner (person with the same identification code in the data) three years later, but at a different address than before the divorce (so they are now back together but in a new home); so they had sold their previous house. Couples without NHG (third column) had about half of the reunions (0.69%) at a different address.

Table 4: Reunions in the population data

3 years after the divorce in 2009 or 2010	NHG qualifier	NHG non-qualifier
Single	4,206	2,143
Couple (but with different ID code than before)	2,279	1,112
Reunion (in different address than before)	80	23
Lock-in (Stay together in the same address)	86	71
Total	6,651	3,349
Reunion rate	1.20%	0.69%
Lock-in rate	1.29%	2.12%

Source: CBS, own computations

We also look at the share of couples that, though divorced, still show both adults registered in the same house three years later. We call this a lock-in rate. Such observations might be connected to

the inability to sell the property or to register somewhere else. Those couples without NHG show a much higher lock-in rate (2.12% vs 1.29%).

Table 4 is suggestive of a differential behavior depending on insurance. While the recession would have induced those who intended to divorce to stay together because of financial reasons (see higher lock-in rates), insurance allowed some couples to divorce without preventing them from reuniting a few years later, even when the economic outlook was deteriorating. In this sense we interpret some divorces as being strategic, because these do not follow those of uninsured couples. So, combining this evidence with our estimation results, divorces were relatively more frequent among NHG couples as well as reunions, but their lock-in rates are in fact lower.

6. Summary and Conclusions

Using Dutch administrative data, we have analyzed the reasons for the very noteworthy but hardly discussed fact that divorce has increased disproportionately among participants in the residual mortgage debt insurance program (NHG), and among reimbursement applicants in the wake of the 2008-2011 financial crisis and the ensuing house price slump. We estimate the causal effect of NHG qualification on divorce and show that the scheme induces moral hazard, or the absence of lock-in effects associated with economic downturns. The effect on the hazard rate into divorce is considerable and statistically significant. It increases from 0.87% to 1.26%, which corresponds to a 44% higher divorce probability for households with an underwater mortgage. Since adverse selection issues are limited by the extremely high take up rates of insurance qualifiers during our observation window, we attribute the effect to moral hazard, possibly in the form of less frequent lock-in cases. In practice, this means that strategic divorces have taken place, aiming at cancelling residual mortgage debt upon selling a house with negative home equity or at facilitating a divorce by removing a potential financial burden. Moral hazard is also indirectly confirmed by the larger reunion rates of insured couples three

years after a divorce during the house price crash; about 1.2% of insured couples were then again cohabiting with the same partner but at a different address. This figure is twice the number for uninsured couples. Symmetrically, the share of those still cohabiting after a divorce at the same address, the lock-in rate, is twice as high for uninsured couples.

These findings call for a reform of the residual debt insurance system in the Netherlands, whereby insurance premiums or reimbursements could become more closely connected to the risks posed by the insurance contract, differentiating them by indebtedness level (loan to value ratio, for instance) and qualification criteria (disability or death could get higher coverage relative to divorce, for instance), respectively.

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Appendix:

Description of the NHG system

In the Netherlands a residual debt insurance applies. This insurance is called the Nationale Hypotheek Garantie (NHG). As noted by Lea (2011), the mortgage insurer is a government-owned fund, the so-called Homeownership Guarantee Fund (in Dutch: Waarborgfonds Eigen Woning). The fund is a private institution with fall-back agreements with the national and municipal governments. These agreements form the basis for interest-free loans to the Fund from the national and municipal governments at times when its assets are no longer sufficient to meet claims. This means that the Fund is able to comply with its payment obligations at all times. As a result, the Dutch central bank (in Dutch: De Nederlandsche Bank (DNB)) considers the NHG as a government guarantee. According to the figures shown by Lea (2011), mortgage default rates in the Netherlands are among the lowest internationally. This raises the question whether the low default rate is related to the NHG. Debt insurance may have significant effects. For example, De Haan (2003) finds that NHG affects monetary transmission, in the sense that a bank lending channel is operative in the Netherlands but only for unsecured lending and not for secured lending, possibly because loans with NHG get special treatment by banks.

A default is not strictly needed for the insurance to be activated. Those selling a property with an underwater mortgage, can apply for reimbursement of residual debt. The NHG will then reimburse

the bank and become the sole creditor of the mortgage owner. If specific conditions are met, the NHG will pardon debt fully if the mortgage was amortizing and partially if not. The specific conditions to qualify for pardoning depend on the reason for selling the house. If this was necessary due to unemployment, disability, death of a partner or divorce, NHG will pardon. Since 2014 also an affordability test can be carried out in specific cases.

This insurance system does not apply penalties to previous users. Once the insurance is activated and a household is reimbursed, this household is allowed to purchase a new loan, again with NHG. Also, when a house is sold, NHG will not allow a fire sale. If the house stays unsold and the value could drop significantly, NHG will buy the house and keep it until a proper market value can be realized.

Finally, NHG also serves as a standard setter for the mortgage market. They only grant insurance to borrowers that strictly respect the loan-to-income limit and would not accept to insure mortgages with a share of interest only loans above 50%.