

# Hypotheekcrisis's: de rol van financiële kennis en financieel advies

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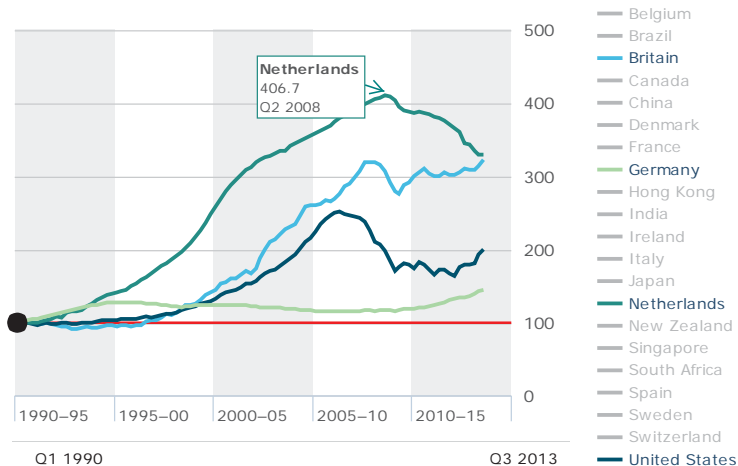
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Netspar workshop: Pensioenbewustzijn, Informatie en Gemaakte Keuzes  
PGGM, 1 Mei 2014

\*The views expressed in this presentation are those of the authors  
and do not necessarily reflect the views of De Nederlandsche Bank.

Figure: The Economist house-price index



Sources: FHFA; NVM; OECD; Office for National Statistics; Standard & Poor's; Statistics Netherlands; Thomson Reuters

# Motivation

- ▶ The financial crisis has shown that mortgage decisions can have a huge impact on the financial situation of a household and financial stability.
- ▶ Despite the housing recovery many households have negative equity:
  - ▶ 11m U.S. homes are 'underwater' and 3m-4m are in default;
  - ▶ In the Netherlands 25% have negative equity; default rates are relatively low but rising.
- ▶ Negative equity triggers default for households with payment problems.
- ▶ Result in serious financial problems or even bankruptcy (recourse loan).
- ▶ High mortgage debt and uncertainty about housing price developments might slowdown economic recovery.

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  - ▶ In the Netherlands 25% have negative equity; default rates are relatively low but rising.
- ▶ Negative equity triggers default for households with payment problems.
- ▶ Result in serious financial problems or even bankruptcy (recourse loan).
- ▶ High mortgage debt and uncertainty about housing price developments might slowdown economic recovery.
  - ▶ Iceland's government unveiled a \$1.25b mortgage debt relief program;
  - ▶ Dutch economists propose mortgage debt cancelation after a default;
  - ▶ Compulsory-purchase and refinance of mortgages by U.S. municipalities;
  - ▶ Use of compulsory pensions savings to pay off mortgage debt.

# Introduction

- ▶ Are borrowers completely aware of the risks of a mortgage loan?
- ▶ Default rates are high among borrowers with non-traditional mortgages (e.g. Mayer et al., 2009; Demyanyk and Hemert, 2011; Amromin et al., 2011) and among borrowers with a lower financial literacy (Gerardi et al., 2010).
- ▶ We know little about the mechanism.

We analyze the impact of financial literacy on 'risky' mortgage choice.

Do financially sophisticated households better understand the risks of their mortgage loan? Do they take out different mortgages? What is the role of financial advise?

Figure: 'Mortgage without advice' financial knowledge test



Financiële kennistest Weet wat je weet voor je geld besteedt

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## Hypotheken



### Vraag 1 van 15

Je ziet een advertentie voor een hypotheek. In de advertentie staan drie verschillende rentes. De eerste rente is 2,9 procent. De tweede is 4,7 procent en de derde is 5,2 procent. Welke rente je moet betalen hangt af van de periode die je afspreekt waarin de rente gelijk blijft. Die periode heet de rentevaste periode. Bij welke rente is die periode het kortst?

- A 2,9%.
- B 4,7%.
- C 5,2%.

## Questionnaire on mortgage risks

- ▶ We designed a special module for the DNB household survey (Dutch CenterERpanel) in June 2010.
  - ▶ Explicitly measuring the riskiness of a mortgage loan and perceived risk of different mortgage terms - instead of examining default behavior.
  - ▶ The financial literacy questions in our survey put special emphasis on the understanding of characteristics of loan contracts (Lusardi and Tufano, 2009).
  - ▶ Having a basic financial knowledge may be insufficient for complex debt decisions.

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  - ▶ The financial literacy questions in our survey put special emphasis on the understanding of characteristics of loan contracts (Lusardi and Tufano, 2009).
  - ▶ Having a basic financial knowledge may be insufficient for complex debt decisions.
- ▶ Dutch CenterERpanel is an internet based panel of over 2,000 households.
  - ▶ Representative of the Dutch population
  - ▶ The head and partner age 20 + are interviewed
  - ▶ 1464 members (1,185 households) participated in the survey (67%)
  - ▶ Homeownership rate is 74% of which 86% own a residential mortgage
  - ▶ Merged with DHS module on 'Accommodation & Mortgages' (80% match)

Financial features

Mortgage types



## Main results

- ▶ Individuals with a lower level of financial literacy are more likely to take out traditional mortgages and less likely to have an interest-only mortgage.
- ▶ Risky mortgages are characterized by a large loan amount, high mortgage payments and complex features such as linked investment vehicles and adjustable rates.
- ▶ Riskier mortgages are more prevalent among individuals with a better understanding of loan contracts as well as those who consult intermediaries for financial advice.
- ▶ Households who take out risky mortgages more often expect to encounter financial problems when housing prices decline or earnings losses occur.
- ▶ Less sophisticated persons who attach great importance to advice from an intermediary get riskier mortgages than more sophisticated persons.

## To measure Debt Literacy we use three questions designed by Lusardi and Tufano (2009)

1. Stel u gaat naar een bank en sluit een lening af van €3000. Vervolgens betaalt u iedere maand €30 aan de bank. Hoeveel jaar duurt het om de lening volledig af te lossen bij een jaarrente van 12% (1% per maand)?
  - (1) minder dan 5 jaar
  - (2) tussen de 5 en 10 jaar
  - (3) tussen de 10 en 15 jaar
  - (4) **nooit, u blijft een schuld houden**
  - (5) Ik weet het niet
2. Stel u koopt een huishoudelijk apparaat ter waarde van €1.000. U kunt op twee manieren betalen:
  - a) u betaalt het aankoopbedrag in 12 maandelijkse termijnen van €100
  - b) u sluit een lening af tegen een rente van 20% op jaarbasis en betaalt over een jaar €1.200 terug.Welke optie is voor u voordeliger?
  - (1) optie (a)
  - (2) **optie (b)**
  - (3) beide opties zijn gelijk
  - (4) Ik weet het niet

## Measuring financial literacy (Lusardi and Mitchell, 2007)

1. Suppose you had euro 100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?  
i) **More than euro 102** ii) Exactly euro 102 iii) Less than euro 102 iv) Do not know.
2. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?  
i) More than today ii) Exactly the same **iii) Less than today** iv) Do not know.
3. Buying a company stock usually provides a safer return than a stock mutual fund. True or false?  
i) True **ii) False** iii) Do not know.

Table 3: Percentage of correct and incorrect financial literacy and debt literacy questions

<i>Panel A. Percentage of correct answers</i>								
	Debt literacy questions			Financial literacy questions				
	1	2	3	1	2	3		
Correct	66.9	48.3	12.1	90.7	84.6	58.1		
Incorrect	21.0	35.7	76.7	3.2	6.0	11.5		
Do not know	12.1	16.0	11.2	6.1	9.4	30.4		
<i>Panel B. Number of correct answers</i>								
	None	1	2	3	4	5	6	Mean
Debt literacy	24.6	32.1	34.7	8.6	.	.	.	1.3
Financial literacy	6.1	6.9	34.6	52.5	.	.	.	2.3
Debt & fin. literacy	4.9	4.2	12.7	19.9	25.8	25.2	7.3	3.6

Notes: The first part of Panel A shows weighted percentages of correct debt literacy questions for all respondents of the questionnaire (N=1465). The final three columns report the distribution of answers to the financial literacy questions which were asked in a separate module. This module was answered by more than 90 percent of our sample (N=1324). Panel B displays the weighted number of correct answers for both separate modules and all six questions combined (N=1324). The statistics are weighted averages.

Debt literacy versus financial literacy

Table 5: Debt literacy and demographics

	Number of correct debt literacy answers				Mean
	None	1	2	All	
<b>Age classes</b>					
Above age 70 (n=249)	42.4	35.5	18.8	3.3	0.83
Age 60 to 69 (n=362)	27.1	32.9	33.0	7.0	1.20
Age 50 to 59 (n=353)	21.2	30.0	41.0	7.7	1.35
Age 40 to 49 (n=261)	19.2	30.2	37.1	13.5	1.45
Below age 40 (n=240)	19.2	32.9	38.3	9.6	1.38
Pearson $\chi^2$ statistic: $F(11.01, 16124.0) = 4.86, p\text{-value} = 0.00$					
<b>Gender</b>					
Men (n=788)	18.7	29.3	37.9	14.0	1.47
Women (n=677)	30.7	35.1	31.3	2.9	1.06
Pearson $\chi^2$ statistic: $F(2.97, 4352.0) = 19.1583, p\text{-value} = 0.00$					
<b>Education level</b>					
Master degree (n=197)	5.9	24.0	51.4	18.7	1.83
Bachelor degree (n=408)	18.3	29.2	41.2	11.3	1.45
Secondary (n=404)	26.2	36.5	32.0	5.3	1.16
Primary (n=456)	41.4	36.2	19.9	2.5	0.84
Pearson $\chi^2$ statistic: $F(8.79, 12870.9) = 16.0531, p\text{-value} = 0.00$					
<b>Homeownership status</b>					
Tenant (n=374)	33.3	37.9	24.3	4.5	1.00
Homeowner (n=1,091)	21.5	30.1	38.4	10.0	1.37
Pearson $\chi^2$ statistic: $F(2.93, 4289.1) = 10.3986, p\text{-value} = 0.00$					

Notes: (N=1465). The Pearson chi-squared statistic is corrected for the use of sample weights.

Table 6: Debt literacy versus self-assessed knowledge and experience

	Number of correct debt literacy answers				Mean
	None	1	2	All	
Self-assessed ability to originate a mortgage without advice					
Well able (n=171)	13.4	18.4	46.5	21.7	1.76
Able (n=316)	16.6	27.1	45.4	10.9	1.51
More or less able (n=298)	18.9	37.1	34.1	9.9	1.35
Poorly able (n=314)	24.5	33.5	37.5	4.5	1.22
Not able (n=133)	34.2	37.5	25.3	3.0	0.97
Do not know (n=51)	60.8	23.0	12.8	3.4	0.59
Pearson $\chi^2$ statistic: $F(17.12, 25067.7) = 7.55, p\text{-value} = 0.00$					
Self-assessed financial knowledge					
Very knowledgeable (n=40)	17.0	18.0	40.9	24.2	1.72
Knowledgeable (n=291)	15.3	28.5	38.9	17.2	1.58
More or less knowledgeable (n=808)	24.8	34.1	34.7	6.5	1.23
Not knowledgeable (n=268)	33.1	32.5	31.5	2.8	1.04
Pearson $\chi^2$ statistic: $F(11.61, 16998.9) = 4.97, p\text{-value} = 0.00$					
Times moved to an owner occupied house					
Never (n=346)	33.5	37.1	24.5	4.8	1.01
1 time (n=561)	24.1	34.1	32.6	9.3	1.27
2 times (n=364)	21.1	26.7	42.0	10.2	1.41
3 times (n=129)	16.8	31.5	39.7	12.0	1.47
4 times or more (n=65)	13.8	20.3	59.0	6.9	1.59
Pearson $\chi^2$ statistic: $F(11.59, 16961.8) = 3.93, p\text{-value} = 0.00$					

Notes: (N=1465). The Pearson chi-squared statistic is corrected for the use of sample weights.

Table 7: Financial advice versus debt literacy

	Number of correct answers				Total	p-value
	None	1	2	All		
<i>Panel A. What is your most important source of advice when you purchase a house?</i>						
Parents, friends or acquaintance	22.5	33.2	31.4	25.4	29.4	0.24
Information from the newspapers	2.1	2.8	3.4	9.3	3.5	0.00
Financial magazines, guides, books	6.9	9.3	16.0	20.8	12.3	0.00
Brochures from my bank or mortgage adviser	6.4	7.7	7.3	11.2	7.6	0.99
Bank or other institution who provide the mortgage	41.7	49.5	55.3	43.4	49.4	0.27
Professional (independent) financial advisers	46.6	56.3	58.2	51.8	54.4	0.28
Advertisements on TV or in other Media	0.7	0.4	0.5	0.0	0.5	0.50
Financial computer programs	4.0	4.0	5.5	10.4	5.1	0.08
Financial information on the Internet	15.2	22.7	36.3	36.6	27.4	0.00
Other sources	5.1	4.3	6.2	8.0	5.5	0.22
Do not know	13.4	3.8	0.7	1.4	4.5	0.00
<i>Panel B. Through which contractor have you taken out your mortgage?</i>						
Directly with a bank or other financial institution	42.5	42.4	44.2	44.1	43.4	0.92
Real estate agent, personal property agent, etc.	11.5	8.5	9.0	1.4	8.3	0.77
Insurance agent, insurance office, etc.	28.1	27.0	23.6	32.4	26.5	1.00
Hypotheekshop, Hypotheker, etc.	9.1	18.0	18.8	17.9	16.8	0.85
Employer, the Internet or otherwise	8.8	4.1	4.4	4.2	5.1	1.00

Notes: Panel A. (N=1283) The percentages do not sum up to a hundred percent because persons indicate multiple sources as important. The p-values have been adjusted to take into account that multiple tests are being conducted. Panel B. (N=531).

# Measuring mortgage risks

- ▶ The risks associated with a mortgage contract **for the consumer** can be classified into two important types - see also Campbell and Cocco (2003):
  - ▶ **Income risk** of being unable to meet mortgage payments;
  - ▶ **Wealth risk** of having a mortgage which exceeds the value of the property.
- ▶ Trade-off between both risks: e.g. Interest-only or Annuities vs. Linear.
- ▶ In addition, we measure the borrowers perception of the **overall riskiness of the own mortgage contract**:

“How do you characterize the risk profile of your current mortgage loan?”

- ▶ The perceived risk associated with the mortgage loan might not be consistent with the true underlying risk.
- ▶ We also measure the **perceived riskiness of six different mortgage features** (on a seven point scale from 1 corresponding to ‘no risk’ to 7 corresponding to ‘very risky’).



**Table 8: Response frequency regarding the perceived riskiness of the own mortgage**

<i>Overall riskiness (of the mortgage contract)</i>	Very risky	Some-what risky	Not very risky	No risk	Do Not Know
	1.8	27.0	46.3	21.2	3.7
<i>Income risk - Difficult to pay mortgage expenses under adverse unforeseen circumstances?</i>	Yes	No			Do Not Know
	64.6	31.4			4.1
<i>Wealth risk - Financial problems after a large house price decline?</i>	Yes	No			Do Not Know
	25.7	62.9			11.4
No financial problems <sup>a</sup>					
Substantial equity in my house	86.2				
Sufficient net worth to set off the losses	20.8				
Financial problems <sup>a</sup>					
Not enough funds to pay off the mortgage at maturity	57.4				
Results in inadequate savings to support retirement	11.2				
Results in financial strain	16.9				
Unable to move to another house	27.6				
Other	4.5				

*Notes:* (N=930). The questions are asked to all household members who have a residential mortgage on their property (748 households). We have 97 missing observations for the question regarding income risk as these individuals did not participate in the DHS module on Accommodation and Mortgages. The statistics are weighted averages.

<sup>a</sup> Does not sum to a hundred percent because respondents may provide multiple answers.

Table 9: Riskiness of the mortgage vs financial characteristics of the mortgage

	Mean	Overall riskiness			Income risk		Wealth risk	
		Some- what risky	Not very risky	No risk	Yes	No	Yes	No
Original LTV								
Low	0.58	20.7	45.7	33.5	52.4	47.6	12.0	88.0
Intermediate	0.97	21.7	53.6	24.7	59.1	40.9	27.8	72.2
High	1.15	42.6	44.7	12.7	85.7	14.3	40.4	59.6
Original LTI								
Low	3.69	21.4	46.1	32.5	59.6	40.4	26.7	73.3
Intermediate	6.56	44.8	46.6	8.6	85.2	14.8	45.2	54.8
High	12.60	41.2	44.2	14.6	85.9	14.1	56.1	43.9
Current LTV								
Low	0.16	9.6	45.9	44.5	36.3	63.7	6.9	93.1
Intermediate	0.46	29.7	49.3	21.0	67.0	33.0	14.2	85.8
High	0.91	42.4	48.1	9.5	87.7	12.3	52.2	47.8
Current LTI								
Low	1.25	8.2	50.1	41.7	41.6	58.4	7.8	92.2
Intermediate	3.24	32.4	46.7	20.9	64.8	35.2	17.5	82.5
High	6.57	42.0	47.4	10.7	87.0	13.0	51.8	48.2
Current PTY								
Low	0.14	12.1	50.6	37.3	44.5	55.5	10.3	89.7
Intermediate	0.32	25.7	52.2	22.2	67.5	32.5	26.3	73.7
High	0.63	44.4	42.6	13.0	82.7	17.3	41.5	58.5

Notes: (N=680). The statistics are weighted averages. P-values of the Pearson chi-squared test are all  $\leq 0.01$  (not-reported in table). The Pearson chi-squared statistic is corrected for the use of sample weights.

Table 10: Riskiness of the mortgage vs features of the mortgage

	Mean	Overall riskiness			Income risk		Wealth risk	
		Some- what risky	Not very risky	No risk	Yes	No	Yes	No
Mortgage type								
Full amortization	9.1	10.9	36.5	52.5	54.1	45.9	15.0	85.0
Endowment	30.9	22.5	60.2	17.3	77.7	22.3	31.3	68.7
Interest only	45.4	28.0	47.0	25.0	58.8	41.2	24.5	75.5
Investment	10.2	71.7	21.6	6.6	80.5	19.5	33.2	66.8
Other mortgage	4.5	35.7	53.1	11.2	80.5	19.5	53.8	46.2
Pearson $\chi^2$ test:		$p$ -value = 0.00			$p$ -value = 0.00		$p$ -value = 0.04	
Adjustable rate mortgage (ARM)								
No	91.9	29.2	48.5	22.3	67.9	32.1	28.0	72.0
Yes	8.2	34.0	41.0	25.0	61.7	38.3	26.9	73.1
Pearson $\chi^2$ test:		$p$ -value = 0.62			$p$ -value = 0.38		$p$ -value = 0.87	
National Mortgage Guarantee (NMG)								
No	66.8	30.1	45.3	24.6	64.6	35.4	26.0	74.0
Yes	33.2	28.6	53.1	18.4	73.2	26.8	31.9	68.1
Pearson $\chi^2$ test:		$p$ -value = 0.21			$p$ -value = 0.05		$p$ -value = 0.21	
Originated through an intermediary								
No	43.4	21.6	48.1	30.3	58.6	41.4	23.4	76.6
Yes	56.6	35.9	47.7	16.4	74.1	25.9	31.6	68.4
Pearson $\chi^2$ test:		$p$ -value = 0.00			$p$ -value = 0.00		$p$ -value = 0.07	

Notes: (N=680). The Pearson chi-squared statistic is corrected for the use of sample weights.

# Results on financial literacy and mortgage risks

**Table:** Financial literacy and perceived riskiness of different features of the mortgage loan

	Mean / Std. Dev.	Debt literacy	Financial literacy	Ability to originate a mortgage	Financial knowledge
<i>Panel A. Regression results without controls</i>					
Short fixed term	4.87	-0.015	-0.071	-0.084***	0.034
High loan-to-value ratio	6.20	0.017	0.096*	0.019	-0.040
High mortgage expenses	5.98	0.071*	0.047	-0.006	-0.051
Interest-only mortgage	4.18	-0.121***	-0.143***	-0.151***	-0.112**
Investment based mortgage	5.78	0.001	0.066	-0.015	-0.044
Adjustable rate mortgage	5.00	-0.056	-0.019	-0.086***	-0.031
<i>Panel B. Regression results with controls</i>					
Short fixed term		-0.029	-0.075	-0.068**	0.031
High loan-to-value ratio		0.078*	0.129**	0.007	0.008
High mortgage expenses		0.127***	0.074	-0.008	-0.012
Interest-only mortgage		-0.060	-0.059	-0.093***	-0.048
Investment based mortgage		0.051	0.115**	-0.015	0.001
Adjustable rate mortgage		-0.051	-0.008	-0.066**	-0.024
Observations		1100	1003	1088	1092

*Notes:* (N=1100). The coefficient is derived from an ordered probit model in which the perceived riskiness is the dependent variable and the financial literacy measure is the independent variable. The debt (financial) literacy measure is based on the number of correct answers to three debt (financial) questions.

Panel B. estimates an ordered probit model with control variables which include: marital status, gender, age groups, educational level, monthly household income (quartiles), financial situation, homeownership status, children, employment status, risk and time preferences and number of times moved to an owner occupied house. Significant at the \*\*\* 1 percent; \*\* 5 percent; \* 10 percent level.

Table 14: Riskiness mortgage loan

	[1]	[2]
Current Loan-to-value (LTV)	0.969***	0.999***
Current Payment-to-net income (PTI)	0.904***	0.862***
Adjustable rate mortgage (ARM)		0.455**
Endowment mortgage		0.063
Other mortgage		-0.167
Full amortization		-0.24
Investment based mortgage		1.231***
cut1		
Constant	0.431***	0.436**
cut2		
Constant	1.900***	1.975***
Pseudo R-squared	0.09	0.13

*Notes:* (N=484). The table reports the regression coefficients from an ordered probit model. The dependent variable is the perceived riskiness of the own mortgage loan which has a response scale from 0 (no risk at all) to 2 (somewhat risky). We combine the risky group and somewhat risky group. The second column includes indicators for the type of mortgage and an indicator for having an ARM versus FRM. The indicator for having an interest-only mortgage is the omitted category. The investment based mortgage type is interacted with the financial characteristics of the mortgage (i.e. LTV ratio and PTI ratio). Both specifications include controls for the year of origination of the mortgage loan.

\*\*\* Significant at the \*\*\* 1 percent; \*\* 5 percent; \* 10 percent level.

## Predicted mortgage risk and Debt literacy (regression results)

Literacy score	0.121**	0.065*	0.070**	0.058*	0.054*
All questions Do not know	0.061	0.027	0.045	0.022	0.015
<i>Socioeconomic controls</i>					
Master degree		-0.041	-0.03	-0.026	-0.032
Bachelor degree		0.017	0.022	0.027	0.026
Secondary education		0.025	0.027	0.044	0.033
Above age 70		-0.795**	-0.648**	-0.658**	-0.641**
Age 60 to 69		-0.575**	-0.505**	-0.489**	-0.473**
Age 50 to 59		-0.537**	-0.484**	-0.456**	-0.425**
Age 40 to 49		-0.259**	-0.223**	-0.200**	-0.183**
Women		-0.120*	-0.117*	-0.105	-0.105
Married		-0.092	-0.092	-0.088	-0.093
Children		-0.068	-0.072	-0.074	-0.103
Net hh income > 3500		0.145	0.123	0.067	0.106
2750 < Net hh income < 3500		0.066	0.05	0.004	0.032
2000 < Net hh income < 2750		0.013	0.019	-0.032	-0.027
Retired		-0.212**	-0.226**	-0.222**	-0.201**
⋮			⋮	⋮	⋮
Constant	0.018	0.663**	0.608**	0.515**	0.569**
Adjusted R-squared	2.4	21.0	25.9	28.8	29.9

Notes: (N=466). The literacy score measure is equal to the number of correct answered literacy questions. We control for respondents who answer 'don't know' to all three literacy questions with an indicator variable.  
 \*\* Significant at the 5 percent level; \* Significant at the 10 percent level;

## Predicted mortgage risk and Debt literacy (continued)

Literacy score	0.121**	0.065*	0.070**	0.058*	0.054*
All questions 'Do not know'	0.061	0.027	0.045	0.022	0.015
<i>Socioeconomic controls</i>	No	Yes	Yes	Yes	Yes
<i>Most important sources of information</i>					
Issued through an intermediary			0.175**	0.169**	0.175**
Intermediary			0.184**	0.203**	0.190**
Lender			0.046	0.028	0.025
Family and friends			-0.1	-0.092	-0.091
Published sources			-0.022	-0.029	-0.017
<i>Most important sources of information × Literacy Score</i>					
Issued through an intermediary			0.021	0.012	0.004
Intermediary			-0.113*	-0.114*	-0.096
Lender			0.027	0.032	0.017
Family and friends			-0.129*	-0.112	-0.117
Published sources			-0.038	-0.047	-0.046
<i>Risk-, time preferences and experience</i>					
Low perceived mortgage risk				0.099**	0.096**
Risk averse				0.006	0.005
Low time-preference				-0.026	-0.021
Times moved				0.101**	0.090**
<i>Financial and housing market expectations</i>					
Good financial situation					-0.122**
Better financial situation in 5 yr					0.103
Housing price movement next 2 yr					0.01
Constant	0.018	0.663**	0.608**	0.515**	0.569**
Adjusted R-squared	2.4	21.0	25.9	28.8	29.9

Notes: (N=466). \*\* Significant at the 5 percent level; \* Significant at the 10 percent level. The variables are centered.

## Predicted mortgage risk and Basic financial literacy

Literacy score	0.119**	0.042	0.08	0.066	0.055
All questions 'Do not know'	0.614**	0.555**	0.677**	0.655**	0.599**
<i>Socioeconomic controls</i>	No	Yes	Yes	Yes	Yes
<i>Most important sources of information</i>					
Issued through an intermediary			0.198**	0.190**	0.193**
Intermediary			0.154**	0.180**	0.170**
Lender			0.036	0.021	0.016
Family and friends			-0.114*	-0.102	-0.098
Published sources			-0.005	-0.018	-0.004
<i>Most important sources of information × Literacy Score</i>					
Issued through an intermediary			-0.026	-0.027	-0.009
Intermediary			-0.046	-0.039	-0.028
Lender			0.097	0.097	0.112
Family and friends			0.018	0.013	0.005
Published sources			-0.022	-0.02	-0.018
<i>Risk-, time preferences and experience</i>					
Low perceived mortgage risk				0.103**	0.102**
Risk averse				0.01	0.008
Low time-preference				-0.021	-0.015
Times moved				0.102**	0.091**
<i>Financial and housing market expectations</i>					
Good financial situation					-0.110*
Better financial situation in 5 yr					0.117*
Housing price movement next 2 yr					0.011
Constant	-0.125	0.629**	0.504**	0.405**	0.468**
Adjusted R-squared	1.25	21.69	25.97	29.09	30.21

Notes: (N=466). \*\* Significant at the 5 percent level; \* Significant at the 10 percent level. The variables are centered.



## Conclusion

- ▶ Riskier mortgages are originated by more sophisticated individuals and by households who gather financial advice from intermediaries.
- ▶ Less sophisticated individuals do not more often consult financial advisers (and neither family members or friends) when making a mortgage decision than more knowledgeable individuals.
- ▶ Financially sophisticated borrowers more often gather information themselves to find out the best mortgage instead of relying on advice from the field. This way, financially capable borrowers save the costs of financial advice.
- ▶ Suggestive evidence that less sophisticated persons who attach great importance to advice from an intermediary get riskier mortgages than more sophisticated persons.
- ▶ Financial literacy measure - which has proved to be a good predictor of stock market participation and retirement - is less capable to predict mortgage decisions than the debt literacy measure - which is specifically addressed to measure the understanding of debt contracts.

## Policy implications

- ▶ Important to safeguard that mortgage advice is independent and that consumers are informed about the risk characteristics of the menu of choice options.
- ▶ As from January 2013, the Dutch government has prohibited the commission to intermediaries for the origination of mortgages.
- ▶ High brokerage fees, might discourage homeowners to gather financial advice.
- ▶ The good news from a financial stability perspective is that the homeowners that did not ask for independent advice in our sample have taken out less complex and more conservative mortgages.
  
- ▶ Mandatory financial knowledge test to get a 'mortgage without advice'.
- ▶ Mandatory financial counseling for prospective borrowers of risky mortgages. Mandatory counseling (fee) results in the origination of less 'risky mortgages' in the U.S. (Agarwal et al., 2014).

Table 1: Financial features of the mortgage loan

	N	LTV ratio		LTV > 100%		LTI ratio		CPTI
		OLTV	CLTV	OLTV	CLTV	OLTI	CLTI	
<i>Panel A. Year of purchase of the house</i>								
After 2007	44	1.03	0.85	67.3	25.2	9.08	5.89	0.57
2004 to 2007	98	0.96	0.81	53.0	16.8	8.88	5.72	0.51
2000 to 2003	63	0.90	0.67	41.5	5.90	5.60	4.04	0.39
1996 to 1999	69	0.92	0.49	43.1	0	6.23	3.31	0.35
1990 to 1995	91	0.94	0.36	25.0	1.81	.	2.35	0.27
Before 1990	166	0.87	0.28	17.5	0.47	.	2.42	0.26
<i>Panel B. Age groups</i>								
Above age 70	72	0.75	0.26	11.8	0	6.01	2.36	0.23
Age 60 to 69	126	0.87	0.40	22.9	0.59	6.39	3.10	0.32
Age 50 to 59	136	0.89	0.45	30.4	1.24	6.13	3.20	0.33
Age 40 to 49	107	0.97	0.61	45.4	6.65	9.06	4.14	0.43
Below age 40	90	1.03	0.82	62.1	22.6	8.81	5.23	0.47
Mean		0.93	0.55	38.1	7.30	7.97	3.80	0.38

Notes: (N=531). The statistics are weighted averages.

Table 2: Mortgage types

	N	Mortgage type (percent)					ARM	Refinanced
		Full Amortization	Endowment	Interest-only	Investment based	Other		
<i>Panel A. Year of purchase of the house</i>								
After 2007	44	1.15	41.5	45.8	3.32	8.21	6.97	4.73
2004 to 2007	98	4.77	32.4	45.8	8.66	8.35	1.60	6.21
2000 to 2003	63	4.85	22.5	45.7	22.1	4.86	12.2	30.8
1996 to 1999	69	1.27	45.4	34.8	17.6	0.82	4.78	28.3
1990 to 1995	91	11.6	36.5	40.9	11.1	0	11.7	38.5
Before 1990	166	18.4	18.2	56.9	5.88	0.71	15.0	65.4
<i>Panel B. Age groups</i>								
Above age 70	72	19.7	2.34	77.2	0.78	0	13.1	45.1
Age 60 to 69	126	13.4	9.90	67.5	8.62	0.59	9.55	47.4
Age 50 to 59	136	7.72	29.4	47.7	12.8	2.40	15.1	37.6
Age 40 to 49	107	4.16	42.5	35.2	14.6	3.55	5.52	25.3
Below age 40	90	4.54	50.9	24.9	11.1	8.48	3.87	16.7
Mean		8.41	31.1	46.1	10.8	3.52	8.97	32.5

Notes: (N=531). The statistics are weighted averages.

Table 4: Debt literacy versus financial literacy

	Number of correct answers for financial literacy				
	None	1	2	All	Mean
<i>Panel A. Number of correct answers for debt literacy</i>					
None (n=353)	80.6	47.2	28.3	12.1	1.72
1 (n=442)	15.3	39.2	36.4	29.7	2.35
2 (n=430)	4.1	13.6	29.6	44.4	2.63
All (n=99)	0.0	0.0	5.6	13.9	2.79
Pearson $\chi^2$ statistic: $F(8.76, 11595.1) = 22.76, p\text{-value} = 0.00$					
<i>Panel B. Answers debt literacy Question 3.</i>					
Option (a) (n=407)	13.8	41.4	31.9	27.8	2.34
Option (b) (n=145)	0.0	1.4	9.5	17.3	2.72
They are the same (n=625)	15.0	39.0	47.5	52.2	2.48
Do not know (n=147)	71.2	18.2	11.0	2.7	1.21

Notes: (N=1324). The statistics are weighted averages. The Pearson chi-squared statistic is corrected for the use of sample weights.

Table 12: Fin. literacy and financial mortgage attributes

	Debt literacy	Financial literacy	Ability to originate a mortgage	Financial knowledge
<i>Panel A. Regression results without controls</i>				
Current LTV	0.037**	0.005	-0.035***	0.042**
Current LTI	0.181*	-0.146	-0.105	0.208
Current PTI	0.023**	-0.002	0.003	0.027**
Original LTV	-0.019	-0.008	-0.018	0.015
Original LTI	-0.093	0.176	-0.477	-0.100
<i>Panel B. Regression results with controls</i>				
Current LTV	0.007	-0.035**	-0.020*	-0.004
Current LTI	0.080	-0.247*	-0.019	-0.023
Current PTI	0.012	-0.014	0.011	0.007
Original LTV	-0.033*	-0.019	0.000	0.007
Original LTI	-0.647*	-0.217	-0.373	-0.382

*Notes:* (N=517). The correlation coefficient is derived from a OLS regression in which the mortgage feature is the dependent variable and the financial literacy measure is the independent variable. The first regression specification (Panel A.) does not include other control variables, while the second specification (Panel B.) includes: marital status, gender, age groups, educational level, monthly household income (quartiles), financial situation, children, employment status, risk and time preferences, number of times moved to an owner occupied house, and years since origination of the mortgage.

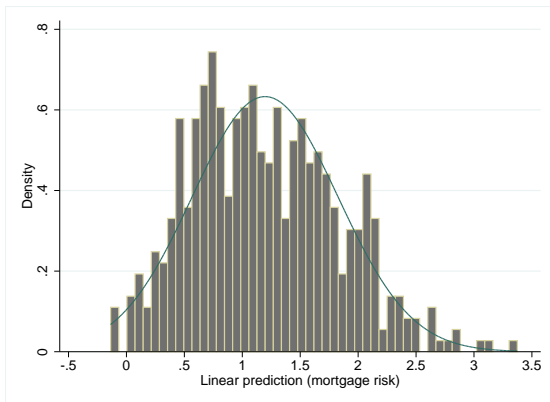
Significant at the \*\*\* 1 percent; \*\* 5 percent; \* 10 percent level.

Table 13: Fin. literacy and mortgage type

	Debt literacy	Financial literacy	Ability to originate a mortgage	Financial knowledge
<i>Panel A. Regression results without controls</i>				
Full amortization	-0.003	-0.029*	-0.014	-0.033*
Endowment	0.002	-0.023	-0.038**	-0.013
Interest-only	0.009	0.050*	0.052***	0.069**
Investment based	-0.007	-0.005	-0.006	-0.025
Adjustable rate mortgage (ARM)	0.011	-0.023	0.012	-0.015
<i>Panel B. Regression results with controls</i>				
Full amortization	-0.026*	-0.037**	-0.009	-0.052***
Endowment	0.016	-0.008	-0.054***	0.003
Interest-only	0.012	0.046	0.072***	0.064**
Investment based	0.001	0.004	-0.003	-0.010
Adjustable rate mortgage (ARM)	0.013	-0.025	0.005	-0.018

Notes: N=517. The correlation coefficient is derived from a OLS regression (ARM) and a multinomial logit regression (mortgage type) in which the mortgage feature is the dependent variable and the financial literacy measure is the independent variable. The first regression specification (Panel A.) does not include other control variables, while the second specification (Panel B.) includes controls (see Table 12). \*\*\* Significant at the \*\*\* 1 percent; \*\* 5 percent; \* 10 percent level.

**Figure:** Distribution of predicted mortgage risk on the basis of the features of the mortgage loan



The graph shows the histogram of the predicted mortgage risk. A normal density function is plotted in the graph.