Mortgage Amortization and Wealth Accumulation

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Asaf Bernstein University of Colorado at Boulder & NBER Peter Koudijs Stanford GSB & NBER

Bernstein & Koudijs Mortgage Amortization and Wealth Accumulation

Summary

"One nice thing about investing in a house is that you're committed to a mortgage payment. So if you don't take out a home equity line of credit or do something like that, you will accumulate wealth." Nobel Laureate Robert Shiller (CNN Dec 4th, 2014)

- 1) Standard mortgages = loan + repayment plan (amortization)
- 2) These amortization "illiquid savings" plans are immense (In U.S. \$100s of bil/yr → comparable w/ pension programs)
- 3) First causal evidence of effect on wealth \rightarrow substantial (\$1 amortization $\rightarrow \sim$ \$1 wealth)
- 4) Implications for homeownership and wealth building/inequality, debt-savings fungibility, and macroprudential policies

The Basics

What is a **mortgage**?

Standard **Mortgage** = Loan + Repayment Plan (Amortization)

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Standard Mortgage = Loan + Repayment Plan (Amortization) expenses

Interest



The Basics

What is a **mortgage**?

Standard Mortgage = Loan + Repayment Plan (Amortization) expenses savings Interest + Debt Repayment Lender **Home Equity** Parker et al. 13', Di Maggio et al. '17,... (+) This paper

What is the effect of mortgage amortization on wealth accumulation?

Wealth Accumulation = Mtg Amortization (Repayment) + Net (non-mtg) Savings

Fungibility
$$(F) \coloneqq -\frac{\partial S}{\partial A}$$

Wealth Elasticity
$$(\epsilon_W) \coloneqq \frac{\partial W}{\partial A} \coloneqq 1$$
- Fungibility

 H_0 : No effect - perfect fungibility between savings and debt repayment

 H_a : Some effect - imperfect fungibility

What is the effect of mortgage amortization +\$1 on wealth accumulation?

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\$0 \$0 "leakage" Wealth Accumulation = Mtg Amortization (Repayment) + Net (non-mtg) Savings

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+\$1

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+\$1 -\$1 "crowdout" Wealth Accumulation = Mtg Amortization (Repayment) + Net (non-mtg) Savings

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- Fungibility= **0**

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What is the effect of mortgage amortization +\$1 on wealth accumulation?

+\$1 +\$1 \$0 Wealth Accumulation = Mtg Amortization (Repayment) + Net (non-mtg) Savings Income - Fungibility $(F) \coloneqq -\frac{\partial S}{\partial A} = \mathbf{0}$ Expenses Wealth Elasticity $(\epsilon_W) \coloneqq \frac{\partial W}{\partial A} \coloneqq 1$ - Fungibility= **1**

 H_0 : No effect - perfect fungibility between savings and debt repayment

- H_a : Some effect imperfect fungibility
- > If H_a : what is the level of fungibility F and therefore elasticity ϵ_W ?

What is the effect of mortgage amortization +\$1 on wealth accumulation?

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-\$1 Expenses

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What is the effect of mortgage amortization on wealth accumulation?

Do they reduce other savings

 $\epsilon_W = 0$

or cut expenses/leisure

 $\epsilon_W = 1$

or **both**?

 $\epsilon_W \in [0,1]$

1) Debt repayments & savings co-determined (obviously)

2) Detailed administrative household-level wealth information

Our approach

1) Natural Experiment from Dutch Macroprudential Policy

Jan-2013 remove tax benefits/conformability of incremental IO mtgs

2) Administrative data

Tax records of assets, income, and liabilities for entire population for 2007-2016

3) Design

Wealth accumulation for homebuyers before vs. after Jan-2013

Our macroprudential shock



Preview of Findings

1) $\Delta \in 1$ amortization increases wealth $\in 1$ ($\epsilon_W \sim 1$)

- \blacktriangleright Little debt-savings substitutability ($F \sim 0$)
- Not selection: Holds for only life-event driven purchases (ex. timing of birth of child)
- Not "non-savers": Holds for HHs who save substantially

2) "Paid" for with income and expenditures

→ Higher wealth paid for with higher income(~1/4th) and lower expenditures (~3/4th)

Dutch Mortgage Environment in 2012

Harsh recourse laws (think harsher than U.S. student loans)

- Little role for strategic default orders of magnitude lower default rates than U.S. in crisis peak
- Origination LTVs>100%

Regulatory DTI limits

DTI max computed as if 30yr amortizing loan (<u>not affected by the regulation</u>)

➢ New mortgages typically 50% interest-only

External validity: IO mtg isn't weird subsample & most have some amortization

The Regulation

"Financial Stability" program

Announced in '12 (passage uncertain til Oct) starting January 1st, 2013

- Based on date purchase contract, not close date (typically >2 months later)
- ➢ For close dates, "treatment" will start after March 1st, 2013

Afterwards only 30-year fully amortizing mortgages eligible for MID

> Applies to incremental loans, so fully to first-time homebuyers and partially to other buyers

Data and Definitions

$\Delta Wealth^{1,2} \equiv \Delta Assets - \Delta Liabilities$

Assets ≡ Deposits (tax records confirmed by banks) +Stocks (tax records confirmed by banks) +Bonds (tax records confirmed by banks) +Voluntary Pension (implied from tax records)

$\begin{array}{l} Liabilities \equiv Mortgages \ (tax \ records \ confirmed \ by \ banks + \ registry) \\ + Other \ liabilities \ (credit \ registry) \end{array}$

¹ Wealth does NOT include value of human capital (which we explore separately)

² Accurate annual house values limited, but can/do look at assessed values

Summary Stats – Our Sample

Universe of all 111,523 first-time time homebuyers in Netherlands in 2012/2013

Relatively High Income

Pre-tax household income as of '11 (mean €58k; median €54k)

Relatively Young

➢ Oldest person in household as of '14 (mean 38; median 36; 90th-tile 52)

Highly Levered

- Balance '14 (mean €203k; median €187k)
- ➤ LTV '14 (median 105%; 25th percentile 101%)

Most have liquid financial savings

- ► Level as of '14 (mean $\in 18k$; median $\in 8k$; $25^{\text{th}} \in 2.6k$)
- Substantial variability within household over time (esp. in years of job loss)

Effect on MTG Repayment (1st stage)



Hypothetical under perfect fungibility



Effect on Financial Assets



Effect on Non-MTG Liabilities



Net Effect on Non-Housing Wealth



Net Effect on Wealth



No bunching or evidence of selection



Robust to Life-Event Date



MTG Amort & AWealth

	1 st Stage	RF	IV	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
	MTG	$\Delta Wealth$	$\Delta Wealth$	∆Non-Home	$\Delta Wealth$	$\Delta Wealth$
	Repaid '15	' 15	' 15	Wealth '15	' 15	' 15
Post	2045.0***	2030.8^{***}				
	(19.22)	(14.34)				
MTG Repaid '15			0.993***	-0.007	0.864^{***}	0.997^{***}
_			[0.88,1.10]	[-0.12,0.11]	[0.54,1.19]	[0.84,1.15]
			(17.62)	(-0.09)	(5.26)	(12.80)
Life-Event Buyers	_	_	_	_	Y	-
Fin Asset '15 $ \Delta$	-	-	-	-	-	>10k >3k
IV	-	-	Post	Post	Post(life)	Post
F-Stat	-	-	369.3	369.3	42.3	223.0
Obs	42,468	42,468	42,468	42,468	16,581	22,005
Adj. R-sq	0.020	0.011	0.331	0.002	0.355	0.252

1-3: MTG repaid & wealth rise $\sim \in 2k \rightarrow \epsilon_w \sim 1$

4: $F \sim 0$

5: Holds using timing of "life-event" (ex. birth of child)

6: Holds for those with who save substantial amounts of financial assets

Not shown (in paper): Robust to concerns about MID or other potential concurrent events, sample used, wealth measures (ex. levels, including real estate or not), and standard errors

How do they "pay" for Δ wealth?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ΔIncome	Δ #Earners	ΔIncome	∆Income	ΔIncome	Income	Income
	'15-'12	'15-'12	'15-'12	'15-'12	'15-'12	'15	'12
Post	1270.1^{***}	0.0239***	364.2				
	(7.71)	(3.36)	(1.59)				
∆Hrs Worked			10.52^{***}				
'15-'12			(40.62)				
MTG Repaid '15				0.621***	0.576^{***}	0.457^{**}	-0.119
•				[0.38,0.87]	[0.29,0.90]	[0.05, 0.79]	[-0.39,0.04]
				(4.97)	(3.83)	(2.20)	(-1.60)
Muni FE	Ν	Ν	Ν	Ν	Y	Y	Y
Add. Cntrls	Ν	Ν	Ν	Ν	Y	Y	Y
IV	-	-	-	Post	Post	Post	Post
F-Stat	-	-	-	369.3	141.6	141.6	141.6
Obs	42,468	42,468	42,468	42,468	40,352	40,352	40,352
Adj. R-sq	0.001	0.001	0.175	0.001	-0.046	-0.005	-0.015

1-3: HHs increase income via more earners & hrs worked (labor supply, rest expenditures)

4: 36% "paid for" w/ higher income (gross HH incomes, so Net ~ Gross × [1-42%])

- 5: Holds with controls for pre-reg income/assets
- 6-7: Driven by income in '15 not '12 \rightarrow 26% paid for w/ income

Possible mechanisms

(1) Liquidity wedge DeFusco & Mondragon '19, ...

➤ Illiquid savings ≠ liquid savings for short-term consumption smoothing

- Constrained by positive equity (risky) and own income (state of the world where you need it!)
- > Inconsistent: $F \sim 0$ and no variation by amount of liquidity, "weird" EIS alter consumption/labor today and ongoing to avoid any risk (at all) in the future...

(2) Behavioral

- (a) Default setting Madrian and Shea '01, Chetty et al. '14, Beshears et al. '19,...
- (b) Commitment device Kovacs and Moran '19, Vihriala '19,...
- (c) Mental accounting Thaler '80, Kahneman & Tverskey '84, Camanho & Fernandes '18,...

(3) Combination?

- Heuristic ("rule of thumb") liquidity targets ("rain day fund")
- "Perceived precautionary savings motive" Olafsson & Pagel '17, Aydin '19, D'Acunto et al' 2020,...

Consistent w/ Existing Work

- (1) Debt forgiveness & consumption (U.S.) Ganong & Noel '19
- > Increased liquidity (maturity extensions) for distressed \rightarrow large change in consumption
- (2) Mortgage run-offs (U.S. & others) Coulibaly & Li '06; d'Astous '17; Andersen et al. '19
 After loans fully paid go from regular (mostly) principal payments to nothing
- Muted changes in savings, bigger changes in consumption & income
- (3) Borrowers selecting IO (U.S. & others) Larsen et al. '18, Amoromin et al. '18,...
- Higher consumption and default more

(4) Elderly household balance sheets (U.S. & others) Kaplan et al. '14

- Substantial home equity (little/no mortgage debt), but few liquid assets
 - "Wealthy hand-to-mouth"
- > Even more than pensions, intertemporal substitution in amortization may be costly...

Potential for Persistence



1) Fully amortizing borrowers (U.S.) don't completely "undo" amortization

- 2) Partially amortizing borrowers (Dutch) don't amortize on their own
- Median non-housing financial assets for all 60-65 year-olds w/ a mortgage is only €26k
- ϵ_W ~1 for 50+ yr-olds and 4yrs after reg (when treatment>median non-housing wealth)

Conclusion/why do we care?

\uparrow mortgage amortization \rightarrow wealth accumulation \uparrow

1) Micro Beshears et al. '19,...

>1/3rd of U.S. households have an amortizing mortgage

Fungibility of debt repayment vs savings (some macro models might need adjustments)

2) Public Economics/Aging Li and Yang '10, Sodini et al. '17,...

In U.S. \$100s of billions/year \rightarrow comparable w/ pension programs

- MTG Design and retirement policies (If you care about pensions you should care about amortization!)
- Homeownership & wealth building/inequality (ex. racial differences)

3) Macroprudential Policy Campbell et al. '19; Guren et al. '19,...

In U.S. 2 years of amortization \sim first 4 yrs of TARP payments post Great Recession

- Ex-post: Reduced repayment plans (interest-only/maturity extensions)
- Ex-ante: Do HHs undo regulation intent (by altering savings)?
 - ➤ The "30 yr" mortgage is arbitrary. What about 20? 40?

THANK YOU