

Household debt and spending in the United Kingdom

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CASE Welfare Policy and Analysis Seminar, LSE
11 May 2016

* This work represents the views of the authors and does not necessarily reflect the views of the Bank of England, the Monetary Policy Committee, the Financial Policy Committee or the PRA.



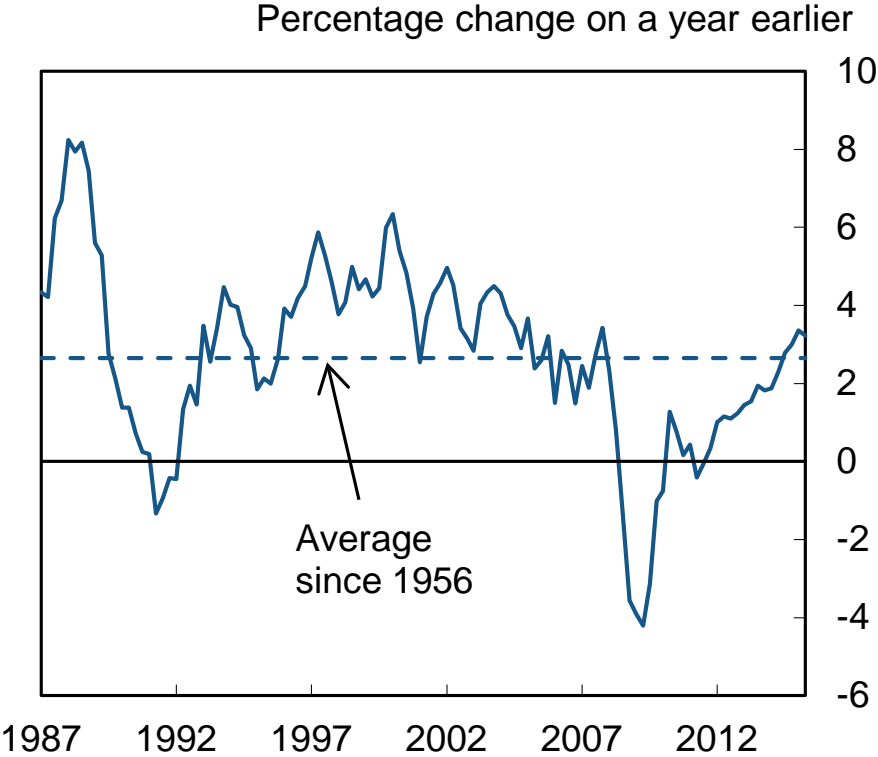
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Outline

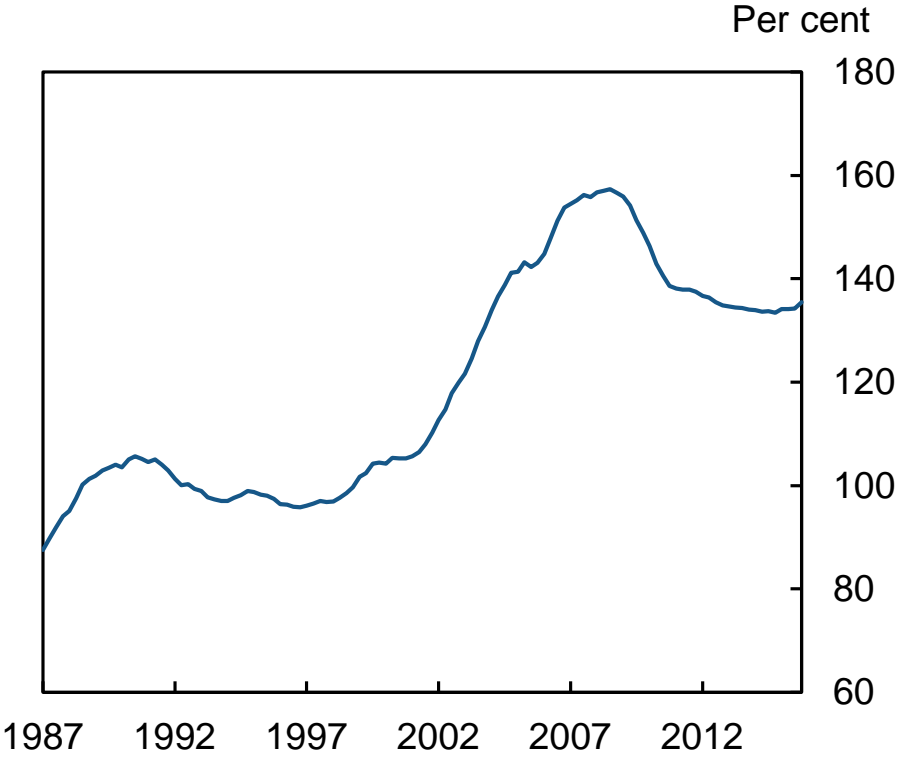
- Motivation
- Literature/theory
- Data/methodology
- Econometric results
- Reasons for different spending responses
- Conclusion/policy implications



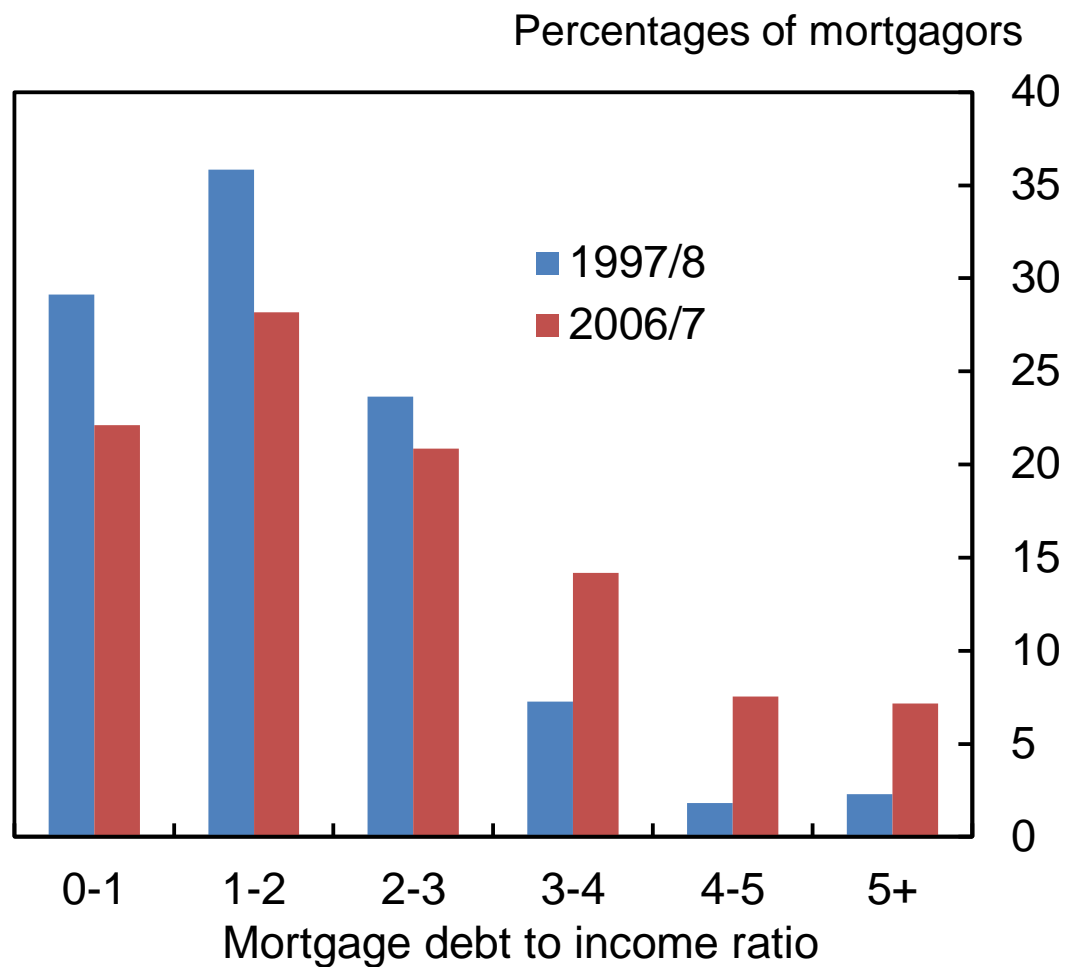
Consumption growth



Household debt to income



Distribution of mortgage debt to income ratios



Research question

- Did households who had high levels of pre-crisis debt reduce their consumption by more than others after the financial crisis?
- And did debt provide any support to spending before 2007?



Why this matters for policy

Understanding the implications of higher levels of indebtedness matters for both monetary and financial stability:

- **Monetary policy:** how aggregate spending responds to shocks affects the appropriate monetary policy response to those shocks
- **Financial stability:**
 - Greater risk of households suffering financial distress following shocks to income or interest rates may pose direct risks to banking system
 - Larger spending cuts could have knock on effects for rest of the economy and increase financial distress further



Should debt affect household spending?

- In a simple life-cycle model, households borrow or save to smooth their consumption and debt has no causal effect on spending decisions
- But assumptions of the simple model may not hold
 - Households' ability to borrow may change
 - Households are not certain about their lifetime incomes
- Some models do find a role for debt in affecting spending by allowing changes in income expectations or credit conditions to interact with debt (King (1994), Eggertson and Krugman (2012))



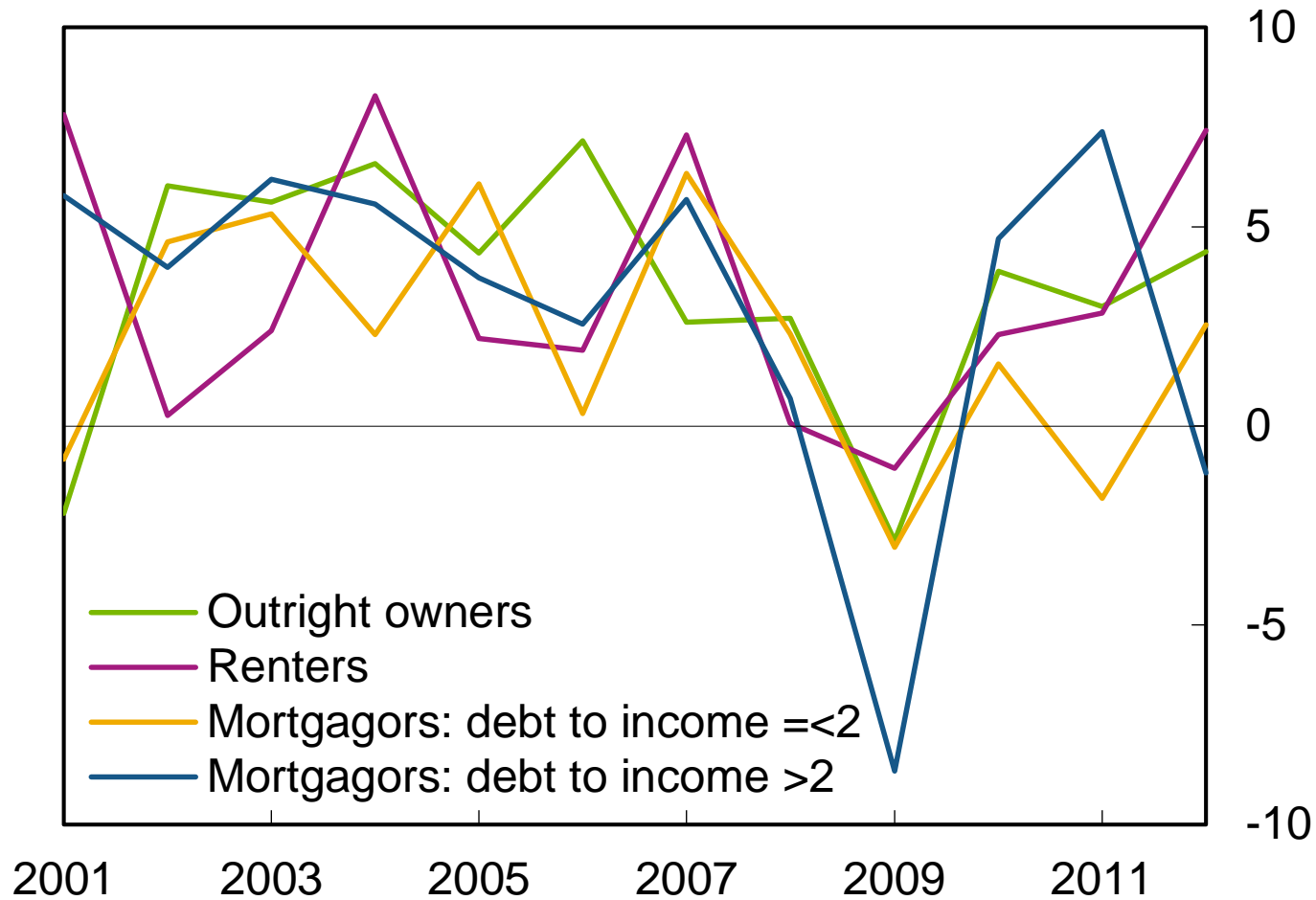
Literature

- Mian, Rao & Sufi (2013)
 - Decline in consumption was greater in regions of the US that had higher debt prior to the crisis
- Dynan (2012)
 - Highly leveraged US mortgagors had larger declines in spending between 2007-2009
- Andersen, Duus and Jensen (2014)
 - Negative correlation between pre-crisis LTV and change in consumption during crisis in Denmark

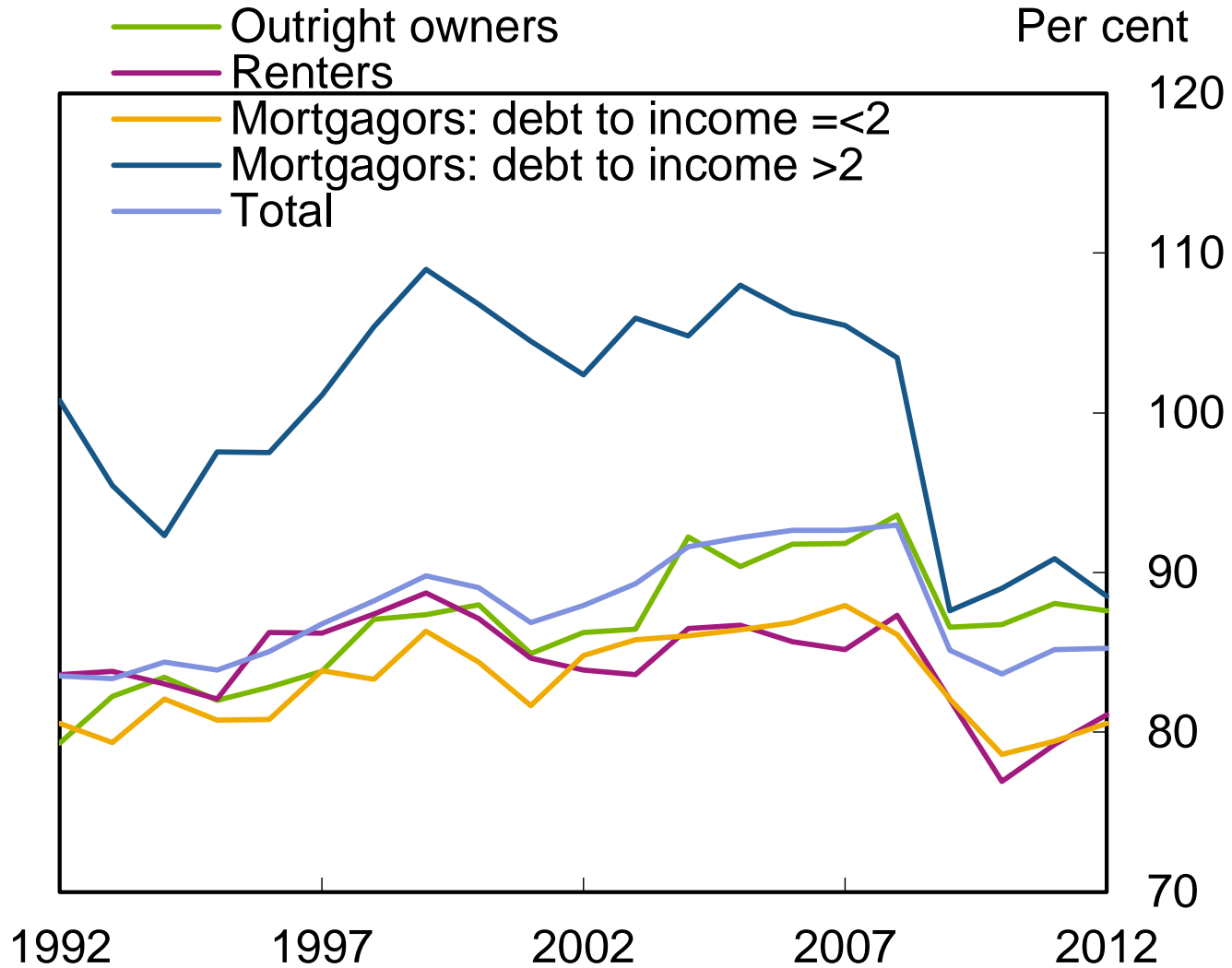


Consumption growth

Percentages changes on a year earlier



Consumption relative to income



Research design

- Ideally would use household panel data to look at changes in consumption over the crisis period by debt level
- But there is no panel in the UK with good consumption and balance sheet data, only repeated cross-section
- Create a pseudo panel (Deaton (1985)) to look at changes in consumption for cohorts
- But also check how level of consumption varies by debt level in cross-sectional data and how that changes over time



Pseudo panel research design

- We estimate the following equation:

$$\Delta C_{it} = \beta_1 (D_{it-1} / Y_{it-1}) + \beta_2 \Delta Y_{it} + \beta_3' \Delta W_{it} + \beta_4' \Delta HH_{it} + e_{it}$$

- Pool 2006/07 as pre-crisis period and 2009/10 as post-crisis
- Assess sensitivity to different cohort definitions:
 - Single birth years
 - Single birth years by mortgagor/non-mortgagor status
 - 5 birth years by mortgagor/non-mortgagor status
 - 10 birth years by region
- Minimum cell size of 50 (averages of 198, 110, 475 and 159)



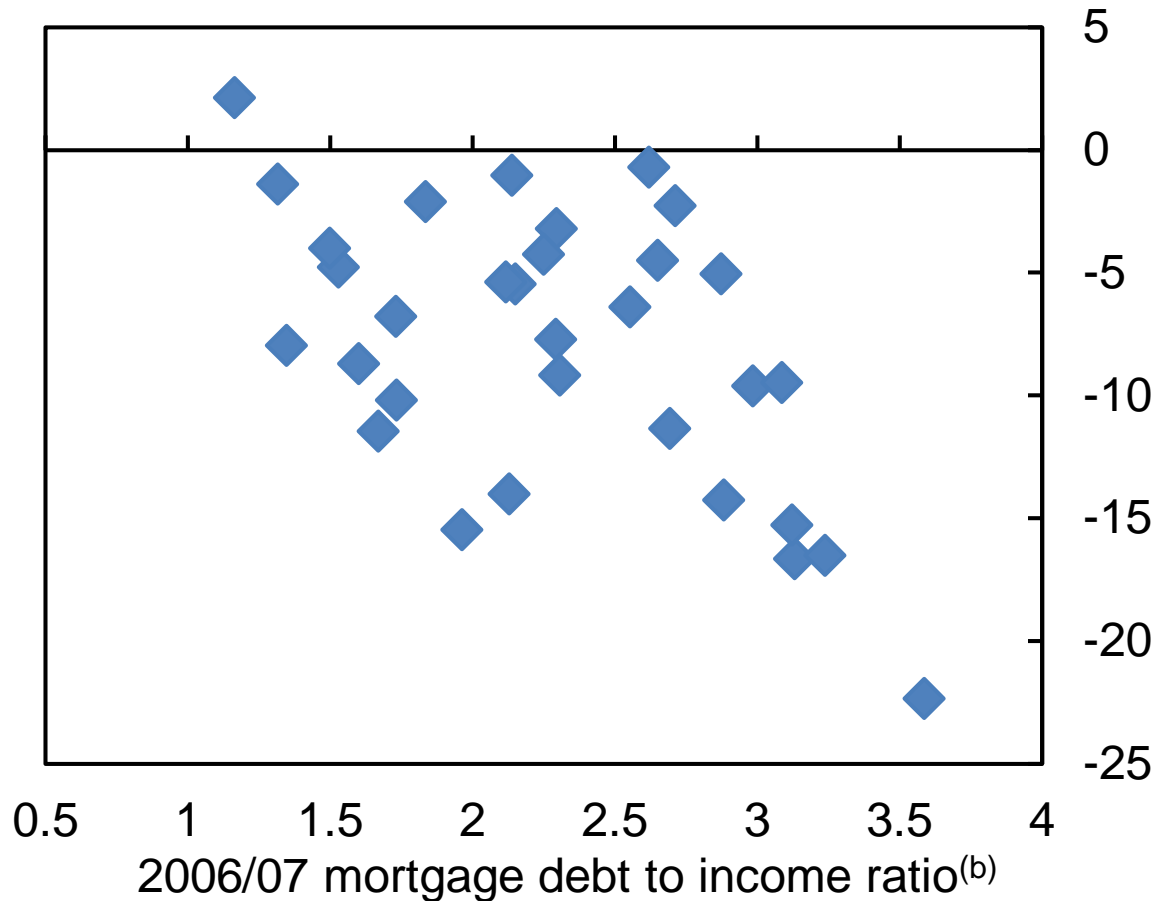
Data

- Living Costs and Food Survey (1992-2012)
 - Main source of UK consumption microdata
 - Repeated cross section of UK households (5300 a year)
 - Focus only on households where head is aged 21-69
 - Use non-housing consumption
 - Secured debt data: level of outstanding mortgage debt
- Wealth and assets survey (3 waves, 2006-12)
 - Merge in with LCFS at cohort level
 - Data on housing wealth, financial wealth and unsecured debt



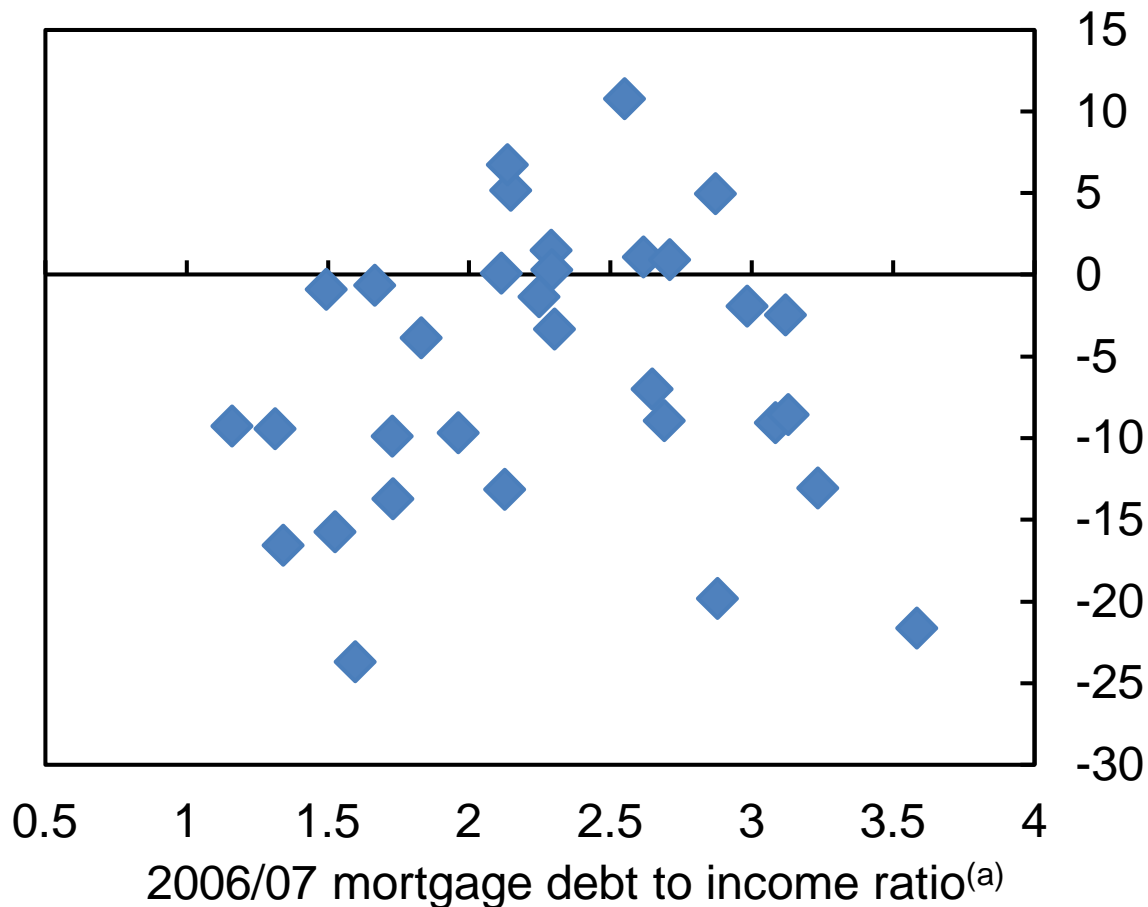
Change in consumption relative to income (single birth year mortgagor cohorts)

Percentage point change in non-housing
consumption/income 2006/07 to 2009/10^(a)



Change in consumption (single birth year mortgagor cohorts)

Percentage change in real non-housing
consumption 2006/07 to 2009/10



Pseudo panel regression results 1

Dependent variable: $\Delta \ln(\text{non-housing consumption } 06/07 \text{ to } 09/10)$

Cohort definition	Single birth year		Single birth year, mortgagor/non-mortgagor		5 birth year, mortgagor/non-mortgagor		10 birth year, region	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
06/07 mortgage debt to income ratio	-0.030** (0.014)		-0.028*** (0.007)		-0.026** (0.009)		-0.024 (0.014)	
06/07 mortgage loan-to-value ratio		-0.128* (0.064)		-0.153*** (0.038)		-0.160** (0.054)		-0.129** (0.050)
Observations	45	45	76	76	19	19	53	53

All equations are estimated by OLS. Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

All equations also include change in income, change in housing wealth, change in financial wealth, change in number of adults, change in number of children and a constant.



Pseudo panel regression results 2

Dependent variable: $\Delta \ln(\text{non-housing consumption } 06/07 \text{ to } 09/10)$

Single birth year, mortgagor/non-mortgagor cohorts

Cohort definition	Younger households (age under 40)		Older households (age over 40)	
	[1]	[2]	[3]	[4]
06/07 mortgage debt to income ratio	-0.037*** (0.011)		-0.020* (0.010)	
06/07 mortgage loan-to- value ratio		-0.188*** (0.051)		-0.118* (0.062)
Observations	25	25	51	51

All equations are estimated by OLS. Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All equations also include change in income, change in housing wealth, change in financial wealth, change in number of adults, change in number of children and a constant.



Pseudo panel regression results 3

Changes 2006/07 to 2009/10. Single birth year, mortgagor/non-mortgagor cohorts.

Dependent variable	$\Delta \ln(\text{Non-housing consumption})$ [1]	$\Delta \ln(\text{Non-housing consumption})$ [2]	$\Delta \ln(\text{Durables})$ [3]	$\Delta \ln(\text{Non-durables})$ [4]
$\Delta \ln(\text{Income net of mortgage interest})$		0.602*** (0.117)	0.934*** (0.195)	0.447*** (0.147)
$\Delta \ln(\text{Income before mortgage interest})$	0.612*** (0.120)			
Actual 06/07 mortgage debt to income ratio	-0.017** (0.008)	-0.027*** (0.007)	-0.051*** (0.013)	-0.010 (0.012)
06/07 unsecured debt to income ratio		-0.020 (0.122)		
Observations	76	76	76	76

All equations are estimated by OLS. Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All equations also include change in housing wealth, change in financial wealth, change in number of adults, change in number of children and a constant.



Pseudo panel regression results 4

Dependent variable: $\Delta \ln(\text{non-housing consumption})$

Single birth year, mortgagor/non-mortgagor cohorts

Time period	06/07 to 09/10	06/07 to 11/12	00/01 to 03/04	03/04 to 06/07
	[1]	[2]	[3]	[4]
Mortgage debt to income ratio at start of period	-0.028*** (0.007)	-0.031*** (0.007)	0.009 (0.009)	0.006 (0.008)
Observations	76	73	78	78

All equations are estimated by OLS. Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

All equations include change in income, change in number of adults, change in number of children and a constant.

Equations [1] and [2] also include change in housing wealth and change in financial wealth.



Cross-sectional analysis research design

- We estimate the following equation:

$$C_{it} = \beta_1 (D_{it} / Y_{it}) + \beta_2' (D_{it} / Y_{it}) * year_t + \beta_3' year_t + \beta_4' cohort_i + \beta_5' X_{it} + e_{it}$$

vector

- Allow coefficient on debt to income to vary by year, relative to 2007
- Estimate from 1992-2012
- Include controls for income, birth cohort, age, household composition, education, employment status, region and house prices



Cross sectional regression results

Dependent variable: $\ln(\text{non-housing consumption})$ (1)

Mortgage debt to income ratio year interactions
(reference year 2007):

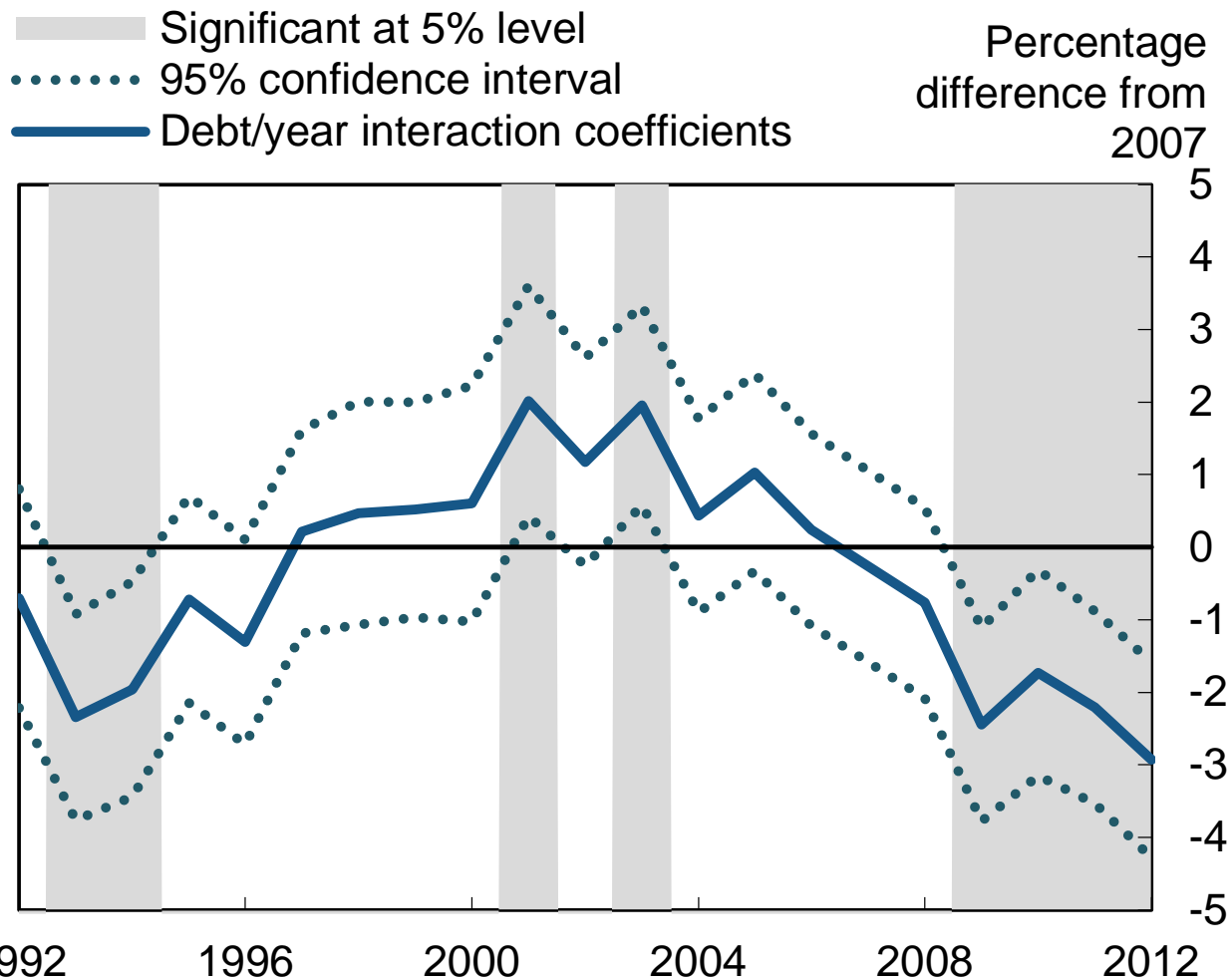
2008	-0.008 (0.007)
2009	-0.024*** (0.007)
2010	-0.017** (0.007)
2011	-0.022*** (0.007)
2012	-0.029*** (0.007)

Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$



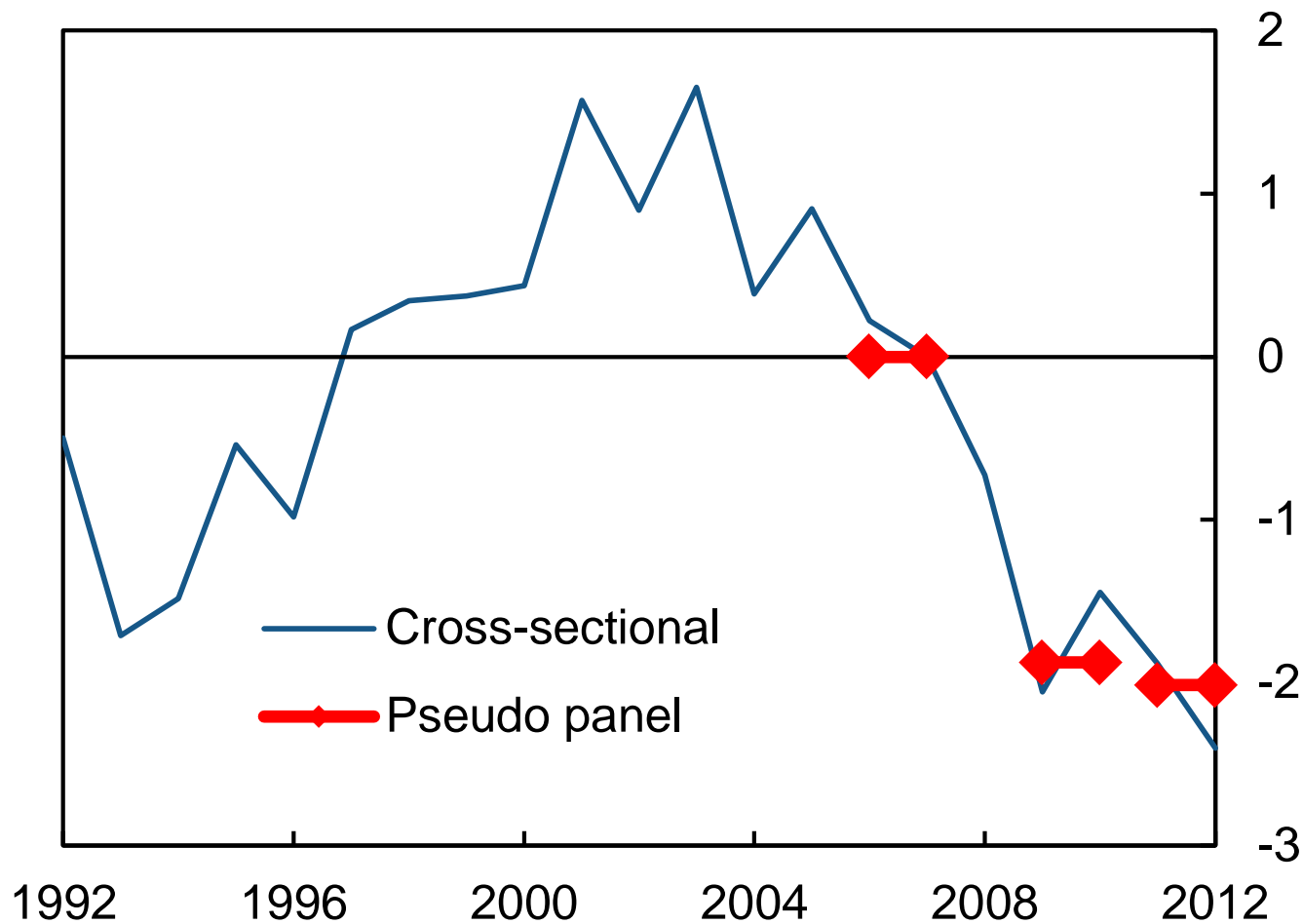
Cross sectional regression results

Impact of a 1 unit increase in debt to income ratio on consumption, relative to 2007



Impact of debt on aggregate consumption

Percentage difference from 2007



Possible explanations for why indebted households made larger spending cuts

Larger spending cuts could reflect more indebted households:

- 1) Being disproportionately affected by tighter credit conditions
- 2) Becoming more concerned about their ability to make future loan repayments:
 - Lower permanent income
 - Increased uncertainty
- 3) Making larger adjustments to income expectations (perhaps because their previous expectations were too optimistic)



Evidence on why indebted household might have made larger cuts in spending

- Hard to prove causality from observing empirical correlations, even after controlling for other factors
- Three approaches to investigating this further:
 - Including proxies for the different channels in regressions
 - Using survey data on attitudes to spending
 - Developing a structural life-cycle model



Pseudo panel regression results 4

Dependent variable: $\Delta \ln(\text{non-housing consumption } 06/07 \text{ to } 09/10)$

Cohort definition	Single birth year, mortgagor/ non-mortgagor [1]	5 birth year, mortgagor/ non-mortgagor [2]	10 birth year, region [3]	5 birth year, mortgagor/ non-mortgagor [4]
06/07 mortgage debt to income ratio	-0.022*** (0.008)	-0.014 (0.014)	0.004 (0.015)	-0.002 (0.027)
Δ Cohort unemployment	-0.280 (0.261)	-0.466 (0.456)	0.079 (0.478)	-0.451 (0.727)
Δ Cohort unemployment x 06/07 mortgage debt to income ratio	-0.429 (0.384)	-0.563 (0.677)	-0.961** (0.453)	-1.517 (1.457)
% Credit constrained				-0.192 (0.354)
Observations	76	19	53	17

All equations are estimated by OLS. Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$. All equations also include change in income, change in housing wealth, change in financial wealth, change in number of adults, change in number of children and a constant.

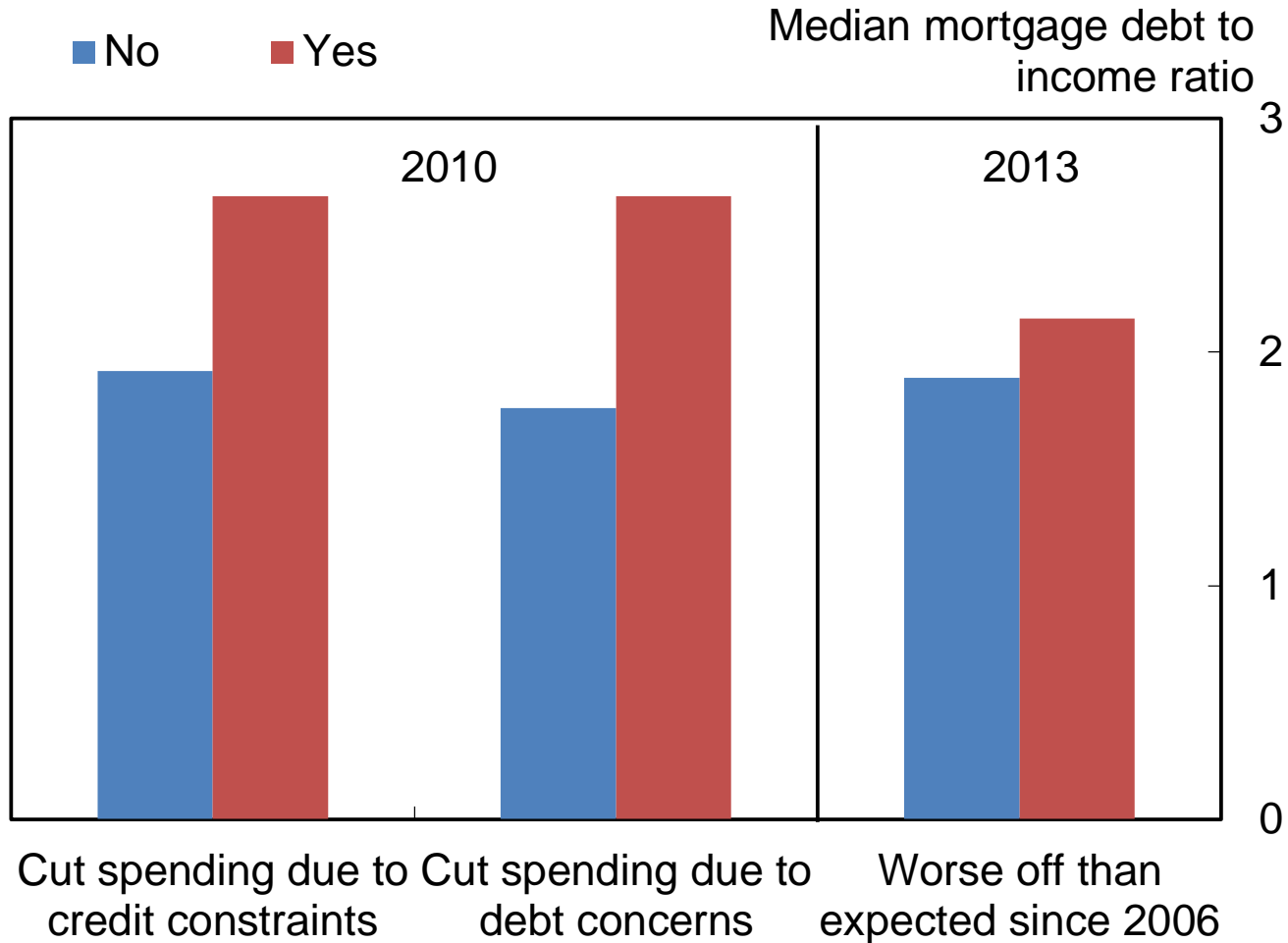


Explanations for why indebted household might have made larger cuts in spending

- Highly indebted households were disproportionately affected by tighter credit conditions
 - ‘Have you been put off spending because you are concerned you will not be able to get access to further credit when you need it?’
- Highly indebted households become more concerned about their ability to make future repayments
 - ‘How concerned are you about your current level of debt?’, and ‘What actions are you taking to deal with your concerns?’
- Highly indebted households made larger adjustments to future income expectations
 - ‘Would you say you are better or worse off financially now than you would have expected at the end of 2006, before the start of the financial crisis?’



Mortgage debt to income and NMG survey responses



Next steps

- Developing a structural life-cycle model (joint with Agnes Kovacs) to try and better understand the mechanisms behind our results
 - Model with heterogeneous agents
 - Includes a maximum LTV limit on borrowing and uncertainty about both house prices and labour income
 - Mortgage repayments part of intertemporal budget constraint
- Parameterise using UK data and aim to simulate to match our empirical results



Conclusion

- Indebted UK households made larger cuts in spending following the financial crisis, after controlling for other factors
- Those effects have persisted, at least up until 2012, and are estimated to be worth around 2% off aggregate consumption
- Hard to prove a causal link, but survey evidence suggests larger cuts in spending by indebted households may reflect a combination of tighter credit conditions and concerns about ability to make future repayments



Policy implications

- June 2014 Bank of England Financial Policy Committee recommendations:
 - Lenders should apply stress test to assess affordability if Bank Rate rose by 3 percentage points in first 5 years of loan
 - Lenders should limit proportion of mortgages at loan to income ratios of 4.5 or above to 15% of new mortgage lending
- FPC wanted to insure against further a significant increase in number of highly indebted households
- Evidence on indebted households making larger cuts in spending during financial crisis in UK and elsewhere was an important reason for this

