



# **HOUSEHOLD DELEVERAGING AND SAVING RATES: A CROSS-COUNTRY ANALYSIS**

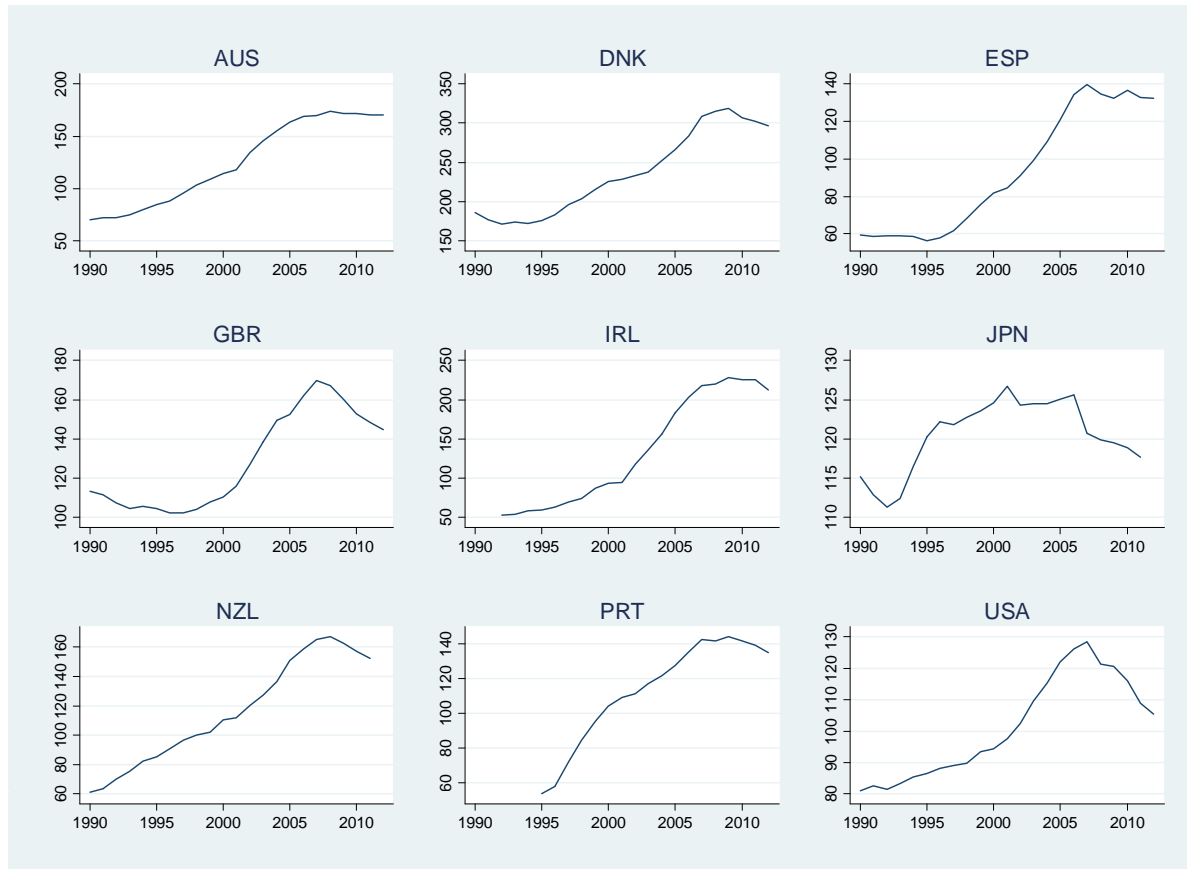
**Romain Bouis**

2015 KDI International Conference on  
Household Debt from an International Perspective:  
Issues and Policy Directions  
Seoul, July 10, 2015

*The views expressed herein are those of the author and should not be attributed to the IMF, its Executive Board, or its management.*

# Background and objective

- Household **debt ratios (*Debt/Yd*)** have **substantially increased** in OECD countries since end 1990s. They are **now declining** in some countries (deleveraging)...

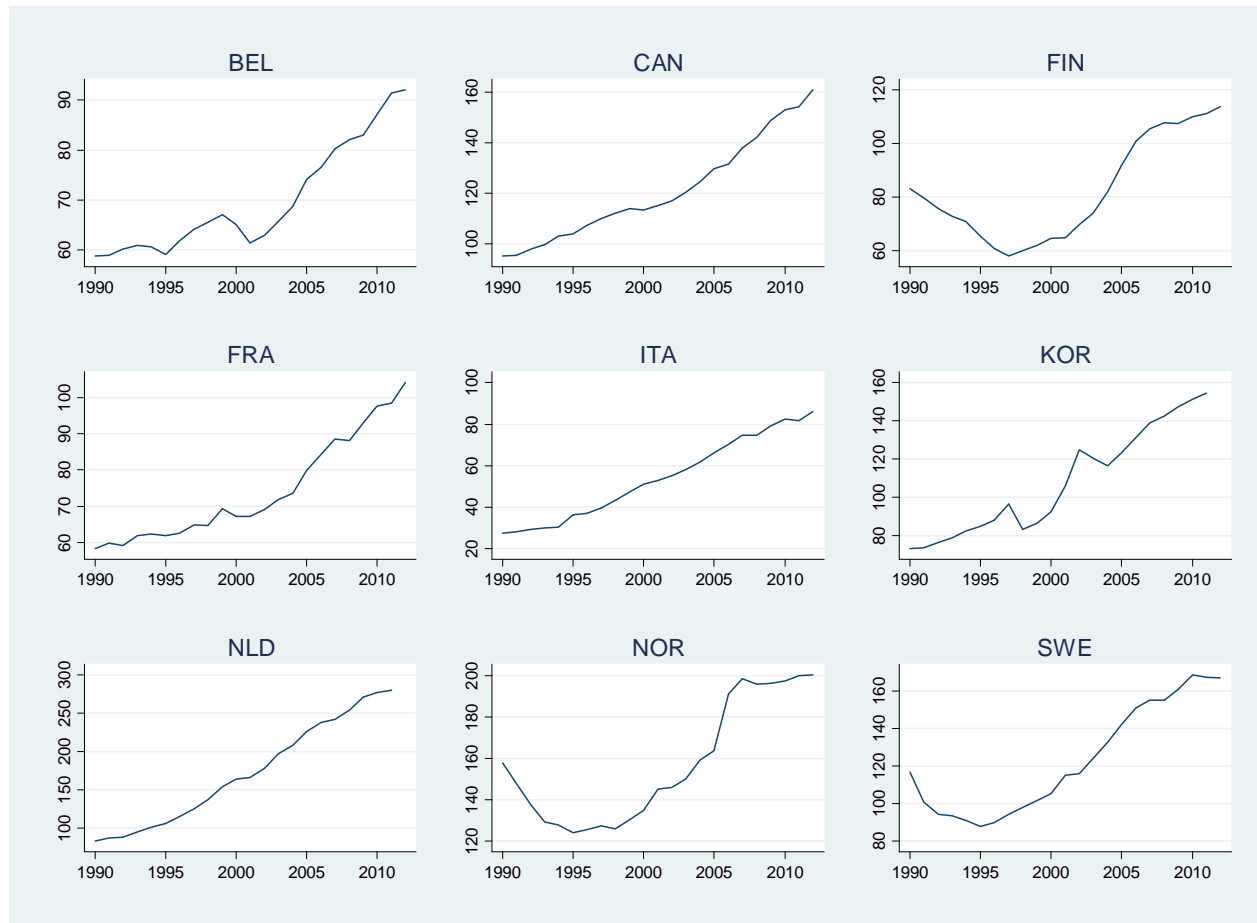


Source: OECD.

# Background and objective

---

... and are expected to reverse soon in other countries.

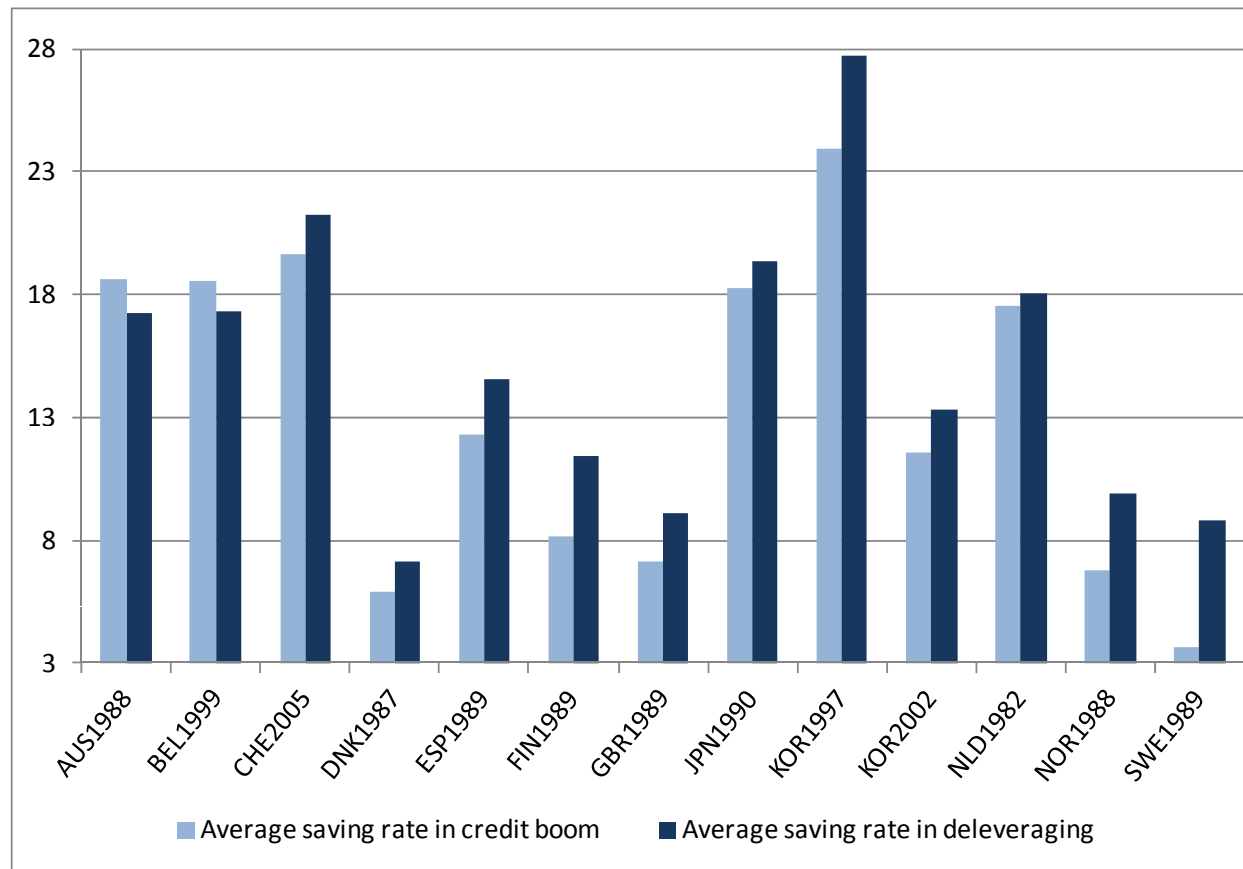


Source: OECD.

# Background and objective

**Deleveraging** will weigh on the recovery as **lower debt** is associated with **higher saving**.

**Historical credit booms and busts:** Saving during bust higher than during boom.



Sources: OECD and author's calculations.

## Background and objective

---

- **Economic mechanism (why  $\Delta S > 0$  as  $\Delta Debt < 0$ ?)**
  - Households **reduce debt by increasing debt repayments** (McCarthy and McQuinn, 2014 ; Dombret, 2013).  
→ prioritise saving over consumption.

- **3 components of the change in debt:**

$$\Delta Debt = New Loans - Debt Repayments - Debt Defaults.$$

- However, in practice, debt declines **not driven by higher repayments** but by **lower new borrowings** and **higher defaults** (e.g. Bhutta, 2014 for the US).

## Background and objective

---

### *Implications for consumption?*

- *Higher Defaults* → more consumption (Cooper, 2012);
- *Lower New Borrowings* → less consumption, but not automatic.

*Importance of consumer credit? Impact of mortgage on consumption? (constrained saving)*

$$S - I \equiv \Delta \text{Financial Assets} - \Delta \text{Financial Liabilities.}$$

**⇒ No automatic link between saving and deleveraging.**

## Background and objective

---

- **Objective:**

Analyse the relationship between household saving rates and changes in debt ratios for a panel of 28 OECD countries (1980-2012).

→ first cross-country estimates of the impact of deleveraging on saving rates.

# Results

---

(i) **Asymmetric** effect of debt changes on saving.

Changes in debt ratios negatively related to saving rates but economic and statistical significances higher for rising debt than for deleveraging.

(ii) **Weak economic impact of deleveraging** in comparison to other saving determinants (income growth, economic uncertainty).

(iii) **Cross-country heterogeneity** in the credit-saving relationship

Impact of declining debt ratios on saving rates is **larger in countries with more consumer credit**. Consumer credit is driving the negative credit-saving relationship (endogeneity issue?) but mortgage debt is not related to saving.

# Outline

---

1. Relationship between saving and credit
2. Empirical approach
3. Estimation results
4. Conclusion

# 1. The relationship between saving and credit

---

*Why saving and credit are correlated?*

- **Direct effect: Liquidity-constrained households** raise their buffer-stock savings as credit availability declines (Carroll, 2001).
- Other saving **effects indirectly** related to deleveraging:
  - *Asset prices decline during deleveraging (**wealth effects**);*
  - *Lower house prices → **lower collateral** → lower consumption through Housing Equity Withdrawal (HEW);*
  - *Credit busts associated with **higher unemployment** and **higher economic uncertainty** → **precautionary saving**.*

# 1. The relationship between saving and credit

---

- Credit market features/other country-specific settings  
→ *cross-country heterogeneity* in credit-saving relationship:
  - Prevalence of **consumer credit** with direct effect on consumption;
  - Availability of **HEW**;
  - **Homeownership rates** raise macro effects of housing wealth and HEW;
  - **Cost to default** on household debt
    - lower response of consumption to deleveraging  
("financial decelerator" mechanism, Elul, 2008).

## 2. Empirical approach

---

- Estimate effect of change in household debt ratio  $\Delta(\mathbf{Debt/Yd})$  on **saving rate**. Panel of 28 OECD countries over 1980-2012 (annual & quarterly data).
- Control variables:
  - **Income related variables (+)**  
Real disposable income (level & growth), Terms of trade.
  - **Demographic structure (-)**  
Old and young-age dependency ratios.
  - **Ricardian equivalence effects (-)**  
Cycl. adj. Gvt. Net Lending as % of potential GDP.
  - **Economic Uncertainty (+)**  
Unemployment rate, Inflation rate, GDP growth volatility (GARCH (1,1) measure).
  - **Financial variables (+/-)**  
Short-term real interest rate (+/-), Lagged household financial net worth (= Fin. Assets - Fin. Liabilities) as a share of Yd (-), Lagged growth of real house prices (-), Lagged growth of real equity prices (-).

## 2. Empirical approach

---

- Dynamic fixed-effects panel data equation

$$s_{i,t} = \alpha_0 s_{i,t-1} + \alpha_1 \ln RY^d_{i,t} + \alpha_2 GRY^d_{i,t} + \alpha_3 Trade_{i,t} + \alpha_4 Old_{i,t} + \alpha_5 Young_{i,t} + \alpha_6 UNR_{i,t} \\ + \alpha_7 Inflation_{i,t} + \alpha_8 Volatility_{i,t} + \alpha_9 IRS_{i,t} + \alpha_{10} \Delta \left( \frac{Debt}{Y^d} \right)_{i,t} + \eta_i + \gamma_t + \varepsilon_{i,t}.$$

- Lagged dependent variable  $\rightarrow$  LSDV estimator biased (Nickel, 1981)  $\rightarrow$  use IV and GMM.  
However, bias small for  $T > 30$  and  $N = 20$  & LSDV more precise than IV and GMM.
- Reverse causality between saving and  $\Delta Debt$ 
  - $\rightarrow$  OLS estimator biased downwards;
  - $\rightarrow$  more likely to find negative relationship;
  - $\rightarrow$  absence of effect considered as conservative.

## 3. Estimation results

---

3.1 Baseline

3.2 Decomposing the change of the debt ratio

3.3 Cross-country heterogeneity and credit market institutions

## 3.1 Baseline equation

	Dependent variable: Household gross saving rate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged saving rate	0.789*** (26.71)	0.780*** (27.78)	0.795*** (24.78)	0.798*** (24.66)	0.790*** (27.95)	0.775*** (23.04)	0.794*** (26.20)
Log (Real disposable income Yd)	2.142 (1.66)	3.362** (2.47)	1.026 (0.89)	0.868 (0.55)	2.207* (1.88)	2.489 (1.44)	1.038 (0.61)
Real growth rate of Yd	0.355*** (12.27)	0.356*** (13.11)	0.392*** (10.97)	0.406*** (9.25)	0.348*** (12.06)	0.387*** (8.45)	0.419*** (8.02)
Terms of trade <sup>(a)</sup>	0.600 (0.38)	-0.152 (-0.08)	0.837 (0.65)	1.514 (0.68)	-0.465 (-0.32)	0.231 (0.11)	0.573 (0.29)
Old dependency ratio	-0.120** (-2.41)	-0.113** (-2.14)	-0.138** (-2.59)	-0.114 (-1.61)	-0.112** (-2.23)	-0.091 (-1.24)	-0.119 (-1.57)
Young dependency ratio	-0.001 (-0.03)	-0.021 (-0.46)	-0.012 (-0.24)	-0.041 (-0.47)	0.016 (0.37)	0.035 (0.38)	-0.038 (-0.46)
Unemployment rate	0.081** (2.22)	0.107*** (2.78)	0.074* (1.84)	0.031 (0.66)	0.131*** (3.58)	0.154** (2.53)	0.106* (1.83)
Inflation rate <sup>(a)</sup>	13.286*** (3.38)	14.383*** (3.68)	14.949*** (2.80)	17.589* (1.91)	11.433*** (3.09)	16.588** (2.49)	18.408** (2.64)
GDP growth volatility	0.301*** (2.92)	0.303*** (3.03)	0.256** (2.61)	0.383*** (3.77)	0.308*** (3.15)	0.264** (2.61)	0.361*** (4.07)
Real interest rate <sup>(a)</sup>	11.353** (2.72)	12.961*** (3.14)	12.101** (2.27)	6.767 (0.96)	12.611*** (2.98)	14.828** (2.34)	6.936 (1.04)
$\Delta(\text{Debt}/Yd)$	-0.127*** (-5.87)	-0.122*** (-4.76)	-0.111*** (-4.01)	-0.119*** (-4.39)	-0.143*** (-5.99)	-0.116*** (-3.51)	-0.119*** (-3.40)
Net financial wealth/Yd, lagged		0.000 (0.08)					
House prices, real growth lagged			-0.022 (-1.21)			-0.023 (-1.26)	-0.011 (-0.61)
Stock prices, real growth lagged			-0.011** (-2.72)			-0.013*** (-2.83)	-0.012** (-2.73)
Cyclically adj. government net lending				-0.099** (-2.72)		-0.044 (-1.37)	-0.093** (-2.50)
Housing investment/Yd					0.129*** (2.89)	0.124** (2.32)	0.120 (1.57)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.565	0.424	0.780	0.792	0.565	0.493	0.772
Number of observations	698	670	606	493	698	542	476
Number of countries	28	28	26	19	28	26	19

### One-SD increase in:

- Real disposable income growth

→ +0.9 p.p. of saving rate (both for rising and declining income).

- $\Delta$ debt ratio (+5 p.p. of disposable income)

→ -0.7 p.p. of saving rate.

- Unemployment rate, Inflation rate, GDP growth volatility

→ +0.4 p.p., +0.4 p.p., +0.5 p.p. of saving rate, respectively.

## 3.2 Decomposing the change of the debt ratio

	Dependent variable: Household gross saving rate			
	(1)	(2)	(3)	(4)
Lagged saving rate	0.786*** (26.04)	0.819*** (27.42)	0.772*** (22.78)	0.791*** (25.30)
Log (Real disposable income Yd)	2.208* (1.75)	0.717 (0.63)	2.625 (1.59)	1.157 (0.70)
Real growth rate of Yd	0.352*** (12.29)	0.387*** (11.89)	0.378*** (8.30)	0.412*** (7.84)
Terms of trade <sup>(a)</sup>	0.537 (0.33)	0.700 (0.48)	0.031 (0.02)	0.453 (0.23)
Old dependency ratio	-0.124** (-2.55)	-0.122** (-2.43)	-0.094 (-1.37)	-0.121 (-1.69)
Young dependency ratio	-0.007 (-0.16)	-0.020 (-0.49)	0.033 (0.36)	-0.039 (-0.47)
Unemployment rate	0.083** (2.37)	0.053 (1.47)	0.164** (2.76)	0.115** (2.11)
Inflation rate <sup>(a)</sup>	14.012*** (3.74)	16.593** (2.73)	17.996** (2.71)	19.847*** (2.96)
GDP growth volatility	0.298*** (2.87)	0.357*** (3.71)	0.261** (2.54)	0.368*** (4.13)
Real interest rate <sup>(a)</sup>	11.047** (2.58)	6.464 (1.22)	14.254** (2.16)	6.536 (0.93)
$\Delta(\text{Debt}/Yd) > 0$	-0.149*** (-7.02)	-0.146*** (-7.09)	-0.143*** (-5.58)	-0.143*** (-5.06)
$\Delta(\text{Debt}/Yd) < 0$	-0.059 (-0.91)	-0.092 (-1.32)	-0.049 (-0.71)	-0.062 (-0.85)
House prices, real growth lagged			-0.024 (-1.27)	-0.011 (-0.63)
Stock prices, real growth lagged			-0.013*** (-2.86)	-0.012** (-2.83)
Cyclically adj. government net lending			-0.042 (-1.34)	-0.092** (-2.53)
Housing investment/Yd			0.138** (2.74)	0.133* (1.75)
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.557	0.841	0.477	0.748
Number of observations	698	565	542	476
Number of countries	28	19	26	19

$\Delta(\text{Debt}/Yd) > 0$  highly significant  
(0.1% level)

but

$\Delta(\text{Debt}/Yd) < 0$  non-significant  
statistically.

Results also true when isolating  
full boom-bust cycles of credit  
(i.e. observations ten years before the  
boom + observations from the peak  
to the trough of the debt ratio).

**Conclusion: asymmetric effect  
of change in debt ratio on  
saving rates and only tentative  
evidence of an effect of  
deleveraging.**

## 3.2 Decomposing the change of the debt ratio

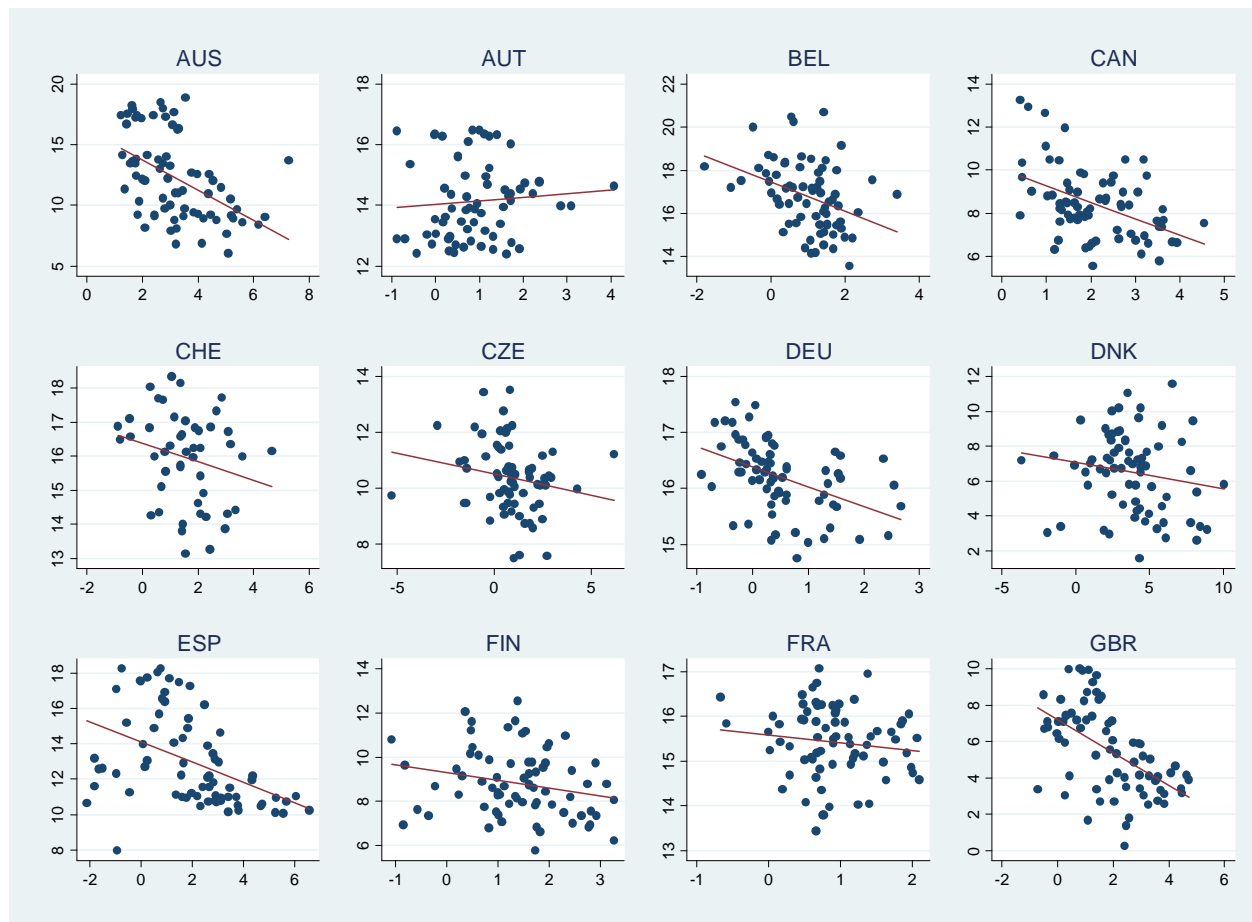
---

- **Why** impact of  $\Delta(\text{Debt}/Yd)$  is asymmetric?
  - **Credit market liberalisation** (debt ratios do not return to pre-boom levels; reversals of financial reforms scarce) + weak response of business-cycle changes of saving to credit;
  - **Debt defaults** mitigate negative effect of deleveraging on consumption;
  - **Cross-country heterogeneity** implies large standard errors of panel estimates.

### 3.3 Cross-country heterogeneity and the role of credit market institutions

---

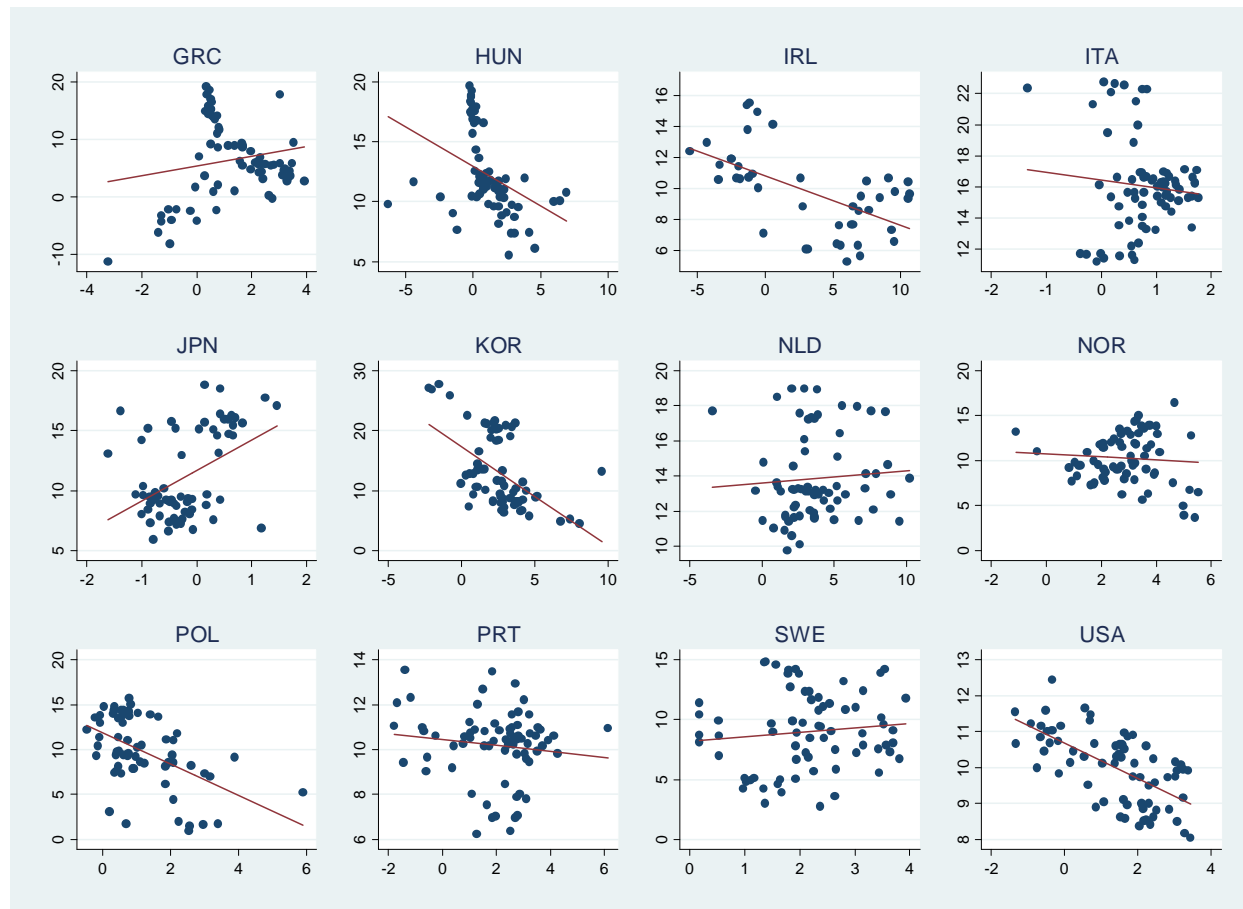
- Quarterly  $\Delta\text{Debt}/Y_d$  (x-axis) versus saving rates (y-axis), 1995-2012.



Sources: OECD and BIS.

## 3.3 Cross-country heterogeneity and the role of credit market institutions

- Stronger credit-saving relationship in AUS, CAN, GBR, KOR, USA...



Sources: OECD and BIS.

## 3.3 Cross-country heterogeneity and the role of credit market institutions

---

- **Differences in response of saving to credit explained by institutions?**
  - Estimate interaction effects of changes in debt ratio with dummy variables for:
    - Countries with HEW;
    - High consumer credit countries;
    - High pension funds/low saving rate countries...
- Results:
  - **Consumer credit** interaction effect significantly explains differences in the response of saving rates to changes in debt ratios;
  - No evidence of an interaction effect from other institutions/settings.

### 3.3 Cross-country heterogeneity and the role of credit market institutions

## Robustness checks:

(1) Split the sample of countries based on importance of consumer credit.

Result: Declines in debt ratios only significant in the group of countries with high consumer debt ratios.

Dependent variable: Household gross saving rate

	High Consumer Credit Countries			Low Consumer Credit Countries	
	1980-2012 (1)	1980-2012, KOR excluded (2)	1980-2006, KOR excluded (3)	1980-2012 (4)	1980-2006 (5)
Lagged saving rate	0.601*** (42.64)	0.561*** (25.83)	0.499*** (12.02)	0.772*** (21.88)	0.750*** (13.67)
Log (Real disposable income Yd)	8.385*** (5.50)	13.931*** (5.40)	16.737*** (15.82)	2.676* (1.95)	2.520* (2.02)
Real growth rate of Yd	0.182** (2.85)	0.195*** (5.46)	0.151** (3.66)	0.441*** (12.09)	0.439*** (9.92)
Terms of trade <sup>(a)</sup>	7.940*** (6.96)	2.050 (1.24)	2.616 (0.74)	-1.541 (-1.36)	-0.799 (-0.43)
Old dependency ratio	0.096* (2.39)	0.137** (3.66)	0.129** (2.88)	-0.086 (-0.89)	-0.075 (-0.79)
Young dependency ratio	0.231*** (6.84)	0.111 (2.10)	0.127* (2.47)	-0.041 (-0.76)	-0.020 (-0.34)
Unemployment rate	0.190*** (4.65)	0.180** (3.17)	0.306*** (7.19)	0.071 (1.40)	0.061 (0.89)
Inflation rate <sup>(a)</sup>	22.428*** (6.36)	16.418*** (4.89)	19.934** (3.63)	17.389*** (3.17)	19.695*** (2.77)
GDP growth volatility	0.157* (2.51)	0.114** (2.93)	0.040 (0.44)	0.263* (1.84)	0.310* (1.95)
Real interest rate <sup>(a)</sup>	4.178 (0.57)	-5.570 (-1.21)	-0.626 (-0.16)	3.916 (0.72)	2.324 (0.41)
House prices, real growth lagged	-0.012 (-1.99)	0.001 (0.24)	0.003 (0.72)	-0.006 (-1.61)	-0.006 (-1.52)
Stock prices, real growth lagged	0.014 (0.51)	-0.017 (-0.88)	-0.018 (-0.72)	-0.037*** (-4.06)	-0.047*** (-3.87)
$\Delta(\text{Debt}/Yd)>0$	-0.116* (-2.03)	-0.079** (-2.92)	-0.081* (-2.44)	-0.137*** (-8.06)	-0.149*** (-6.53)
$\Delta(\text{Debt}/Yd)<0$	-0.261** (-3.85)	-0.109* (-2.53)	-0.066 (-1.31)	0.045 (0.91)	0.083 (1.48)
Test Coeff. $\Delta(\text{Debt}/Yd)>0 = \text{Coeff. } \Delta(\text{Debt}/Yd)<0$	0.02	0.68	0.83	0.01	0.01
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
R-squared	0.210	0.136	0.178	0.827	0.840
Number of observations	182	161	132	348	284
Number of countries	6	5	5	12	12

### 3.3 Cross-country heterogeneity and the role of credit market institutions

**(2) Series of consumer credit versus housing credit for 8 countries (AUS, BEL, CAN, FRA, GRC, JPN, GBR, USA).**

**Result:** Series of Consumer credit significantly related to saving rates (endogeneity?) but series of Housing credit not related to saving rates.

	Dependent variable: Household gross saving rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged saving rate	0.803*** (32.42)	0.807*** (30.23)	0.803*** (32.80)	0.814*** (30.79)	0.808*** (28.17)	0.810*** (31.32)
Log (Real disposable income Yd)	5.031** (2.69)	3.684* (2.23)	5.035** (2.71)	3.608* (2.06)	3.640* (2.07)	4.403** (2.43)
Real growth rate of Yd	0.376*** (7.65)	0.410*** (8.05)	0.375*** (7.86)	0.431*** (8.82)	0.412*** (8.29)	0.436*** (8.54)
Terms of trade <sup>(a)</sup>	0.928 (0.45)	0.783 (0.49)	1.006 (0.47)	0.254 (0.15)	0.563 (0.34)	-0.754 (-0.41)
Old dependency ratio	-0.082 (-1.85)	-0.108** (-2.90)	-0.081 (-1.66)	-0.121** (-2.84)	-0.113** (-2.50)	-0.138** (-3.47)
Young dependency ratio	0.064 (0.88)	0.083 (1.01)	0.067 (0.96)	0.071 (0.85)	0.075 (0.89)	0.071 (0.86)
Unemployment rate	0.109 (1.22)	0.083 (1.36)	0.109 (1.23)	0.097 (1.54)	0.082 (1.32)	0.124 (1.66)
Inflation rate <sup>(a)</sup>	18.335** (2.65)	11.276* (1.91)	18.558** (2.98)	10.024 (1.65)	10.494 (1.81)	8.996 (1.23)
GDP growth volatility	0.222*** (4.61)	0.224*** (5.50)	0.219*** (4.80)	0.243*** (5.26)	0.231*** (5.26)	0.238*** (5.63)
Real interest rate <sup>(a)</sup>	-5.411* (-1.93)	-7.928* (-2.36)	-5.437* (-1.90)	-8.130** (-2.47)	-7.912* (-2.33)	-8.266* (-1.99)
House prices, real growth lagged	0.024 (0.85)	0.023 (0.84)	0.023 (0.75)	0.025 (0.80)	0.025 (0.80)	0.026 (0.74)
Stock prices, real growth lagged	0.005 (1.34)	0.006 (1.32)	0.005 (1.34)	0.006 (1.41)	0.006 (1.32)	0.005 (1.28)
Δ(Debt/Yd)	-0.096** (-3.27)	-0.056 (-1.87)	-0.101*** (-4.15)		-0.041 (-1.87)	
Δ(Consumer Debt/Yd)		-0.373** (-2.64)		-0.422** (-3.22)	-0.381** (-2.68)	
Δ(Housing Debt/Yd)			0.008 (0.21)	-0.056 (-1.26)	-0.022 (-0.49)	
Δ(Consumer Debt/Yd)>0						-0.365 (-1.66)
Δ(Consumer Debt/Yd)<0						-0.529*** (-4.87)
Δ(Housing Debt/Yd)>0						-0.080 (-1.47)
Δ(Housing Debt/Yd)<0						0.027 (0.34)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.95	0.95	0.95	0.95	0.95	0.95
Number of observations	195	195	195	195	195	195
Number of countries	8	8	8	8	8	8

## Conclusion

---

- ***Asymmetric effect*** of changes in debt ratios
  - Private sector **deleveraging not necessarily harmful** for growth (Takáts and Upper, 2013). Debt overhang (effect of the *level* of debt on consumption) different from deleveraging.
- ***Cross-country heterogeneity*** in credit-saving relationship explained by importance of **consumer credit**
  - Deleveraging associated with lower consumption in Canada or Korea but not in Belgium or Italy.
- ***Facilitate the deleveraging*** process for a stronger recovery (deal with the legacy of the boom; do not hamper the adjustment)
  - **Lower new borrowings for housing** with normalisation of credit conditions.
  - **Higher debt defaults** or writedowns to mitigate the negative impact of debt overhang on consumption (Nordic countries in the 1990s) with reform of bankruptcy legislation.

# Annex

Table 1 – Household debt ratios and saving rates during full boom-bust credit cycles

(Percentage points of disposable income)

Country	Peak	Trough	5-year period before debt peak				From peak to trough			
			Δ Debt-to-income ratio	Net credit effect	Nominal growth effect	Average gross saving-to-income ratio	Δ Debt-to-income ratio	Net credit effect	Nominal growth effect	Average gross saving-to-income ratio
AUS	1988	1990	20.7	40.9	-20.2	18.6	-6.0	8.3	-14.2	17.3
BEL	1999	2001	6.9	15.1	-8.2	18.5	-6.0	0.3	-6.3	17.3
CHE	1987	1993	39.3	65.8	-26.4	n.a.	-17.7	36.8	-54.5	n.a.
CHE	2005	2008	18.6	30.7	-12.1	19.6	-9.9	11.3	-21.2	21.3
DNK	1987	1994	66.4	95.5	-29.1	5.9	-24.4	20.6	-45.0	7.1
ESP	1989	1995	17.7	35.1	-17.3	12.3	-3.4	19.9	-23.3	14.6
FIN	1989	1997	28.9	48.0	-19.1	8.2	-27.0	-7.6	-19.3	11.4
GBR	1989	1996	33.6	62.3	-28.7	7.2	-12.4	33.6	-46.0	9.1
JPN	1990	1992	27.2	47.9	-20.7	18.3	-4.3	6.6	-11.0	19.4
KOR	1997	1998	18.5	51.5	-33.0	23.9	-12.3	-8.9	-3.4	27.7
KOR*	2002	2004	31.7	41.0	-9.3	11.6	-8.0	9.0	-17.0	13.3
NLD*	1982	1985	3.1	10.3	-7.2	17.5	-4.2	3.2	-7.4	18.1
NOR	1988	1995	54.6	92.1	-37.5	6.8	-48.3	3.2	-51.5	9.9
SWE	1989	1995	26.9	60.3	-33.4	3.6	-44.9	-3.3	-41.6	8.8

Notes: \*: Changes and averages during the boom phase are computed two years before the peak.

The change in the debt-to-income ratio is decomposed into a net credit effect  $\frac{Debt_{t+T} - Debt_t}{Y^d_{t+T}}$  and a nominal growth effect

$$-\frac{Y^d_{t+T} - Y^d_t}{Y^d_t} \times \frac{Debt_t}{Y^d_{t+T}}$$

Sources: OECD national accounts, national central banks, and author's calculations.

# Annex

Table 2 – Household debt ratios and saving rates in the run-up to the Great Recession and during on-going deleveraging processes (or from 2007 for still debt booming economies)

(Percentage points of disposable income)

Country	Peak	From 1997 to debt peak (or to 2007)				From debt peak (or from 2007) to 2012			
		Δ Debt-to-income ratio	Net credit effect	Nominal growth effect	Average gross saving-to-income ratio	Δ Debt-to-income ratio	Net credit effect	Nominal growth effect	Average gross saving-to-income ratio
AUS	-	74.9	121.1	-46.3	10.9	2.3	47.8	-45.6	17.5
AUT	2010	21.3	45.3	-24.1	14.3	-2.9	2.4	-5.3	12.3
BEL	-	15.6	34.3	-18.7	16.7	12.2	22.5	-10.2	15.9
CAN	-	37.3	76.5	-39.2	7.5	20.2	44.4	-24.1	9.1
CHE	-	8.4	48.6	-40.2	19.7	15.2	30.2	-15.0	22.2
CZE	-	32.2	40.0	-7.8	10.1	12.0	17.7	-5.7	10.4
DEU	2000	10.4	15.7	-5.4	15.6	-22.1	2.9	-25.1	16.4
DNK	2009	122.5	184.0	-61.5	6.2	-19.3	12.6	-31.9	7.3
ESP	2007	77.7	106.7	-29.0	11.9	-7.3	-5.0	-2.3	13.7
EST	2010	97.0	106.4	-9.4	1.3	-21.4	-12.0	-9.4	7.8
FIN	-	47.2	69.3	-22.1	8.4	8.5	27.4	-18.9	9.5
FRA	-	23.5	44.7	-21.3	15.2	13.9	21.8	-7.9	15.9
GBR	2007	66.7	103.4	-36.6	4.6	-25.4	3.3	-28.7	6.1
GRC	-	55.2	63.4	-8.2	8.2	32.3	13.0	19.3	-1.3
HUN	2010	62.2	69.9	-7.8	11.4	-15.2	-9.5	-5.6	9.1
IRL	2009	158.8	196.5	-37.7	11.0	-13.5	-30.0	16.4	10.8
ITA	-	35.1	43.9	-8.7	16.3	9.0	9.2	-0.2	13.1
JPN	2006	1.6	-5.7	7.3	11.3	-10.1	-12.8	2.8	8.2
KOR	-	41.6	79.5	-37.9	14.8	17.2	47.2	-30.1	9.7
NLD	-	117.5	157.9	-40.4	13.9	46.1	52.7	-6.6	11.5
NOR	-	72.2	122.5	-50.3	9.9	8.9	56.3	-47.4	11.6
NZL	2008	70.1	111.1	-40.9	-0.1	-13.0	11.7	-24.7	3.4
POL	-	18.4	22.0	-3.6	11.0	19.9	29.1	-9.2	5.3
PRT	2009	71.6	101.6	-30.0	9.8	-7.6	-7.7	0.1	10.6
SVK	-	20.0	30.3	-10.2	8.8	14.6	21.0	-6.4	8.0
SVN	2010	24.3	36.3	-12.0	14.7	-1.4	-1.7	0.3	12.0
SWE	-	60.0	94.2	-34.2	7.3	11.7	41.8	-30.1	13.0
USA	2007	39.8	77.3	-37.5	9.5	-23.4	-5.9	-17.5	10.9

Note: The change in the debt-to-income ratio is decomposed into a net credit effect  $\frac{Debt_{t+T} - Debt_t}{Y^d_{t+T}}$  and a nominal growth effect

$$-\frac{Y^d_{t+T} - Y^d_t}{Y^d_t} \times \frac{Debt_t}{Y^d_{t+T}}$$

Sources: OECD national accounts, national central banks, and author's calculations.