# Pre-pension savings out of housing wealth: a comparative study of Italy and the Netherlands

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# Overview

- Effectiveness of monetary policy linked to propensity to consume out of wealth.
- Housing wealth effect on pre-retirement savings in Italy and the Netherlands

- **Theoretical model**:
  - changes in future prices unlock a direct intertemporal wealth effect ($C \uparrow$ and $I \uparrow$), and an indirect endogenous effect (investments increases future home equity).
  - Indifference between $S$ and $I$, when the cost of the improvement equals its' present value.

- **Results**:
  - disregarding home improvements could induce a bias in the estimation of the wealth effect.
  - wealth effects become significant, yet small, only in the extended specifications.

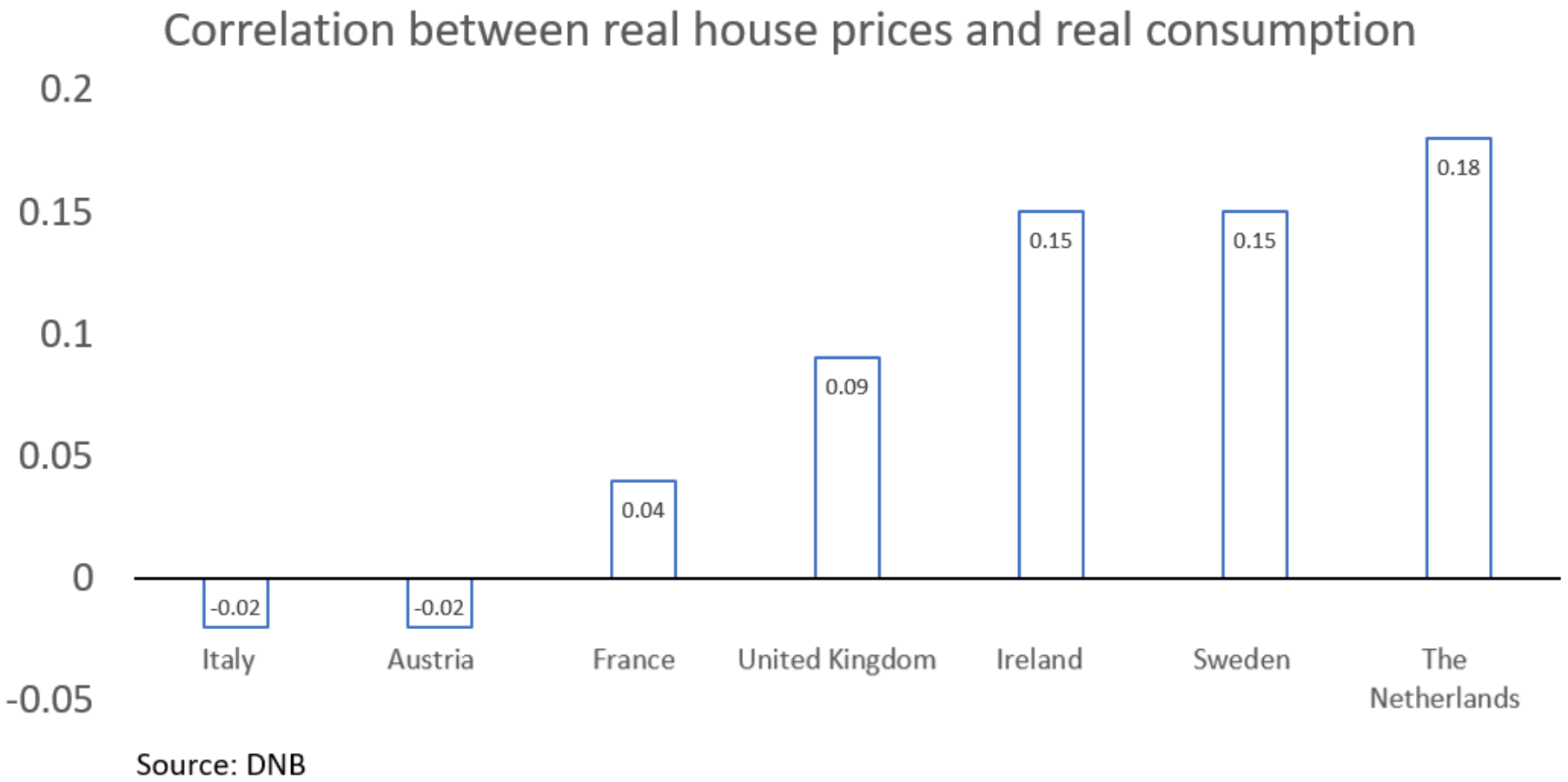
# Literature: different methods, data … and results!

- Attanasio and Weber (1994) find that housing market accounts for much of the increase in consumption by the older cohorts (UK).
- Also Campbell and Cocco (2007) find a positive effect on consumption for older homeowners and a null effect for young renters (US).
- Browning et al (2013) instead find no significant effect (DK).
- Rouwendal and Alessie (2002) and Engelhardt (1996) find a negative association between housing wealth changes and savings (NL and US)
- Paiella (2007): small and indirect wealth effect (IT)
- Suari Andreu (2015) finds no significant effect (NL).

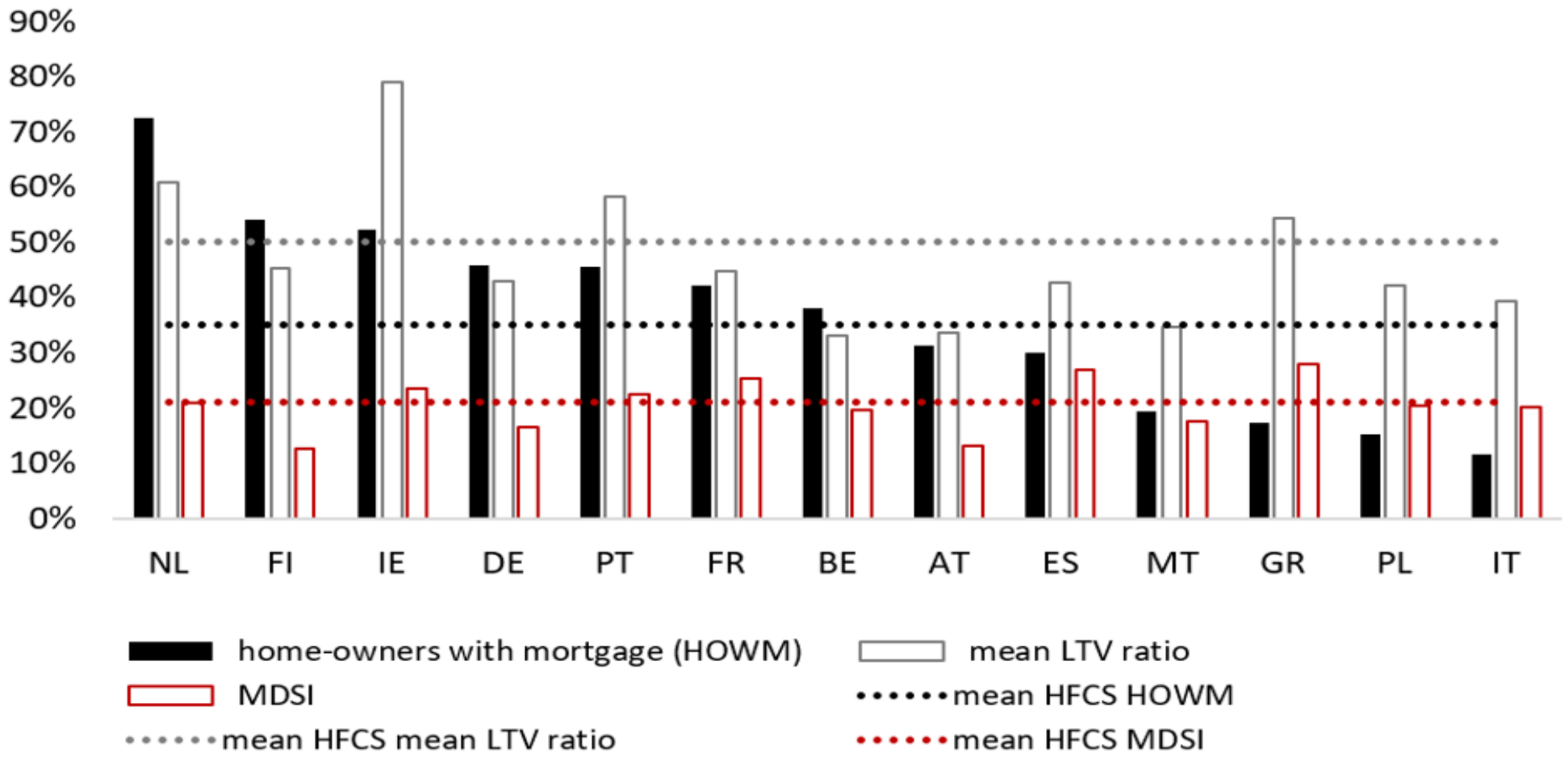
- Theory: Piazzesi and Schneider (2016)

# Micro / macro

Correlation between consumption and house price growth is very high and heterogenous in aggregate data (Case et al, 2005). IT and NL are very different …



# … different also in terms of indebtedness

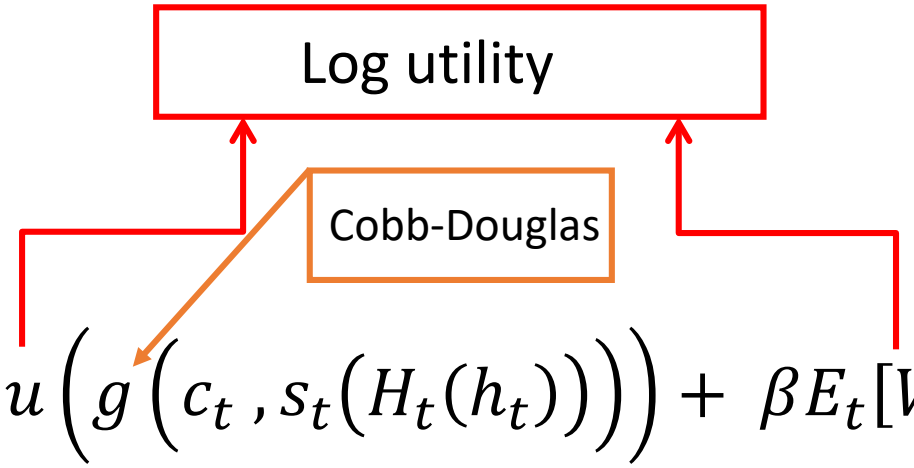



**Explanatory note**: The figure uses home owners' with mortgage ownership (HOWM) and the loan to value (LTV) ratio as a proxy of indebtedness, while the current mortgage debt service to income ratio (MDSI) is a proxy of mortgage affordability. The MDSI represents the ratio between total monthly mortgage debt payments and household gross monthly income divided by 12. Source: HFCS, second wave, own computations.

# Our strategy

- We use subjective expectations asked in both questionnaires to the Italian and Dutch respondents (first contribution).
- To obtain a causal estimate, the change in house value must be not only unexpected but also *exogenous.*
- We distinguish changes in prices (exogenous wealth effect) from changes in asset allocation (endogenous wealth effect), thus adding the value of home improvements (second contribution).

# Theory




**Maximization problem**:

$$max_{c_t,h_t,w_{t+1}} \; u\left(g\left(c_t\,, s_t\left(H_t(h_t)\right)\right)\right) + \beta E_t[V(w_{t+1})]$$

$$s.t. \qquad c_t + \kappa h_t = w_t - a_t \quad ; \quad w_t = y_t + a_{t-1}$$

$$w_{t+1} = Ra_t + y_{t+1} + p_{t+1}H_{t+1}(h_t)$$

**Depreciating** $(\delta)$ **technology**:

$$H_t(h_t) = \mathcal{H}(1-\delta) + h_t$$

**Prices are random walk**:

$$p_{t+1} = p_t + \varepsilon_{t+1} \qquad \varepsilon_{t+1} \sim IID(0, \sigma^2)$$

# Solution of the model

$$u'(g(\,c_t\,;H_t(h_t)))\;g'_h\big(c_t\,;H_t(h_t)\big)=\beta R\,[\kappa-R^{-1}(1-\delta)E_t(p_{t+1})]\,E_t[V'(w_{t+1})]$$

$$\frac{\partial c_t^*}{\partial E_t(p_{t+1})}=\frac{\alpha[R^{-1}(1-\delta)E_t(p_{t+1})-\kappa]}{1-\alpha}\frac{\partial h_t^*}{\partial E_t(p_{t+1})}+\frac{\alpha[R^{-1}(1-\delta)](\mathcal{H}(1-\delta)+h_t^*)}{1-\alpha}$$

- Optimal housing investment $h_t^*$ increases with future prices $E_t(p_{t+1})$
- The effect on consumption is also positive, and is proportional to the net present value of the home improvement, and increases with the endogenous investment.
- Savings must diminish to finance the increase in both consumption and housing investments

# Model extension: quality-specific pricing

- Assume $p_t(H_t)$ such that $p'_t(H_t) > 0$, the home equity:

$$p_{t+1}(H_{t+1}(h_t))H_{t+1}(h_t)$$

- Investing in maintenance becomes more convenient
  - increases the quality stock of the house
  - augments the value of every unit of quality
- Main take away:
  - $a_t$ and $h_t$ substitutable consumption-smoothing devices
  - $h_t$ is risky, yet it exerts current utility.
  - $h_t$ increases future expectations

# Data

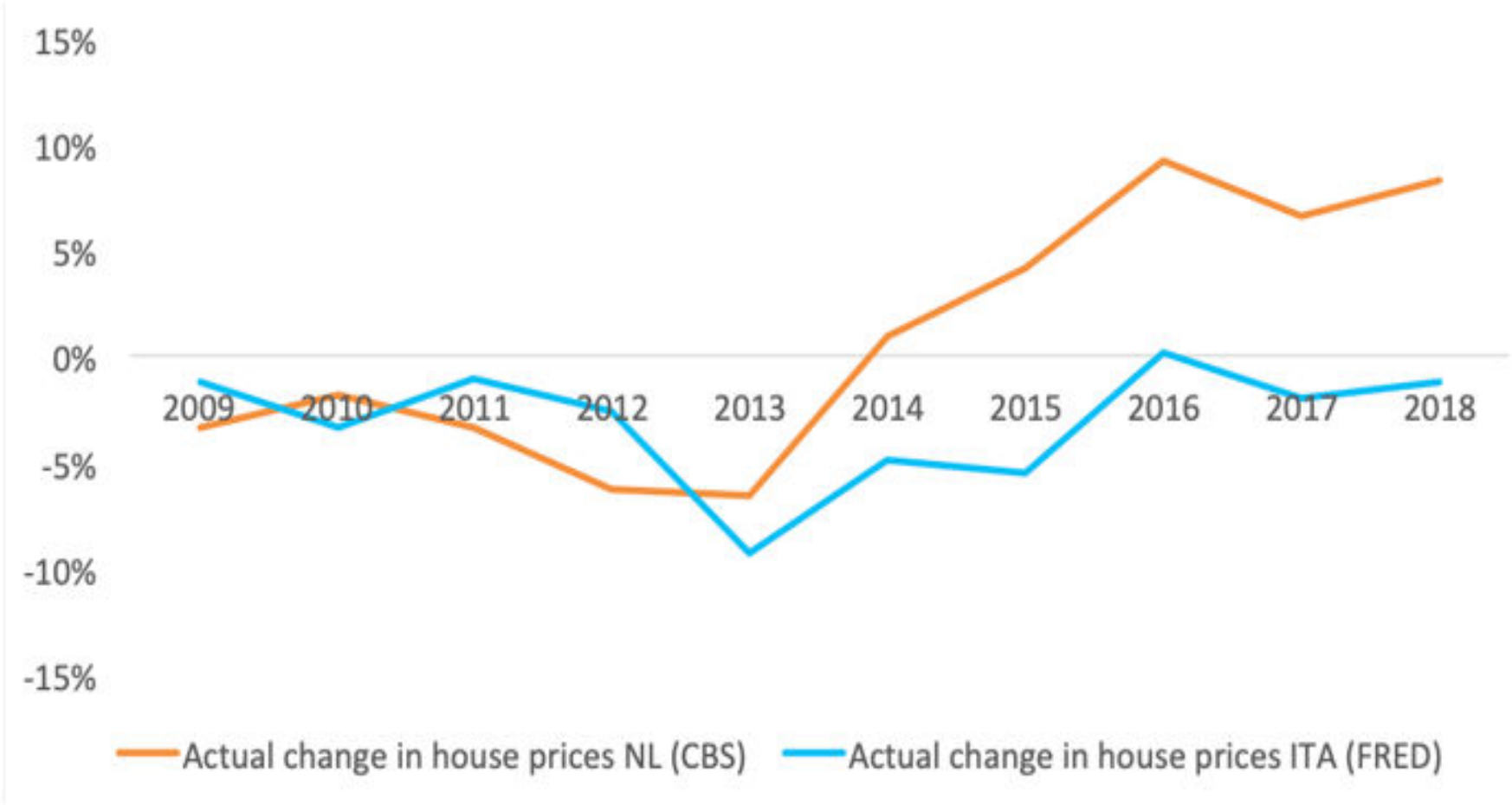
- Household Finance and Consumption Survey (HFCS) plus underlying national surveys:
  - DNB Household Survey (DHS) 2012-2018 : “How much percentage points a year will they increase/decrease on average?”.
  - Survey on Household Income and Wealth (SHIW) 2010-2014. Has two approaches:
    - 1st: “*on a scale from 0 to 100, what is the probability that house prices will drop in the next 12 months?”* and then “*… and what is the probability they will drop by more than 10%?*”.
    - 2nd: In the 2012 wave, the 1st question was asked to a 50% subsample of respondents, while to the other 50% subsample the following question has been asked: “*In 12 months, the price of houses will be (distribute 100 points): much higher (more than 10%), slightly higher (between 2% and 10%), about the same (between -2% and 2%) slightly lower between -2% and -10%) and much lower than today (less than -10%)*”.

- Let $\Omega_t$ be the information set of the individual at time $t$. Then, retrieve the first two moments (mean and variance) of the distribution of expectations by solving

$$\begin{cases} pr\ (r_{t+1} < A\ |\Omega_t\ ) = \ \Phi\left(\dfrac{E_t r_{t+1} - \mu}{\sqrt{\sigma^2}}\right) \\ pr\ (r_{t+1} < B\ |\Omega_t\ ) = \ \Phi\left(\dfrac{E_t r_{t+1} - \mu}{\sqrt{\sigma^2}}\right) \end{cases}$$

- Where $\Phi(\dots)$ denotes the Cumulative Density Function (CDF) of the Standard Normal Distribution, and A and B are the level of returns mentioned in the expectation questions, and $pr\ (r_{t+1} < A\ |\Omega_t\ )$, $pr\ (r_{t+1} < B\ |\Omega_t\ )$ are the observed data points.

**Figure 1:** House Price Changes in Italy and the Netherlands

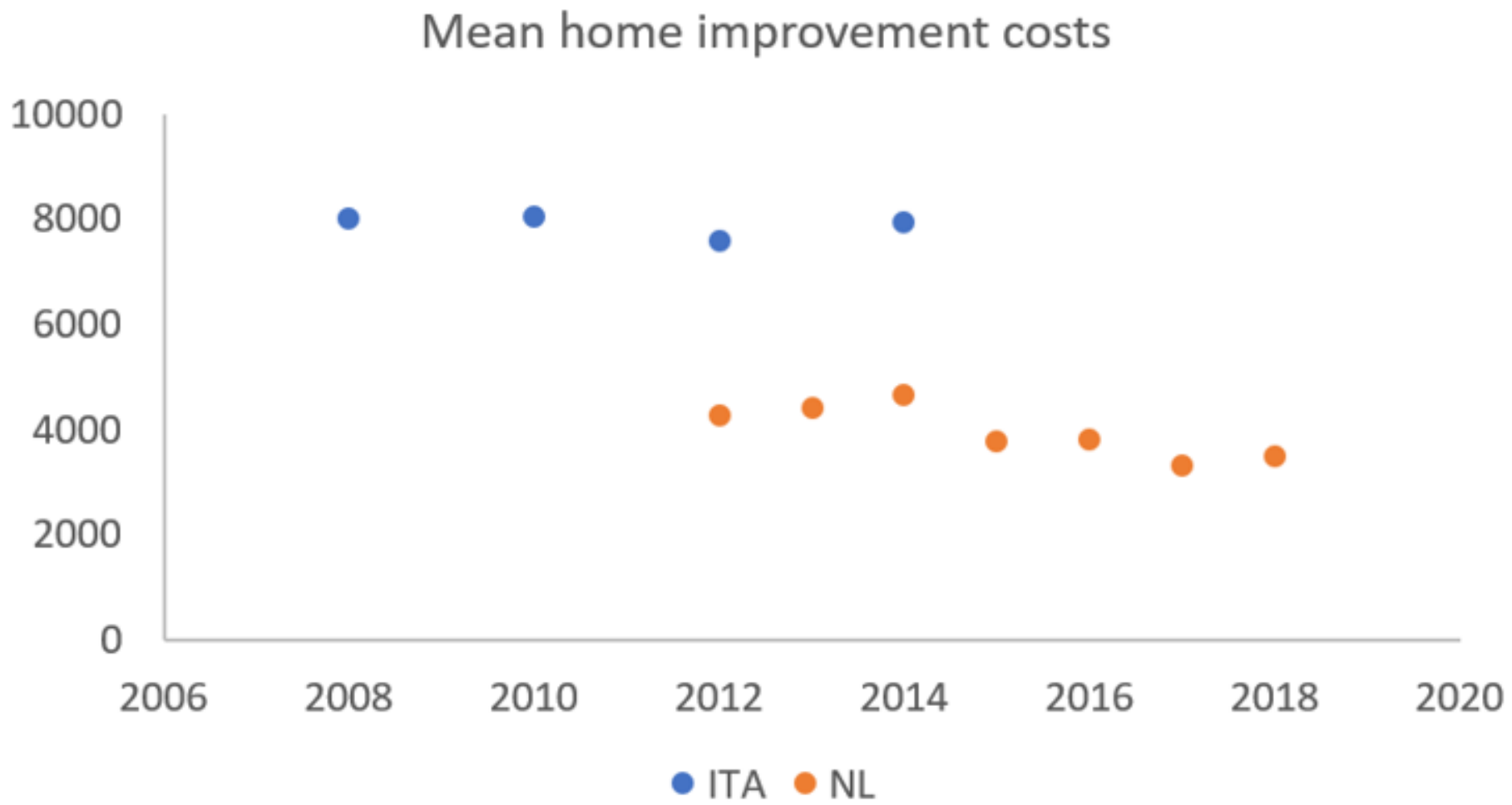



**Note**: The Figure compares the average house price changes in Italy and the Netherlands during the ten-year period between 2009 and 2018. Data on house price changes in the Netherlands are taken from Statistics Netherlands, while data on house price changes in Italy have been taken from the FRED dataset.

**Figure 2:** House Price Changes in Italy and the Netherlands

**Note**: The Figure compares the actual price changes and the expected price changes in Italy and the Netherlands. Actual price changes have obtained from data released by the Statistical Agencies (Istat and CBS), Expected price changes have been computed from the Survey data (SHIW and DHS).

**Figure 4:** Mean costs of home improvements in Italy and the Netherlands




**Note**: The Figure compares the mean costs of home improvements in Italy and the Netherlands, using the responses to the SHIW and DHS questionnaires.

# Estimating equation

$$\Delta s_{i,t:t+2} = \alpha + \beta\left[\Delta W_{i,t:t+2} - E_t\left(\Delta W_{i,t,t+2}\right)\right] + \boldsymbol{X}'_{\boldsymbol{i,t}}\gamma + \varepsilon_{i,t}$$

- Change in wealth could depend on maintenance ($m$ – endogenous). If we treat this as an omitted variable problem, we augment to:

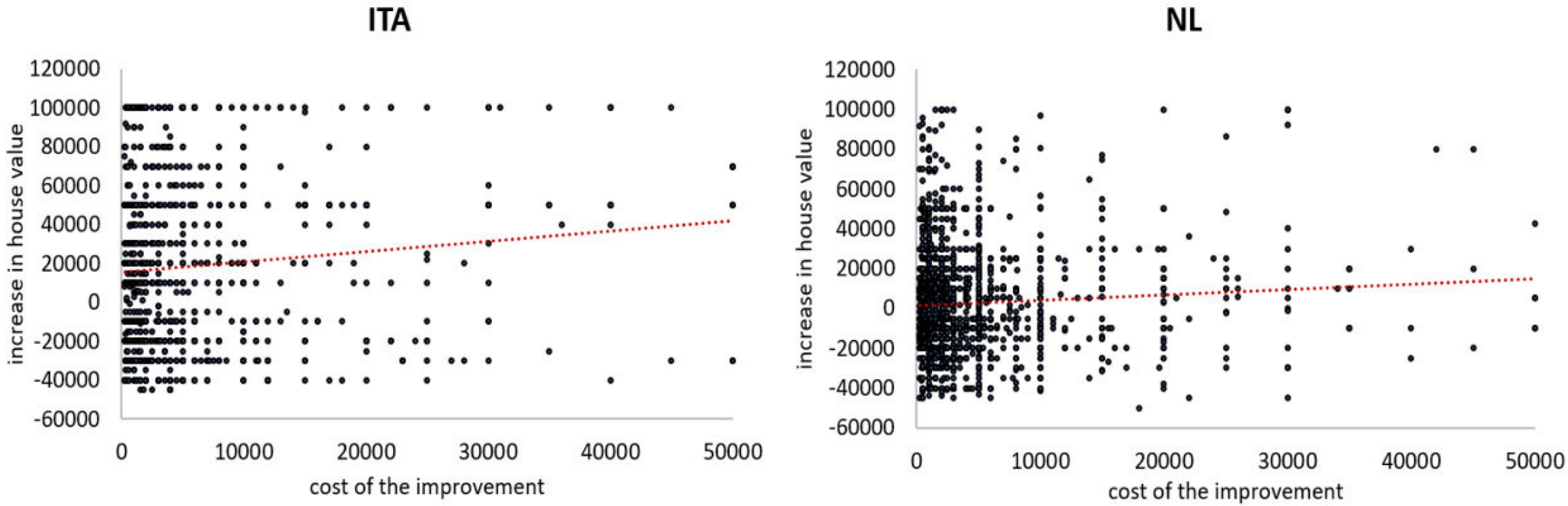
$$\Delta s = \alpha + \beta[\Delta W^u] + \theta m_{i,t:t+2} + \boldsymbol{X}'_{\boldsymbol{i,t}}\gamma + \varepsilon_{i,t}$$

- A positive bias emerges if the covariance between the change in house value and the value of the undertaken maintenance is positive

$$bias = \widehat{\beta} - \beta = (\Delta W^{u\prime}\Delta W^u)^{-1}\, Cov(\Delta W\,; m)$$

# Is the bias large?

**Figure 5:** Expectations on House Price changes in Italy and the Netherlands




**Note**: The Figure shows the monetary cost of the home improvement on the horizontal axis, and the difference of between two adjacent waves of the subjective estimation of housing value. Sources: SHIW and DHS, own computations.

# Estimation results

**Regression results NL**

| | (1) *standard* | (2) *with value H* | (3) *with cost H* | (4) *balanced panel 1* | (5) *balanced panel 2* | (6) *H < €10.000* | (7) *dummy low H* |
|---|---|---|---|---|---|---|---|
| Expected change in housing wealth | 0.00913 | 0.00821 | 0.00884 | -0.0222 | -0.0200 | 0.00412 | 0.00719 |
| Unexpected change in housing wealth | -0.0276*** | -0.0270** | -0.0275*** | -0.0353** | -0.0412*** | -0.0259*** | -0.0269*** |
| Expected value of home improvement | | 0.301 | | 2.753 | | | |
| Unexpected value of home improvement | | -0.298 | | -2.736 | | | |
| Cost of maintenance (improvement) | | | 0.00317 | | 0.00916 | 0.0224 | -0.0583 |
| Cost of maintenance (improvement), low maintenance | | | | | | | 0.0820** |

**Regression results IT**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Expected change in housing wealth | -0.0496*** | -0.0433*** | -0.0503*** | -0.0259 | -0.0302* | -0.0467*** | -0.0508*** |
| Unexpected change in housing wealth | -0.0340*** | -0.0437*** | -0.0342*** | -0.0381*** | -0.0299** | -0.0304** | -0.0344*** |
| Expected value of home improvement | | -2.595*** | | -1.673 | | | |
| Unexpected value of home improvement | | 2.524*** | | 1.622 | | | |
| Cost of maintenance (improvement) | | | -0.0741** | | -0.0393 | -0.0319 | -0.167*** |
| Cost of maintenance (improvement), low maintenance | | | | | | | 0.134* |

# Conclusions

- Savings and home improvements are substitutable consumption smoothing devices.
- Expectations of increasing house prices induce higher consumption and more home improvements.
- Endogeneity stems from the fact that, by undertaking more maintenance, agents also induce a higher wealth change.
- Ignoring home improvements can bias the estimate of the housing wealth effect. The size of this bias is likely to be small.
- Wealth effects are small, and less heterogenous than macro studies suggest.