House Prices and Health in Europe

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Work in Progress

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Motivation

- ▶ Does higher socioeconomic status (SES) lead to better health ?
- ▶ Positive correlation between SES and health
- ▶ Gradient is "poorly understood" (A. Deaton)
- ▶ Shocks on SES :
- ▶ Macro shocks : fall of the Berlin Wall
- ▶ Micro shocks : lottery prizes, inheritances
- ▶ House prices shocks = exogenous variations in local house prices (Ratcliffe, 2013)
    - ▶ Housing represents a large share of household wealth. Booms and busts in house prices → significant gains and losses in wealth
    - ▶ House prices variations capture
        - ▶ Pure wealth effects
        - ▶ Changes in available amenities in the area
        - ▶ Changes in economic opportunities in the area
    - ▶ Separate analysis for homeowners and non-homeowners
    - ▶ Positive correlation between house prices and well-being, for both population groups → Wealth + amenities + opportunities effects

Motivation

▶ We explore whether house prices have an impact on health

  ▶ for individuals ages 50 and older
  ▶ in five European countries : France, the Netherlands, Spain, Sweden, and Switzerland.

▶ Data

  ▶ SHARE data, waves 2 (2006-2007) and 4 (2011-2012)

    ▶ Longitudinal aspect
    ▶ The 2006-2012 period : large variations in prices around the 2008 crisis
    ▶ Subjective house prices
    ▶ Large set of health variables : general health status, depression, physical health problems, and health-related behaviours

  ▶ Data on objective house prices, disaggregated by regions, from various national sources

▶ Contributions :

  ▶ Five European countries ; international comparisons
  ▶ Both subjective and objective house prices
  ▶ (Increase and decrease in house prices)
  ▶ Wide range of health components and behaviours

Outline

Empirical Findings on Health and Wealth - Shocks Other Than House Prices Shocks

- ▶ Frijters et al. (2005)
  - ▶ Health : SAH
  - ▶ Shock : fall of the Berlin wall
  - ▶ Small positive effect of income on health

- ▶ Meer et al. (2003)
  - ▶ Health : self-assessed health and a binary variable indicating physical or nervous disabilities which limit the individual's ability to work
  - ▶ Shock : inheritances
  - ▶ No effect of wealth on health

- ▶ Kim and Ruhm (2012)
  - ▶ Health : mortality rates, self-assessed health, ADL, IADL, depression, health behaviours (use of medical services)
  - ▶ Shock : inheritances
  - ▶ No effect for most outcomes ; positive effect for alcohol consumption (and use of medical services)

- ▶ Lindahl (2005)
  - ▶ Health : a general health measure comprised of both the physical and mental aspects of health
  - ▶ Shock : lottery prizes
  - ▶ Positive effect

- ▶ Gardner and Oswald (2007)
  - ▶ Health : mental health (GHQ)
  - ▶ Shock : lottery prizes
  - ▶ Positive effect

- ▶ Apouey and Clark (2014)
  - ▶ Health : general, physical, and mental health, lifestyles
  - ▶ Shock : lottery prizes
  - ▶ No effect on general health, positive effect on mental health, detrimental effect on lifestyles

- ▶ Van Kippersluis and Galama (2013)
    - ▶ Health : eating, smoking, and drinking behaviours
    - ▶ Shock : lottery prizes and inheritances
    - ▶ Detrimental impact on lifestyles

- ▶ Schwandt (2014)
    - ▶ Health : physical health, mental health, and survival rates
    - ▶ Shock : stock market fluctuations
    - ▶ Positive effects

- ▶ Conclusion
    - ▶ Heterogeneity of the types of shocks
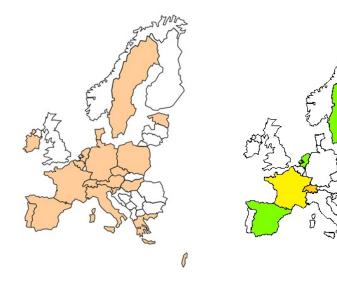   - ▶ Heterogeneity of the effects on health components

Empirical Findings on Health and Wealth - House Prices Shocks

- ▶ Ratcliffe (2013)
- ▶ Individual data from the BHPS between 1991 and 2007 matched with average house prices by postcode areas
- ▶ Health variable : mental health (GHQ)
- ▶ Increases in house prices = wealth effect + change in available amenities in the area + change in economic opportunities
- ▶ Homeowners / non-homeowners
- ▶ Positive correlation between house prices and well-being for both homeowner and non-homeowners
    - ▶ Inconsistent with a pure wealth effect
    - ▶ House prices also reflect amenities and opportunities

Data - The SHARE

- ▶ SHARE, waves 2 (2006-2007) and 4 (2011-2012)
- ▶ Individuals aged 50 and older from several European countries
- ▶ Nationally representative samples
- ▶ Longitudinal survey
- ▶ Individual- and household-level data on housing, health, and socioeconomic conditions
- ▶ Sample restrictions :
    - ▶ Individuals who are surveyed in both waves of SHARE
        - ▶ We want to take advantage of the longitudinal aspect of the data
    - ▶ France, the Netherlands, Spain, Sweden, and Switzerland
        - ▶ The disaggregated house price index is only available for these countries

FIGURE : Countries Participating in SHARE

FIGURE : Our Sample

Data - Objective House Prices

- ▶ Quarterly house prices, disaggregated at the region level
- ▶ Smallest region identifier in the SHARE :
    - ▶ Spain and Sweden : NUTS3
    - ▶ France, the Netherlands, Switzerland : NUTS2

- ▶ The 2006-2012 period : rapid and contrasted evolutions of house prices
    - ▶ Plummeted in Spain after 2007
    - ▶ Continuously decreased in the Netherlands after 2008
    - ▶ Increased in France and Sweden

- ▶ We exploit within and between-country variation in the interview date at each wave

The Timing of the SHARE

Objective House Prices in Europe, 2005-2012

Objective House Prices Changes in our Sample

% change in house prices	Sweden	Netherlands	Spain	France	Switzerland	Total
<-15	0	0	18.00	0	0	4.45
-15 to -10	0	0	12.44	0	0	3.08
-10 to -5	0	6.33	30.63	0	0	9.09
-5 to 0	0	77.90	28.46	0	0	25.69
0 to 5	0	15.77	10.46	48.07	0	14.20
5 to 10	0	0	0	15.02	0	2.45
10 to 15	0	0	0	0	26.66	3.66
15 to 20	3.61	0	0	36.91	35.14	11.61
20 to 25	22.45	0	0	0	20.71	7.62
25 to 30	34.06	0	0	0	0	7.25
>30	39.87	0	0	0	17.49	10.89
Total	100	100	100	100	100	100
N	913	1027	1061	699	589	4289

Variables - General and Mental Health

- General health - Self-assessed health (SAH)
  - "Would you say your health is... Excellent ; Very good ; Good ; Fair ; Poor ?"
  - From 1 (poor) to 5 (excellent)
- Mental well-being
  - EURO-D index, constructed using answers on 12 questions on depression
  - Recoded so that 0 represents poor mental health (depression) and 12 good mental health (no depression)

Variables - Physical Health

- ▶ Physical health - Mobility
  - ▶ From 0 (important mobility problems) to 10 (no mobility problem)
- ▶ Physical health - Less health symptoms
  - ▶ Score on health symptoms varies between 0 and 12
  - ▶ Recoded so that 0 indicates poor health (12 health symptoms) and 12 good health (no health symptom)
- ▶ Physical health - Less ADL and IADL
  - ▶ ADL = limitations with activities of daily living ; between 0 and 6
  - ▶ IADL = limitations with instrumental activities of daily living ; between 0 and 7
  - ▶ Recoded so thathigher values mean better health / less limitations
- ▶ Physical health - Grip strength
  - ▶ Strength of individuals' hands in a gripping exercise : individuals are asked to squeeze a handle as hard as they can for a couple of seconds. Alternate measurements from the right and left hand
  - ▶ From 0 to 100

Variables - Health-Related Behaviours/Lifestyles

- Lifestyles - BMI
    - Weight (in kilograms) divided by height (in meters) squared
    - Proxy for eating habits

- Lifestyles - Alcohol consumption
    - How often did the individual drink alcoholic beverages during the three months preceding the interview ?
    - From 1 ("Not at all in the last 3 months") to 7 ("Almost every day")

Variables - Objective House Price Shocks

- ▶ Objective house price shocks
    - ▶ Constructed using the average house price in the region
    - ▶ ΔHPI is the percentage change in the regional House Price Index (HPI) between the quarters prior to the quarter of interview at each wave
        - ▶ Switzerland : quarterly data are not available; ΔHPI is equal to the percentage change in the regional HPI between the years prior to the two interview dates
        - ▶ Within- and between-country variation in the interview date at each wave
    - ▶ $Pos\Delta HPI$ is the percentage change in the HPI, conditional on the change being positive
    - ▶ $Neg\Delta HPI$ is the percentage change in the HPI, conditional on the change being negative

Variables - Subjective House Price Shocks and Tenure Status

- ▶ Subjective house price shocks
    - ▶ Defined for homeowners only
    - ▶ Question in the SHARE asked to each household about the market value of the property
    - ▶ $\Delta SPrice$ is the percentage change in the self-assessed market value of the house between the two waves
    - ▶ $Pos\Delta SPrice$
    - ▶ $Neg\Delta SPrice$
- ▶ Tenure Status
    - ▶ Dummy for whether the individual is a homeowner
    - ▶ Interacted with the house prices shocks variables to explore potentially heterogeneous impacts of house prices depending on the tenure status

Variables - Controls

- Controls for baseline characteristics measured at wave 2 :
    - Gender
    - Age (in seven categories)
    - Marital status
    - Household size
    - ISCED education levels (in three categories)
    - Retirement status
    - Number of children (the log of the number of children + 1)

- Controls for changes in characteristics occurring between waves 2 and 4
    - Dummy for whether at least one child left the household
    - Dummy for becoming a widow or divorcing
    - Dummy for retiring

Empirical Strategy

▶ We estimate the following equation :

$$\Delta Health_{irc} = \alpha + \beta \Delta HPrice_j + X_{irc}^B \gamma_1 + \Delta X_{irc} \gamma_2 + D_c + \epsilon_{irc}$$

▶ Individual i, in region r, and country c

▶ $\Delta Health_{irc}$ is the change in health

▶ $\Delta HPrice_j$ (with $j = i, r$) represents either a subjective or an objective house price shock

   ▶ Subjective shocks are measured at the individual level ($j = i$)
   ▶ Objective shocks are measured at the regional level ($j = r$)

▶ X_{irc}^B are baseline individual controls (measured at wave 2)

▶ ΔX_{irc} are changes in some individual characteristics (retirement, divorce or widowhood)

▶ D_c are country dummies

▶ ϵ_{irc} is the error term

▶ Model estimated using OLS and clustering standard errors by regions

▶ On the sample of non-movers

Results - Objective and Subjective House Prices

TABLE : Correlation between objective house price variations and self-assessed house market value - Sample : homeowners who did not move between the two waves

Dependent variable : $\Delta SPrice$	(1)	(2)	(3)
ΔHPI	0.866***	0.683***	0.682***
	(0.111)	(0.161)	(0.162)
Controls			
Baseline X^B	NO	YES	YES
Changes ΔX	NO	NO	YES
N	2640	2594	2594

Results - Effect of Objective House Prices on Health

	(1) SAH		(2) Mental WB	
ΔHPI	0.002	(0.002)	0.004	(0.006)
ΔHPI * Owner	-0.001	(0.002)	-0.003	(0.003)
Owner	-0.016	(0.042)	0.006	(0.088)
Female	0.032	(0.030)	-0.051	(0.067)
Age $\leq$ 55	0.019	(0.055)	-0.068	(0.117)
Age 55-60	0.081	(0.059)	0.208**	(0.104)
Age 65-70	-0.059	(0.053)	-0.204*	(0.118)
Age 70-75	-0.035	(0.051)	-0.308**	(0.152)
Age 75-80	-0.057	(0.055)	-0.317**	(0.144)
Age 80-85	-0.169**	(0.079)	-0.352*	(0.191)
Age >85	-0.289**	(0.114)	-0.647*	(0.341)
Married at wave 2	-0.001	(0.047)	-0.218**	(0.089)
Household size at wave 2	-0.010	(0.022)	0.000	(0.042)
Pre-primary education	-0.023	(0.086)	-0.232	(0.191)
Primary education	0.008	(0.047)	-0.188*	(0.101)
Lower secondary education	0.024	(0.050)	-0.069	(0.098)
Tertiary education	-0.025	(0.050)	-0.203**	(0.085)
Retired at wave 2	-0.002	(0.043)	0.041	(0.104)
Log of number of children at wave 2	-0.000	(0.026)	-0.001	(0.063)
Widowed or divorced between waves 2 and 4	-0.069	(0.102)	-0.899***	(0.251)
Retired between waves 2 and 4	0.011	(0.046)	0.121	(0.098)
Child departure between waves 2 and 4	0.386**	(0.171)	0.867**	(0.383)
% change in unemployment rate	0.002**	(0.001)	-0.001	(0.003)
Country fixed-effects	YES		YES	
N	5710		5483	

Results - Effect of Objective House Prices on Health

	(1) Less symptoms		(2) Mobility		(3) Less ADL		(4) Less IADL		(5) Maxgrip	
ΔHPI	-0.007	(0.004)	-0.003	(0.005)	-0.002	(0.002)	-0.000	(0.003)	-0.015	(0.017)
ΔHPI * Owner	-0.003	(0.003)	-0.003	(0.003)	-0.001	(0.001)	-0.002	(0.002)	-0.014	(0.017)
Owner	-0.036	(0.068)	-0.004	(0.071)	0.001	(0.032)	0.070	(0.043)	-0.329	(0.282)
Female	-0.011	(0.046)	-0.060	(0.054)	0.025	(0.019)	0.028	(0.024)	-1.176**	(0.519)
Age $\leq$ 55	0.036	(0.081)	0.072	(0.087)	0.112***	(0.042)	0.093*	(0.050)	-0.850**	(0.414)
Age 55-60	0.093	(0.065)	0.034	(0.081)	0.038	(0.043)	0.041	(0.045)	-0.157	(0.275)
Age 65-70	-0.165**	(0.081)	-0.241***	(0.090)	-0.055*	(0.031)	-0.100***	(0.037)	-0.147	(0.378)
Age 70-75	-0.107	(0.100)	-0.323***	(0.107)	-0.110**	(0.046)	-0.195***	(0.052)	0.102	(0.407)
Age 75-80	-0.140	(0.098)	-0.648***	(0.114)	-0.289***	(0.065)	-0.430***	(0.084)	-0.546	(0.471)
Age 80-85	-0.151	(0.135)	-0.832***	(0.205)	-0.471***	(0.089)	-0.866***	(0.125)	-1.363***	(0.435)
Age >85	-0.289	(0.289)	-1.811***	(0.376)	-1.203***	(0.218)	-1.847***	(0.266)	-1.109	(0.989)
Married at wave 2	0.011	(0.077)	0.083	(0.068)	0.047	(0.030)	0.035	(0.046)	-0.269	(0.254)
Household size at wave 2	0.030	(0.038)	-0.082**	(0.039)	-0.046***	(0.017)	-0.046*	(0.025)	0.067	(0.131)
Pre-primary education	-0.079	(0.134)	-0.041	(0.176)	-0.049	(0.075)	-0.119	(0.097)	0.022	(0.521)
Primary education	-0.075	(0.066)	0.079	(0.066)	0.029	(0.033)	-0.033	(0.042)	-0.339	(0.271)
Lower secondary education	0.027	(0.061)	0.021	(0.071)	0.004	(0.025)	-0.009	(0.031)	-0.809**	(0.374)
Tertiary education	0.024	(0.053)	-0.031	(0.073)	0.004	(0.032)	0.001	(0.028)	-0.133	(0.277)
Retired at wave 2	0.029	(0.081)	0.035	(0.090)	0.082***	(0.030)	0.081	(0.049)	-1.282**	(0.486)
Log of number of children w2	-0.021	(0.057)	0.079	(0.055)	0.033	(0.021)	-0.011	(0.031)	0.006	(0.192)
Widowed or divorced w2-w4	-0.012	(0.123)	-0.008	(0.181)	0.151**	(0.070)	0.117	(0.103)	0.250	(0.773)
Retired w2-w4	0.066	(0.074)	-0.042	(0.079)	0.031	(0.029)	0.021	(0.033)	-0.981**	(0.410)
Child departure w2-w4	0.202	(0.234)	-0.044	(0.356)	-0.012	(0.161)	-0.098	(0.184)	-0.061	(1.505)
% change in unemployment rate	-0.000	(0.002)	-0.005	(0.003)	0.000	(0.001)	-0.001	(0.001)	0.006	(0.009)
Country fixed-effects	YES		YES		YES		YES		YES	
N	5730		5715		5714		5714		5175	

Results - Effect of Objective House Prices on Health

	(1) BMI		(2) Alcohol	
ΔHPI	0.003	(0.005)	0.003	(0.004)
ΔHPI * Owner	0.002	(0.004)	-0.001	(0.003)
Owner	-0.063	(0.073)	0.009	(0.078)
Female	-0.229**	(0.093)	-0.059	(0.061)
Age $\leq$ 55	0.076	(0.119)	-0.039	(0.084)
Age 55-60	0.101	(0.108)	0.001	(0.077)
Age 65-70	-0.021	(0.129)	0.030	(0.095)
Age 70-75	0.013	(0.134)	-0.043	(0.108)
Age 75-80	-0.289**	(0.144)	-0.164	(0.113)
Age 80-85	-0.542***	(0.188)	-0.296*	(0.153)
Age >85	0.348	(0.349)	-0.625***	(0.195)
Married at wave 2	-0.106	(0.080)	0.049	(0.063)
Household size at wave 2	-0.037	(0.052)	0.008	(0.038)
Pre-primary education	-0.185	(0.142)	-0.190	(0.191)
Primary education	-0.072	(0.077)	0.015	(0.077)
Lower secondary education	-0.108	(0.072)	-0.161**	(0.078)
Tertiary education	-0.105*	(0.060)	-0.080	(0.069)
Retired at wave 2	-0.401***	(0.105)	-0.083	(0.068)
Log of number of children at wave 2	0.134**	(0.062)	-0.003	(0.054)
Widowed or divorced between waves 2 and 4	-0.485*	(0.280)	-0.218	(0.214)
Retired between waves 2 and 4	-0.191*	(0.113)	0.010	(0.090)
Child departure between waves 2 and 4	-0.202	(0.284)	-0.107	(0.347)
% change in unemployment rate	-0.003	(0.002)	-0.006***	(0.002)
Country fixed effects	YES		YES	
N	5472		5678	

Results - Effect of Objective House Prices on Health

- ▶ Control variables
  - ▶ Female
    - ▶ Negative effect on (the change in) grip strength and BMI
  - ▶ Age
    - ▶ Negative correlation with general health, mental well-being, mobility, less ADL and IADL
    - ▶ Negative correlation at older ages for alcohol consumption
  - ▶ Education
    - ▶ Non-linear relationship with mental well-being, (high education) negative correlation with BMI
  - ▶ Becoming a widow/divorcing
    - ▶ Negative effect on mental well-being and BMI
  - ▶ Unemployment rate
    - ▶ Negative correlation with alcohol consumption (see work of C. Ruhm)

- ▶ Future work : distinction between positive and negative shocks + heterogeneity between countries
  - ▶ Specificity of Spain
  - ▶ Other countries : positive shocks are associated with an increase in mental well-being
  - ▶ Interactions between ΔHPI, owner, and country dummies

Results - Effect of Subjective House Prices on Health

- Sample of homeowners
- Same list of controls as before
- Negative correlation with mental health and physical health (less IADL)

	(1)		(2)		(3)	
	SAH		Mental WB		Less Symptoms	
$\Delta SPrice$	0.000	(0.001)	-0.002*	(0.001)	-0.001	(0.001)
N	2610		2552		2617	
	Mobility		Less ADL		Less IADL	
$\Delta SPrice$	0.001	(0.001)	-0.000	(0.000)	-0.001**	(0.000)
N	2609		2610		2610	
	Maxgrip		BMI		Alcohol	
$\Delta SPrice$	0.004	(0.004)	0.001	(0.001)	0.000	(0.001)
N	2461		2548		2609	

Results - Effect of Subjective House Prices on Health

	(1)		(2)		(3)	
	SAH		Mental WB		Less symptoms	
$\Delta Sprice$	0.000	(0.002)	0.001	(0.001)	0.000	(0.001)
$\Delta SPrice$ * Netherlands	-0.000	(0.002)	-0.007**	(0.003)	0.001	(0.003)
$\Delta SPrice$ * Spain	0.000	(0.002)	-0.003	(0.002)	-0.001	(0.001)
$\Delta SPrice$ * France	0.001	(0.002)	-0.004	(0.003)	-0.001	(0.002)
$\Delta SPrice$ * Switzerland	0.001	(0.002)	-0.004**	(0.002)	-0.001	(0.002)
N	2610		2552		2617	
	Mobility		Less ADL		Less IADL	
$\Delta Sprice$	0.001	(0.001)	0.001	(0.001)	-0.000	(0.001)
$\Delta SPrice$ * Netherlands	-0.003	(0.002)	-0.001	(0.001)	-0.002*	(0.001)
$\Delta SPrice$ * Spain	-0.000	(0.001)	-0.003***	(0.001)	-0.001	(0.001)
$\Delta SPrice$ * France	0.002	(0.001)	-0.001	(0.001)	-0.000	(0.001)
$\Delta SPrice$ * Switzerland	0.001	(0.001)	-0.001	(0.001)	-0.000	(0.001)
N	2609		2610		2610	
	Maxgrip		BMI		Alcohol	
$\Delta Sprice$	0.003	(0.006)	0.002	(0.001)	0.002**	(0.001)
$\Delta SPrice$ * Netherlands	0.005	(0.012)	-0.004	(0.003)	-0.003	(0.004)
$\Delta SPrice$ * Spain	-0.008	(0.009)	-0.002	(0.002)	-0.001	(0.001)
$\Delta SPrice$ * France	0.015	(0.015)	0.001	(0.002)	-0.004	(0.003)
$\Delta SPrice$ * Switzerland	0.013	(0.009)	-0.001	(0.002)	-0.003**	(0.001)
N	2461		2548		2609	

Conclusion

- ▶ Different impacts of objective and subjective shocks
  - ▶ No impact of objective shocks on health
  - ▶ No difference between owners and tenants
  - ▶ When excluding Spain, positive impact of objective shocks on mental health (still no difference between owners and tenants)

  - ▶ Small but significant negative impact of subjective shocks on mental well-being and physical health (IADL)

- ▶ Preliminary results/work in progress
  - ▶ Focus on the sample of individuals who do not move. Since residential mobility is correlated with wealth (Angelini & Laferrère, 2012) : sample selection ?
  - ▶ Are the effects of positive and negative shocks non symmetric ?
  - ▶ Why a Spain effect ?
  - ▶ Heterogeneous impacts (interactions with gender, age) ?