The Impact of Real Estate and Stock Market Fluctuations on Human Well-Being

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Abstract

Fluctuations of house and stock prices have an important effect on household wealth and, consequently, on household consumption patterns. The literature has found that house price variations have a stronger effect on households' consumption patterns than stock market variations, although results are not fully conclusive. In this paper I analyze the effects of real estate and stock market fluctuations on self-reported life-satisfaction levels of around 400,000 Western European citizens from 1975 to 2002. There are two main findings. First, in line with research on the link between financial wealth and consumption, only real estate variables display a strong and robust effect on happiness, while stock market price changes have a negligible effect. Second, house price increases generate a temporary rise in life-satisfaction due to the capital gain and to the higher borrowing capacity, but also a permanent negative effect due to the lower affordability of houses. Therefore, real estate speculations increase life-satisfaction only in the short term, while in the medium-long term the negative effect connected to the lower affordability of houses prevails.

1. Introduction

Many studies have tried to measure the impact of real estate and stock market fluctuations on wealth and, consequently, on consumption. At the same time a number of other studies have focused on the identification of the socio-economic determinants of well-being: the target of the benevolent social planner/policy maker should be to maximize the population's welfare, rather than its consumption level *per se*. Consumption capabilities are only one aspect of human life, although fundamental. Since most of household wealth is held in houses and stocks, it is important to measure the impact of real estate and stock market fluctuations on life-satisfaction, which one is more relevant and what policy implications we can draw. Policy makers should try to maximize the population's welfare taking into account the effects of macroeconomic variables both in the short and in the medium-long term. To my knowledge, this is the first study on the effects of these two sources of wealth on life-satisfaction.

The paper is organized as follows. Chapter 2 presents a literature review of the effects of real estate and stock market fluctuations on household wealth and consumption (Ch. 2.1) and of the determinants of happiness (Ch. 2.2). Chapter 3 shows the data and the methodology used. Chapter 4 presents the three main empirical results. Chapter 5 concludes.

2. Literature Review

2.1 Real estate and stock market fluctuations, wealth and consumption

Over the last decades a growing body of literature has analyzed the effects of asset markets on consumption. Housing is the dominant component of wealth for the typical household in the United States and Europe, while financial assets follow closely. Real estate and stock market fluctuations can strongly influence upward or downward household financial wealth, like the dot-com stock market boom until 2000 and the real estate bubble of the last years. Therefore, it is reasonable to expect some effects on household consumption.

The nature of the effect on consumption has to be analyzed in a permanent income/life-cycle perspective (see Friedman, 1957 and Ando and Modigliani, 1963). There are two main transmission channels: liquidating assets and borrowing capacity. The first is more relevant for stock markets, given their intrinsic higher liquidity: selling an asset after a price boom provides a capital gain which increases the permanent income and allows higher consumption levels. Unexpected wealth shocks change the household permanent income, thereby affecting the life-cycle pattern of saving and consumption (see Lettau and Ludvigson, 2004). The second refers mainly to real estate markets: housing properties can be used as collateral to weaken the borrowing constraints towards financial institutions and increase the consumption level. Agents want to smooth consumption over

their life-cycle, thus they will distribute over time the increases in anticipated income or wealth. Both assets have advantages: stocks are liquid and can easily be sold to monetize the gain or minimize the loss, while houses can be used as collateral and their prices are more stable.

On the other hand, from a theoretical point of view the overall wealth effect on consumption is not necessarily unambiguous, especially for the real estate market. A substantial percentage of financial assets are held into unquoted shares or private pension and investment funds which cannot be sold whenever one believes the price to be convenient. More importantly, capital gains from increased real estate prices imply also higher costs for housing services like rental costs and mortgage repayments for non-homeowners. Households planning to buy a new house or to move to a bigger one will have to reduce their consumption level to save more for down-payments and repayments. Hence, some or all of any consumption increases made by current owners might be offset by increased savings of renters who aspire to become homeowners as mentioned, among others, by Englund and Yoannides (1997). Finally, focusing on the wealth effect (without considering the effect on collateral and credit), homeowners can increase their consumption level only if they reduce the consumption of housing services. In other words, homeowners who are not planning to sell a house (e.g. because they are currently living there and are not planning to move to a smaller one) are only theoretically, but not actually richer.

However, most of empirical studies show that the wealth effect of both stock and the housing markets on consumption is positive. Evidence of a positive housing effect on consumption has been found by Skinner (1989) for the U.S., Yashikawa and Ohtake (1989) for Japan, Case (1992) for New England, Brodin and Nymoen (1992) for Norway, Koskela et al. (1992) for Finland, Bayoumi (1993) for the U.K., Engelhardt (1994) for Canada, Berg and Bergström (1995) for Sweden, and others. Using data from the PSID during the 1980s Engelhardt (1996) finds that the link between house price appreciation and savings behavior of US homeowners under age 65 derives from an asymmetry in the saving response. Households that experience real losses reduce their consumption levels while households that experience real gains do not modify their behavior.

A natural question is: which of the two effects is more important? The answer depends on whether we compare relative or absolute effects. If we compare the marginal propensity to consume (relative impact) of the two variables there is more evidence suggesting a higher MPC for housing than for financial wealth. An early paper by Elliot (1980) finds a positive effect of financial wealth while "houses, automobiles, furniture and appliance can be treated more as part of the environment by households than as a part of realizable purchasing power" (p. 528). However, the method used to estimate non-financial wealth is questioned by Bhatia (1987). Dvornak and Kohler (2003), using a panel of Australian states, find a MPC equal to 0.03 for housing wealth and equal to 0.06-0.09 for financial wealth. Boone and Girouard (2002), analyzing aggregate data on six of the G7 countries,

with the exception of Germany[1], find a positive effect of both forms of wealth on consumption, although results are not easy to compare.

On the other hand Levin (1998), with survey data from the Retirement History Survey, finds a MPC of 0.5-0.6 for housing wealth and less than 0.02 for financial wealth. Benjamin, Chinloy and Jud (2004), using U.S. aggregate quarterly data from 1952 to 2001, find that an additional dollar of housing wealth increases consumption by 8 cents, compared with only 2 cents for financial wealth. Consequently, the marginal propensity to consume (MPC) out of housing wealth is four times the size of that from financial assets. Bostic, Gabriel and Painter (2005), using U.S. micro data from the Survey of Consumer Finance and from the Consumer Expenditure Survey over the period 1989-2001, find that housing wealth elasticities range from 0.063 in 1989 to 0.057 in 2001, while financial wealth elasticities range from 0.021 in 1989 to 0.015 in 2001. Although both forms of wealth seem to become less important over time, this result is in line with Benjamin, Chinloy and Jud (2004): real estate wealth is three up to four times more important. Case, Quigley and Shiller (2005), using two different panel datasets for European countries and U.S. states, find a statistically significant and rather large effect of housing wealth upon household consumption.

Even if, to some extent, the results of some studies seem to be sample-specific (which is often the case), when taking into account the composition of the households' wealth it generally appears that housing wealth has a stronger absolute effect on savings and consumption than financial wealth. This might be due to the fact that a higher share of household wealth is held in real estate form. Norman, Sebastia-Barriel and Weeken (2002) calculate that in the first three quartiles of the income distribution of Italy, France, Germany, U.K. and U.S., less than 20 percent of the population owns shares. As noted by Boone and Girouard (2002), this is important since the agents with the largest propensity to consume out of wealth are typically considered to be those with lower wealth holdings and lower income. Most of financial assets are held by big private equity and pension funds and by a minority of wealthy households. On the contrary, the majority of American and (especially Southern) European families are homeowners. Consequently it is normal to expect a higher absolute impact of real estate fluctuations on consumption patterns.

Another relevant issue refers to the size of the wealth effects at different age cohorts. While the MPC out of financial wealth is expected to be a function of the households' total income and wealth, in the case of housing wealth there can be significant redistribution effects between agents at different stages of their housing career[2]. Rising prices redistribute income away from new entrants towards households about to leave the owner-occupancy market. Usually young people start living in small apartments, then move to bigger houses when the size of the family grows, finally (sometimes) move back to smaller places when children leave. Following this line of reasoning, we should be able

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[1] Germany was not included in the sample because housing wealth was not available over a long enough period for econometric analysis.
[2] In other words, there is no reason to expect a negative effect of stock market rises for any age cohorts. On the contrary, rising house prices might benefit old age cohorts and damage young ones.

to observe older homeowners increasing their consumption when house prices rise, while young renters should cut their consumption. Quite consistently, Campbell and Cocco (2005) using data on the U.K. find a strong positive effect of house prices on consumption for older homeowners and no effect for younger renters. The authors argue that this latter result is due to the fact that households tend to substitute non-durable consumption for housing consumption, thus counteracting the negative wealth effect.

Lehnert (2004) estimates consumption elasticities from housing wealth by age quintile. The result is that the youngest group has higher elasticity of consumption than the next two age quintiles. The elasticity of the quintile about to retire is the highest, then diminishes although remains positive. The author claims, in a life-cycle perspective, that the youngest want to consume more since they have the highest permanent income increases. They would like to borrow, but are liquidity-constrained. Higher house prices relax their borrowing constraints, no matter if they move to a bigger house in the future and have to pay a higher price for this. People about to retire have the highest elasticity because they have accumulated housing wealth for the entire life and are probably going to move to a smaller place, realizing substantial capital gains. Finally, the elasticity of the oldest people (above age 62) is still positive because, if they move to a smaller place, the capital gain might help to compensate the lower income due to retirement.

2.2 The determinants of happiness

Although the theoretical discussion on the role of happiness in economics has become increasingly popular since Easterlin's (1974) seminal paper, there is plenty of social scientists and philosophers who, over the centuries, speculated about the importance and the pursuit of happiness. As an example, it is worth to mention this nice quote from Malthus (1798) on Adam Smith's work: "*The professed object of Dr. Adam Smith's inquiry is the nature and the causes of the wealth of nations. There is another inquiry, however, perhaps still more interesting, which he occasionally mixes with it, I mean an inquiry into the causes which affect the happiness of nations*".

As previously written, the first rigorous economic paper on happiness has been written by Easterlin (1974), whose purpose was to study the relationship between income and life-satisfaction over time and across countries. His surprising result was that "money does not buy happiness": higher per capita GDP levels do not automatically imply higher average happiness scores. The author showed that in 1960 some African and South American countries had much lower GDP per capita but same or even superior average well-being than Germany. Furthermore, the average life-satisfaction of American citizens in the post WWII period was found to be almost constant while the real GDP per capita had doubled or tripled.

The literature on the link between real personal income and happiness has grown a lot over the last decades and has benefited a number of important academic contributions. Veenhoven (1993) with data on Japan, Oswald (1997) with data on the U.S. and Europe and Blanchflower and Oswald (2004) with data on the U.S. and U.K., confirm Easterlin's (1974) results, while Diener and Oishi (2000) with data on Denmark, Germany and Italy

provide a counterexample. Much effort has been put to solve this puzzle and explain why higher income does not automatically increase life-satisfaction by the same amount. The most obvious theory refers to the diminishing marginal utility of absolute income, since initial income is used to purchase primary goods which have a stronger impact on individuals' well-being. Adaptation effects play an important role: people increase their income aspirations over time because they get used to higher standards of living. When we had 100 $ we though that 200 $ would have made us very satisfied, but after a while we will get used to the 200 $ and will consider 400 $ the necessary amount to make us very happy.

Many studies have stressed the importance of relative rather than the absolute income. People compare themselves with others, thus well-being increases with own income and decreases with others' one. The consciousness of belonging to the richest share of the population is as important as being wealthy, or possibly even more. We are more likely to be very satisfied of the quality of our life if we have 100 $ and our neighbor 50 $ rather than when we have 100 $ and our neighbor 200 $. Consequently, if the per capita GDP rises over time but the income distribution is identical, the marginal utility of additional income might be reduced. If instead income inequality increases, the total well-being can remain unchanged or might even diminish.

Castriota (2006) analyzes the effect of absolute income on human well-being by education level. Using data from the World Bank's World Value Survey he finds that the higher the education level is, the less relevant the absolute income level (GDP per capita measured in PPP constant 2000 international USD). Higher income makes everybody happier but, everything else being equal, the marginal utility of additional income is higher for less educated people. This might partly explain why the rising income in Western Europe, Japan and the United States has not necessarily been followed by a rise in the average well-being. Furthermore, average satisfaction levels in rich and poor countries are not as different as GDP levels. Since the average education level is much higher in advanced countries than in developing ones and has constantly improved all over the world, this might contribute to explain why higher absolute income level has not automatically implied higher life-satisfaction across countries and over time.

Finally, omitted variables may play a role in "neutralizing" the positive effect of additional absolute income. Deteriorating social conditions, higher criminal rates, worsening working hours, decreasing real wages and rising costs of living due to higher real estate prices might counterbalance the overall macroeconomic improvement. Blanchflower and Oswald (2007) show that in the United States the wellbeing of successive birth-cohort has, *ceteris paribus*, fallen through time. Friedman (2006) points out that the majority of the American population has not benefited at all the economic growth of the last thirty years, apart from the second half of the 1990s. The average real wage, taking into account the cost of living, has diminished by 15% over the last thirty years.

Most of families have managed to maintain their previous standard of living, or even to improve it, by increasing the number of salaries perceived. Nowadays most of women in

Western countries work, and a substantial number of people have a second or even a third job. But this is not costless since people have little time for their children, relatives and friends, which is probably what makes people really happy[3]. The thesis underlying Friedman's book is that these socio-economic transformations have worsened the quality of life and, consequently, reduced the mental openness and the tolerance towards immigrants of most American citizens.

Although income is probably one of the most important determinants of happiness, the literature has identified many additional relevant socio-economic variables which can be classified into six groups: (i) personality factors, mainly studied by psychologists; (ii) contextual and situational factors; (iii) demographic factors, like gender, age and education; (iv) institutional conditions, such as the type of political system, the design of democratic institutions, the level of freedom etc.; (v) micro and macro-economic factors, such as per-capita income, unemployment, inflation and inequality; (vi) beauty of the respondents' city, countries' natural characteristics like the climate, the proximity to the sea and whatever else affects well-being.

3. Dataset and econometric methodology

The variables used in this analysis come from six different databases. Data on self-reported life-satisfaction and on demographic characteristics like gender, age, education, civil and working status are from the Eurobarometer, a pooled cross-section which provides detailed information on more than one million individuals from 16 countries over the period 1975-2002. Table 1 describes the variables used and their source. Data on GDP growth and inflation come from the World Bank's World Development Indicators, while unemployment rates are from the OECD Statistics which provides more complete series.

Data on house price variations have kindly been provided by the Bank of International Settlements (BIS), those on affordability of houses by the OECD, while stock market country-indexes are from Ecowin, apart from the U.K. and the Netherlands which are from Datastream since for these two countries its series go back to the 1970s. The OECD provides two indexes which measure the affordability of houses: the first captures the price-to-income ratio (the ratio between an index of house prices and the GDP per capita) while the second captures the rent-to-income ratio (the ratio between an index of house rents and the GDP per capita)[4]. These two indexes allow comparisons among countries and over time (see Girouard, Kennedy, Van den Noord and Andre', 2006). Unfortunately, while stock market data are available for all the 16 countries in the sample, the BIS and OECD do not provide data for the smallest European countries. Both the real estate and the stock market variations are computed as simple real price changes, net of inflation

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[3] For this reason Layard (2006) suggests to raise marginal taxes, reduce mobility and restructure the economy to get everybody work less and consume more relational goods.
[4] Sources and methodology are described in Girouard et al. (2002).

effects and without considering rents or dividends[5]. Following the standard literature[6] in this field, all changes in macroeconomic data are three-year moving averages, the underlying assumption being that people need some time to realize the changes in the economic situation of their country.

Table 2 provides a detailed description of the availability of data for each country for the five main variables, namely life satisfaction, stock market and real estate price variations, the two affordability indicators. Table 3 reports summary statistics. The average real stock price increase is around 2.5 times higher than the real estate one, while the standard deviation is more than three times bigger. Stock markets are characterized by higher risk but provide higher returns to investors. Following Di Tella, MacCulloch and Oswald (2001), the original variable "Income" has been recoded in order to obtain four dummy variables for four different income groups. Table 4 shows pairwise correlations to check for possible multicollinearity among the variables of interest. All the correlations are well below 0.50[7], apart from the two affordability indicators (house prices and rents move in the same direction and, consequently, the correlation is close to one).

Three things deserve to be underlined. First, there is a negative correlation between age and income, which is due to the effect of retirement and to the fact that the education level in European countries has constantly risen over time. The correlation between age and education is negative: young people are more educated than old ones. Since higher qualifications imply higher wages (positive correlation between education and income), it turns out that the correlation between income and age is negative. Second, the correlation between the indexes of house affordability and happiness is significant and negative. Third, the correlation between stock market and real estate changes is negative, even if the relation is statistically significant (t-value equal to -78.95) but economically not very strong (coefficient equal to -0.0834).

This negative correlation can be explained by the fact that people disinvest in one market to invest in the booming one. Alternatively, Lustig and Van Nieuwerburgh (2005) elaborate a model with housing collateral where the ratio of housing wealth to human wealth shifts the conditional distribution of asset prices and consumption growth. A decrease in real estate prices reduces the collateral value of housing, increases household exposure to idiosyncratic risk and increases the conditional market price of risk. Using aggregate data for the United States they find that a decrease in the ratio of housing wealth to human wealth predicts higher returns on stocks.

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[5] This methodology has been adopted because the database provided by the BIS does not provide total returns for the real estate market (including rents) and because the target was to focus on simple fluctuations of aggregate price levels rather than on total yields.

[6] See, for example, Di Tella, MacCulloch and Oswald (2001), Di Tella and MacCulloch (2003), Alesina, Di Tella and MacCulloch (2004) and Becchetti, Castriota and Giuntella (2006).

[7] It would have been interesting to add in the regression the GDP per capita as an additional control variable. Unfortunately there is a multicollinearity problem between the GDP per capita on one side and inflation and unemployment rates on the other. In fact, the correlation between GDP per capita and inflation is -0.57 and that between GDP per capita and unemployment -0.50. Nevertheless, the effect of the GDP per capita is in big part captured by the country dummy variable.

The econometric methodology adopted in this research is standard in the literature (see Di Tella et al., 2001) and is based on multinomial ordered probit regressions with standard errors adjusted for clusters. The model specification is:

$$S_{ijt} = \alpha_j + \lambda_t + \sum_{k=1}^{K} \beta_k MICRO_{kijt} + \sum_{l=1}^{L} \gamma_l MACRO_{ljt} + \varepsilon_{ijt}$$

where the satisfaction level S_{ijt} of individual i in country j at time t is affected by a country dummy variable α_j which captures all the economic, political, social etc. unobserved country-specific components, a year dummy λ_t, a set of microeconomic characteristics $MICRO_{kijt}$, and a set of macroeconomic variables $MACRO_{mjt}$, while ε_{ijt} represents the error term. The $MICRO_{kijt}$ characteristics are the variables from the Eurobarometer listed in the upper part of Table 1, while the $MACRO_{mjt}$ are the remaining ones in the lower part.

4. Empirical results

Table 5 presents preliminary results from full sample regressions. In line with previous results, being unemployed has a strong negative effect on well-being, happiness is U-shaped with age while education, income and a stable and successful relationship exert a positive effect. The GDP growth rate has a positive impact on wellbeing while inflation and unemployment a negative one, the effect of unemployment being larger than that of inflation.[8] Columns 1-4 consider the four financial variables separately: the effects of capital gains (*Δ Real Estate* and *Δ Stock Market*) are positive while those of the two house affordability indicators (*Price-to-income* and *Rent-to-income*) are negative.

Column 5 analyses the effect of stock market and real estate price changes together: notice that the number of observations diminishes when including real estate price variations since housing data for Austria, Greece, Luxembourg and Portugal are not available. We can see that the effects of the stock market variations disappear while those of real estate fluctuations are robust. Column 6 repeats the exercise of Column 5 but adds the *Price-to-income* variable which has a strong negative effect on wellbeing. Column 7 replaces the *Price-to-income* with the *Rent-to-income* variable: results are very similar to Column 6, which does not come as a surprise since the two regressors have a correlation equal to 0.92 (see Table 4).

Two results emerge from this table. First, only real estate variables have robust effects on life-satisfaction. Stock market fluctuations do not have any strong and statistically robust effect of happiness, which can be due to the higher share of real estate assets in the household portfolio (most people, especially in Southern Europe, own the house where they live), to the psychological reason that real estate prices are perceived to be more

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[8] For a deeper investigation over the effects of inflation and unemployment on happiness, see Di Tella, MacCulloch and Oswald (2001) and Becchetti, Castriota and Giuntella (2006).

permanent and to the fact that houses can be used as collateral to relax borrowing constraints and obtain loans from a financial institution. This is consistent with the results on the link between wealth and consumption mentioned before, which show that house price variations seem to have a stronger effect on aggregate consumption than stock price variations. Second, while on the one hand individuals are happier if house prices increase (if they hold a house they realize a capital gain and can relax their borrowing constraint), on the other they suffer from more expensive/less affordable houses.

Table 6 performs a robustness check by running the regression in Table 5-Column 6 by age subgroups. Unfortunately, the Eurobarometer does not provide information on whether respondents own or rent the house they live in. Therefore, age cohorts are used as a proxy for house ownership in order to check whether the reactions of renters and owners are different. In fact, young people likely do not own the place they live in while elderly people have more real estate properties. If on average this were the case, we might observe a more negative coefficient of the price-to-income variable for younger people because they would suffer the most from high prices (while the elderly already own their home, young people are likely willing to buy a house but cannot afford it). Furthermore, the coefficient of *Δ Real Estate* could be higher either in older age cohorts, since they are likely to realize the biggest capital gains, or in younger cohorts, since they are more in need (small absolute gains matter more in relative terms).

Two points have to be underlined. First, results on all macroeconomic variables are very robust. Second, the sensitivity of different age cohorts towards the real estate variables is very similar. The coefficient of Price-to-income is, as expected, bigger in the youngest age cohort (age<29), but the difference is not statistically significant. Similarly, results in Table 6 do not show any significant difference among the coefficients of *Δ Real Estate*.[9]

5. Conclusions

This paper studies the welfare effects of real estate and stock market fluctuations using data from the Eurobarometer on the self-declared life-satisfaction levels of 400,000 Western European citizens from 1975 to 2002. Two main conclusions emerge. First, only

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[9] There are four possible explanations for these unexpected results. First, younger people have a lower income and are more in need (higher ratio between change of wealth and personal income). Elderly people are less sensitive to price changes because, excluding big speculators, their quality of life will hardly be compromised by market fluctuations, whereas for poor people a gain can be small in absolute terms but high in relative ones. Second, the borrowing constraints of poor people are more heavily affected by the house prices, provided that one has an asset to give as collateral. Third, transfers from old-age/high income groups to young age/low income ones might have played some role in offsetting the impact of a rise in house prices, especially in family-based countries like in Southern Europe. Last, but not least, the process through which expectations about future price changes are generated might differ across income and age cohorts. More specifically, while young and poor people might believe that house prices will continue along the previous path, the others might be more aware of the future likely market evolutions. Young and poor people might be affected by the illusion that prices will be rising or falling forever, while high income people (who on average have a higher education level) and old people (who have accumulated experience over time) might be aware of the fact that, sooner or later, after a boom there is always a bust.

real estate variables have a relevant impact on human well-being while stock price variations do not show any robust effect. This might be due to the fact that a higher share of households' portfolio is held in real estate properties, to the psychological reason that real estate prices are perceived to be more permanent and to the fact that houses can be used as collateral to relax borrowing constraints and obtain loans from a financial institution.

Second, while a rise in the house prices generates a temporary increase in life-satisfaction due to the capital gain and to the higher borrowing capacity, in the medium-long term the negative and permanent effect connected to the lower affordability of houses might prevail. Therefore, it is important to investigate the best strategy for a benevolent social planner willing to maximize the population's welfare. The impact on wellbeing of measures aimed to discourage real estate as a form of speculative investment (e.g. higher taxes on third and subsequent houses, very high capital gain taxes for properties sold before a certain number of years from the time of purchase etc) should be deeply investigated.

Table 1: Description of the variables used

Name	Source	Variable
Life satisfaction	Eurobarometer	Self-declared life-satisfaction level from 1 (not at all satisfied) to 4 (very satisfied)
Full employed	Eurobarometer	DV which takes value 1 if the respondent is full employed, 0 otherwise
Unemployed	Eurobarometer	DV which takes value 1 if the respondent is unemployed, 0 otherwise
Self-employed	Eurobarometer	DV which takes value 1 if the respondent is self-employed, 0 otherwise
Retired	Eurobarometer	DV which takes value 1 if the respondent is retired, 0 otherwise
Student	Eurobarometer	DV which takes value 1 if the respondent is student, 0 otherwise
Home	Eurobarometer	DV which takes value 1 if the respondent is responsible for home and not working, 0 otherwise
Male	Eurobarometer	DV which takes value 1 if the respondent is male, 0 otherwise
Age	Eurobarometer	Age of the respondent in years
Age squared	Eurobarometer	Square of the respondent's age in years
Low education	Eurobarometer	DV which takes value 1 if the respondent has less than 15 years of education, 0 otherwise
Middle education	Eurobarometer	DV which takes value 1 if the respondent has 15-18 years of education, 0 otherwise
High education	Eurobarometer	DV which takes value 1 if the respondent has more than 18 years of education, 0 otherwise
Single	Eurobarometer	DV which takes value 1 if the respondent is single, 0 otherwise
Married	Eurobarometer	DV which takes value 1 if the respondent is married, 0 otherwise
Divorced	Eurobarometer	DV which takes value 1 if the respondent is divorced, 0 otherwise
Separated	Eurobarometer	DV which takes value 1 if the respondent is separated, 0 otherwise
Widowed	Eurobarometer	DV which takes value 1 if the respondent is widowed, 0 otherwise
Income 1	Eurobarometer	DV which takes value 1 if the respondent blongs to the lowest income group, 0 otherwise
Income 2	Eurobarometer	DV which takes value 1 if the respondent blongs to the 2nd income group, 0 otherwise
Income 3	Eurobarometer	DV which takes value 1 if the respondent blongs to the 3rd income group, 0 otherwise
Income 4	Eurobarometer	DV which takes value 1 if the respondent blongs to the highest income group, 0 otherwise
Δ GDP	World Bank	Growth rate of the GDP per capita in 2000 constant US $, three-year moving average
Inflation	World Bank	Inflation rate, three-year moving average
Unemployment	OECD	Unemployment rate, three-year moving average
Price to income	OECD	Index of affordability of houses given by the relationship between house prices and GDP per capita
Rent to income	OECD	Index of affordability of houses given by the relationship between house rents and GDP per capita
Δ Real Estate	BIS	Growth rate of the house prices net of inflation, three-year moving average
Δ Stock Market	Ecowin/Datastream	Growth rate of the stock market prices net of inflation, three-year moving average

Legend: DV = Dummy Variable.

Table 2: Availability of Data on Life Satisfaction and Asset Prices

Country	Life Satisfaction	Price to income	Rent to income	Δ Real Estate	Δ Stock Market
Austria	1995-2002	n/a	n/a	n/a	1995-2002
Belgium	1975-2002	n/a	n/a	1975-2002	1975-2002
Denmark	1975-2002	1982-2002	1975-2002	1975-2002	1975-2002
Finland	1995-2002	1975-2002	1975-2002	1995-2002	1995-2002
France	1975-2002	1979-2002	1975-2002	1975-2002	1975-2002
Germany	1975-2002	1975-2002	1975-2002	1975-2002	1975-2002
Greece	1981-2002	n/a	n/a	n/a	1988-2002
Ireland	1975-2002	1978-2002	1990-2002	1975-2002	1975-2002
Italy	1975-2002	1975-2002	1996-2002	1975-2002	1975-2002
Luxembourg	1975-2002	n/a	n/a	n/a	1983-2002
Netherlands	1975-2002	1975-2002	1975-2002	1975-2002	1975-2002
Norway	1990-1995	1977-2002	1979-2002	1990-1995	1990-1995
Portugal	1985-2002	n/a	n/a	n/a	1991-2002
Spain	1985-2002	1975-2002	1975-2002	1985-2002	1985-2002
Sweden	1995-2002	1975-2002	1975-2002	1995-2002	1995-2002
UK	1975-2002	1975-2002	1975-2002	1975-2002	1975-2002

Table 3: Summary Statistics

Name	Nr. of Obs.	Mean	Std. Dev.	Min	Max
Life satisfaction	634,710	3.0579	0.7555	1	4
Unemployed	1,094,032	0.0581	0.2340	0	1
Self-employed	1,094,032	0.0144	0.1190	0	1
Retired	1,094,032	0.1857	0.3889	0	1
Student	1,094,032	0.0790	0.2697	0	1
Home	1,094,032	0.1552	0.3621	0	1
Male	1,094,032	0.4825	0.4997	0	1
Age	1,060,782	43.3996	17.9383	15	99
Low education	891,440	0.2817	0.4498	0	1
Middle education	891,440	0.4397	0.4963	0	1
High education	891,440	0.2786	0.4483	0	1
Single	988,625	0.2493	0.4326	0	1
Married	988,625	0.6194	0.4855	0	1
Divorced	988,625	0.0387	0.1928	0	1
Separated	988,625	0.0122	0.1097	0	1
Widowed	988,625	0.0805	0.2720	0	1
Income 1st quartile	783,195	0.2174	0.4125	0	1
Income 2nd quartile	783,195	0.3763	0.4845	0	1
Income 3rd quartile	783,195	0.2408	0.4275	0	1
Income 4th quartile	783,195	0.1655	0.3716	0	1
Δ GDP	1,094,032	0.0227	0.0200	-0.0738	0.0974
Inflation	1,091,991	0.0503	0.0476	-0.0068	0.2451
Unemployment	1,078,512	0.0863	0.0406	0.0020	0.2333
Price to income	859,131	0.9889	0.2275	0.5113	1.7692
Rent to income	800,689	0.9566	0.2474	0.3111	1.8184
Δ Real Estate	890,874	0.0251	0.0586	-0.1497	0.2322
Δ Stock Market	1,057,613	0.0641	0.1739	-0.3528	0.7884

Table 4: Pairwise Correlation Matrix

	Life satisf.	Age	Educat.	Income	Δ GDP	Inflation	Unempl.	Pr.-to-inc.	Pr.-to-rent	Δ Real Est.	Δ Stock Mark.
Life satisf.	1										
Age	-0.03	1									
Education	0.13	-0.26	1								
Income	0.17	-0.22	0.33	1							
Δ GDP	0.04	-0.02	-0.01	-0.01	1						
Inflation	-0.14	-0.02	-0.21	-0.06	-0.20	1					
Unemploym.	-0.05	-0.02	-0.02	-0.02	0.17	-0.14	1				
Price to income	-0.15	0.01	-0.08	-0.05	-0.17	0.11	-0.12	1			
Price to rent	-0.13	0.02	-0.03	-0.02	-0.14	-0.04	-0.14	0.92	1		
Δ Real Est.	0.01	0.00	0.01	0.00	0.28	-0.12	-0.09	0.19	0.23	1	
Δ Stock Mark.	0.01	0.00	0.03	-0.05	0.29	-0.17	0.29	-0.23	-0.22	-0.08	1

Table 5: Life-Satisfaction 0Equations, Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Unemployed	-0.517558	-0.484360	-0.504516	-0.496062	-0.504533	-0.517018	-0.484653
	(-27.27)	(-22.28)	(-25.71)	(-26.24)	(-25.70)	(-27.13)	(-22.24)
Self-employed	0.098760	0.094271	0.099802	0.099717	0.099589	0.096804	0.092537
	(5.08)	(4.32)	(5.19)	(5.65)	(5.19)	(4.97)	(4.22)
Retired	0.017198	0.031187	0.022228	0.023910	0.022272	0.017141	0.031083
	(1.41)	(2.28)	(1.80)	(2.12)	(1.80)	(1.40)	(2.26)
Student	0.190675	0.201782	0.217628	0.237738	0.218575	0.191589	0.202584
	(2.85)	(2.76)	(3.30)	(4.04)	(3.32)	(2.89)	(2.80)
Home	0.017698	0.028147	0.018906	0.024631	0.018908	0.018510	0.028485
	(1.72)	(2.48)	(1.88)	(2.60)	(1.88)	(1.81)	(2.52)
Male	-0.068839	-0.076395	-0.072138	-0.063822	-0.072146	-0.068791	-0.076500
	(-9.59)	(-10.29)	(-10.31)	(-9.72)	(-10.32)	(-9.60)	(-10.34)
Age	-0.027696	-0.027043	-0.026694	-0.026643	-0.026684	-0.027608	-0.026966
	(-25.72)	(-24.07)	(-25.06)	(-26.05)	(-25.06)	(-25.65)	(-24.02)
Age squared	0.000325	0.000318	0.000317	0.000309	0.000316	0.000324	0.000317
	(28.78)	(27.25)	(28.95)	(29.12)	(28.94)	(28.76)	(27.25)
Middle education	0.037589	0.032829	0.049906	0.057426	0.050047	0.038399	0.033605
	(4.71)	(3.80)	(5.83)	(7.13)	(5.83)	(4.83)	(3.89)
High education	0.114570	0.118348	0.134977	0.137759	0.135239	0.116550	0.119900
	(11.47)	(10.03)	(11.84)	(13.04)	(11.85)	(11.73)	(10.13)
Married	0.125572	0.123558	0.125846	0.119322	0.125882	0.124305	0.122772
	(11.36)	(10.24)	(11.66)	(12.09)	(11.65)	(11.28)	(10.20)
Divorced	-0.230046	-0.235878	-0.233871	-0.230901	-0.233991	-0.231126	-0.236767
	(-17.29)	(-17.27)	(-17.30)	(-18.44)	(-17.29)	(-17.38)	(-17.30)
Separated	-0.315369	-0.315014	-0.320378	-0.308692	-0.320442	-0.314201	-0.313720
	(-16.08)	(-15.35)	(-16.48)	(-16.24)	(-16.47)	(-15.98)	(-15.20)
Widowed	-0.134538	-0.135544	-0.135829	-0.138491	-0.135860	-0.134422	-0.135414
	(-10.95)	(-10.29)	(-11.45)	(-12.57)	(-11.45)	(-10.96)	(-10.30)
Income 2nd quartile	0.183356	0.189155	0.177899	0.185133	0.177686	0.185942	0.190166
	(18.02)	(18.24)	(17.43)	(19.32)	(17.40)	(18.72)	(18.53)
Income 3rd quartile	0.331762	0.334106	0.323881	0.324306	0.323674	0.335431	0.336607
	(24.80)	(24.11)	(23.08)	(24.91)	(23.01)	(26.69)	(24.81)
Income 4th quartile	0.513064	0.527131	0.504939	0.502951	0.504542	0.517440	0.529579
	(29.79)	(29.27)	(29.02)	(31.04)	(28.94)	(31.41)	(29.95)
Δ GDP	1.003920	1.912855	0.786808	0.654140	0.696624	0.257824	1.176789
	(1.57)	(2.61)	(1.05)	(1.01)	(0.90)	(0.43)	(1.64)
Inflation	-2.701448	-1.887265	-1.452983	-1.784455	-1.442192	-2.621579	-1.847633
	(-6.95)	(-5.44)	(-3.63)	(-5.40)	(-3.63)	(-6.91)	(-5.13)
Unemployment	-3.272603	-3.051215	-1.806513	-2.357677	-1.881266	-3.381045	-3.186369
	(-4.96)	(-4.39)	(-3.75)	(-4.98)	(-3.99)	(-5.95)	(-5.39)
Price to income	-0.234356					-0.361337	
	(-3.18)					(-5.15)	
Rent to income		-0.205332					-0.293074
		(-3.09)					(-4.84)
Δ Real Estate			0.328373		0.361535	0.709900	0.696409
			(2.14)		(2.24)	(4.50)	(4.25)
Δ Stock Market				0.122195	0.070949	0.055292	0.140990
				(1.88)	(0.96)	(0.85)	(1.73)
Nr. of Obs.	316,697	289,713	335,998	381,312	335,998	316,697	289,713
(Pseudo) R2	0.0878	0.087	0.0881	0.0932	0.0881	0.0882	0.0873

Legend: results are from ordered probit models with standard errors adjusted for clusters. Full-employed, female, low-education, single, income 1, 1975 and France are the base to avoid perfect multicollinearity.

Table 6: Life-Satisfaction Equations, by Age Sub-Groups

	(1) <29	(2) 29-41	(3) 42-64	(4) >64
Unemployed	-0.5087253	-0.5533376	-0.5325975	-0.2880186
	(-25.99)	(-20.93)	(-22.20)	(-4.12)
Self-employed	0.1415889	0.1269378	0.0598119	0.1628048
	(3.24)	(4.82)	(2.05)	(1.91)
Retired	-0.2022197	-0.3677044	-0.027724	0.0094814
	(-2.18)	(-7.06)	(-1.59)	(0.45)
Student	0.1452125	0.0134935	-0.1815888	0.2135134
	(2.06)	(0.13)	(-0.64)	(0.56)
Home	-0.0452257	0.0323112	0.0260287	0.0248166
	(-2.39)	(2.13)	(1.80)	(1.02)
Male	-0.0956192	-0.0893123	-0.0635188	-0.0009824
	(-8.98)	(-7.92)	(-5.65)	(-0.08)
Age	-0.0340268	-0.0489953	-0.1054324	0.0494915
	(-1.48)	(-2.18)	(-9.78)	(3.17)
Age squared	0.0003903	0.0005765	0.0011174	-0.0002743
	(0.79)	(1.80)	(10.67)	(-2.61)
Middle education	-0.0206811	0.0859511	0.0517845	0.0331312
	(-0.97)	(5.39)	(5.00)	(2.65)
High education	0.0813264	0.1418865	0.0928522	0.1333852
	(3.84)	(7.96)	(5.55)	(8.02)
Married	0.1575493	0.179639	0.0651171	0.0476302
	(10.43)	(10.50)	(3.95)	(2.25)
Divorced	-0.3287276	-0.1956886	-0.2408747	-0.2469735
	(-8.77)	(-8.67)	(-11.26)	(-7.20)
Separated	-0.2584444	-0.2740187	-0.359034	-0.3097122
	(-4.67)	(-8.56)	(-11.84)	(-5.09)
Widowed	-0.0000368	-0.080846	-0.1742391	-0.1687071
	(0.05)	(-1.72)	(-8.93)	(-7.82)
Income 2nd quartile	0.1816801	0.1882319	0.2147741	0.1391736
	(10.29)	(9.40)	(14.80)	(10.36)
Income 3rd quartile	0.3185256	0.3552886	0.3738918	0.316015
	(17.78)	(16.76)	(20.76)	(18.12)
Income 4th quartile	0.4715131	0.5645367	0.5842668	0.450321
	(23.20)	(24.06)	(25.88)	(17.22)
Δ GDP	0.1169393	0.7362665	-0.0741688	0.1864466
	(0.16)	(0.98)	(-0.11)	(0.35)
Inflation	-3.154669	-3.015705	-2.46787	-1.830931
	(-6.07)	(-6.48)	(-5.90)	(-4.73)
Unemployment	-3.907586	-3.324465	-3.682634	-2.547416
	(-5.06)	(-4.81)	(-5.80)	(-4.09)
Price to income	-0.5912384	-0.3085616	-0.3266482	-0.3369582
	(-6.11)	(-3.73)	(-4.27)	(-4.66)
Δ Real Estate	0.8576042	0.8648293	0.6319872	0.5991725
	(3.99)	(4.08)	(3.84)	(3.63)
Δ Stock Market	0.0033476	0.104396	0.0286811	0.073019
	(0.04)	(1.24)	(0.42)	(1.09)
Nr. of Obs.	57,874	87,845	111,525	59,453
(Pseudo) R2	0.091	0.1013	0.0913	0.0724

Legend: results are from ordered probit models with standard errors adjusted for clusters. Full-employed, female, low-education, single, income 1, 1975 and France are the base to avoid perfect multicollinearity.

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