The effect of house prices on household saving: the case of Italy.

R. Calcagno[*], E. Fornero[†] and M. C. Rossi[‡]

December 24, 2007

Abstract

In this paper we want to assess the effect of a change in value of real estate assets on optimal consumption and savings behavior for Italian households, as a function of the age and the composition of the households. Our theoretical model predicts the marginal propensity of consumption on real estate wealth to be higher the higher the age of the household and its net equity in real estate at the beginning of its life. We then test such predictions on the SHIW data, which is representative of the universe of Italian dwellings owned or rented by the households. Our preliminary results suggest that the household saving for old households is negatively and significantly related to the household capital gains in housing.

1 Introduction

Recent trends in the personal saving rate – which directly measures the ratio between savings and personal disposable income for households and other non-for-profit institutions – has been steadily declining in the US, the UK and Canada at least since the mid-1980s. On the contrary, this pattern seems to have left untouched Italy (together with few other countries, such as Japan, France, Germany). The standard commentary is that while Americans are raising their living standards cashing-in their skyrocketing house valuations, Italians are not because they simply perceive more expensive housing as a hindrance to their well-being.

Leaving aside measurement issues which are unlikely to explain these differences in trends (not levels), at least three questions are triggered by this "stylized fact". First, is there some structural difference between Italy and US, UK and Canada that we ought to understand and – possibly – model? Second, if the answer is negative, is Italy (together with the other European countries with similar characteristics) destined to follow on the steps of US and UK witnessing

[*] *Vrije* University, Amsterdam, Tinbergen Institute and CeRP, Turin.
[†] University of Turin and CeRP, Turin.
[‡] University of Rome "*Tor Vergata*" and CeRP, Turin.

a steep decline in official savings rates? Third, if the answer is instead positive, can it be that wealth shocks in the two sets of countries are somehow different or at least simply cause different reactions in terms of consumption/savings behavior?

To adress these problems we use a standard life-cycle model similar to Skinner (1993), and we perform a microeconometric analysis based on Bank of Italy's Survey of Household Income and Wealth (SHIW). What makes the Italian economy of particular interest for our study, is that Italy shares, along with the UK the peak of housing investment out of total disposable income, with a value of about 8 times disposable income (Bartiloro et al. 2007). The general observation of Muellbauer (2007), that housing is the most important component of household wealth for OECD countries is then particularly true for the Italian households (see also Bertola and Hochguertel (2007)).

According to the standard life-cycle theory, households should smooth their consumption paths using the capital market, by saving and borrowing. As a result, any shock to the total present value of lifetime wealth, such as shocks to the prices of financial securities and housing, would translate into a shift in the current and future consumption level. Clearly, being real estate the most important component of wealth, and since housing prices have recently grown at an exceptionally high pace, estimating the marginal propensity of consumption (MPC) to housing wealth represents a key step in order to understand the real effects of house prices[1]. Our model points out that the MPC to housing wealth depends on various observable characteristics of the households, such as age, initial endowment in real estate, and its financial situation. Our analysis on SHIW data confirms that only old Italian households increase their consumption in non-housing related goods after an increase in their net real estate wealth.

There is a quite large body of empirical literature that tries to estimate the effects of wealth on consumption and savings. For instance, Carroll (2004) shows that the theoretical predictions on which kind of asset shocks ought to generate the stronger impact on consumption remain ambiguous. On the one hand, a shock to the value of the housing stock tends to generate rather illiquid effects, i.e., real estate tends to be traded in markets plagued by high frictions and pervasive tax effects, while houses are generally non-divisible. On the other hand, housing wealth is widely spread among the population and largely involves not only the rich strata which typically hold financial assets (typically equities) and have modest marginal propensities to consume, but also poorer segments, whose consumption and savings behavior is considerably reactive to wealth. Finally, even disregarding the important role of bequests, house price fluctuations may have no effects on consumption if moving costs are large and the borrowing possibilities for the less wealthy, liquidity-constrained agents are limited (Bover, 2006, Skinner, 1993). A number of subsequent studies have turned to examine the same issues using panel-like, microeconomic data sets concerning the behavior of individual households (e.g., Skinner, 1993). For European countries,

[1] The recent sudden fall in house prices is putting this question even more at the spotlight of the economic debate.

Disney et al. (2002) use the information contained in the BHPS on spending patterns of British households along with county-level indicators of house prices to estimate the British MPS. Their report a PS for housing wealth shocks of approximately 0.98 during the house price boom of the 1990s, i.e. a coefficient significantly higher than aggregate studies. Grant and Peltonen (2005) use the panel section of the Italian SHIW to estimate the impact of changes in housing wealth on non-durable consumption. Their estimated housing wealth effects are small and not significant in general, i.e. their MPS is approximately 1.

In this paper we want to assess the effect of a change in value of real estate assets on optimal consumption and savings behavior for Italian households, as a function of the age and the composition of the households. Our theoretical model predicts the MPC on real estate wealth to be higher the higher the age of the household and its net equity in real estate at the beginning of its life. We then test such predictions on the SHIW data, which is representative of the universe of Italian dwellings owned or rented by the households. The dataset contains several features that make it particularly suitable for our research. First, detailed information on households asset, including housing asset are provided in the dataset. More in detail, every respondent has to declare the subjective value of the house where s/he resides. Moreover, every household is asked about its outstanding debt on real estate asset. The net value of housing can thus be generated using the information available in the data. Moreover, the SHIW data provide information on socio-economic status (such as age, education, income, geographical residence) of each household at every wave. Our preliminary results suggest that the household saving for old households is negatively and significantly related to the household capital gains in housing. On the contrary, for young households (where the main component has less than 40 years) this relation is positive and non significant. While old households seem to be able to cash in at least a small quota of the net real wealth increase in their real estate portfolio (approximately the 0.6% of the wealth increase), this is not the case for young households. When house prices increase, the latter are confronted to an expectation of higher future rents; since the demand for housing services is, up to a minimum point, inelastic (and probably increasing), these young households anticipate then they will have to spend higher amounts for their housing needs, and do not cash in the wealth increase induced by higher housing prices.

We plan to run the same regressions in order to verify whether also the initial endowment in real estate net equity and the net financial position of the households introduce significant differences in the MPC to housing wealth.

The paper is organized as follows. Section 2 presents the model. Section 3 illustrates some stylized facts on the housing wealth in Italy, and Section 4 describes the SHIW dataset, while Section 5 describes our empirical methods and the first estimation results.

2 The model

We analyze a simple life-cycle model with households living two periods that follows closely Skinner (1993)[2]. As in the latter and in other papers (Campbell and Cocco (2005), Iacoviello (2004)), we include the consumption of housing services in the utility function of the household[3]. Then, according to the standard life-cycle model, households increase their consumption in both housing services and other commodities (through a "substitution effect") by some fraction of the increase in their total wealth. However, the same fluctuations in the house prices produce different wealth effects on households with different characteristics (Dreyer-Morris (2005), Bover (2006)). The objective of this section is to solve for the consumption choices of households in a dynamic partial equilibrium framework as a function of their age, their initial endowments in real estate, and their access to the capital markets.

Households derive utility in each period t of their life consuming both housing services h_t and other consumption goods c_t, where the utility function is time separable and isoelastic:

$$U(c_t, h_t) = \frac{c_t^{1-\gamma}}{1-\gamma} + \mu \frac{h_t^{1-\gamma}}{1-\gamma}$$

They discount their future utility at a rate δ so that their lifetime expected utility is:

$$U(c_t, c_{t+1}, h_t, h_{t+1}) = \frac{c_t^{1-\gamma}}{1-\gamma} + \mu \frac{h_t^{1-\gamma}}{1-\gamma} + \frac{1}{1+\delta} \left(\frac{c_{t+1}^{1-\gamma}}{1-\gamma} + \mu \frac{h_{t+1}^{1-\gamma}}{1-\gamma} \right) \quad (1)$$

The interest rate r paid on savings equals the loan rate charged on debt. The price of the non-housing commodity is normalized to one, while the price of the housing service (i.e. the rent per period t) is denoted by ρ_t. At each period of his lifetime the household receives a (certain) income Y.

At the beginning of the second period, each household chooses his optimal level of real estate holding, h_{t+1}^*, where $h_{t+1}^* > \overline{h}_t$ indicates an investment in housing. When selling a real estate property, a fraction $(1 - \lambda)$ of the housing value is lost due to transaction costs[4].

Finally, in the second period the household can liquidate its real estate owning through a "reverse mortgage" obtaining the fraction $\upsilon < 1$ of $\frac{P_{t+1} h_{t+1}^*}{1+r}$, the discounted value of its housing property at the current price.

[2] We study a partial equilibrium model since the purpose of our empirical analysis will be to describe how Italian households change their saving decisions as a response to an unexpected change in their real estate wealth. From this microeconometric analysis it is hard to infer how households consumption choices affect their demand of housing, hence its price, making then a general equilibrium model of little use.

[3] For the moment we rule out any bequests motive.

[4] Calling tc the monetary transaction costs, we have $\lambda = 1 - tc$. In the following we refer alternatively to λ or tc.

The budget constraints in each period are then:

$$t \quad : \quad A_t + c_t + \rho_t h_t \leq Y_t + \rho_t \overline{h}_t$$
$$t+1 \quad : \quad c_{t+1} + \rho_{t+1} h_{t+1} \leq Y_{t+1} + A_{t+1}(1+r) + \lambda \left(\overline{h}_t - h^*_{t+1}\right) P_t + \rho_{t+1} h^*_{t+1} + \frac{\upsilon P_{t+1} h^*_{t+1}}{1+r}$$

where A_t indicates the net financial wealth of the household at the end of the first period of life, while $\overline{h}_t$ is its initial endowment of housing assets. Thus $\lambda \left(\overline{h}_t - h^*_{t+1}\right) P_t$ is the revenue the investor obtains selling part of his initial real estate endowment[5] $(\overline{h}_t - h^*_{t+1})$ at the beginning of period $t+1$ at price P_t[6]; finally, $\rho_{t+1} h^*_{t+1}$ is the rent of the new real estate holding and $\frac{\upsilon P_{t+1} h^*_{t+1}}{1+r}$ is the revenue from the reverse mortgage.

In this model we assume households know at the beginning of their life cycle all future realizations of the parameters in the budget constraints; we allow only unexpected shocks to hit the housing rents at a later periods $\tau \geq t$ (and hence the house prices P_t and P_{t+1}). We make such a strong assumption for the following reason. The investment in real estate when future house prices (and rents), or labor income, or interest rates are uncertain serves as a hedging purpose for risk-averse households (Campbell and Cocco (2005) others ???...).

In particular, if an household expects higher housing needs in the future, as well as higher rents (so that the housing service becomes more expensive), it will hedge this risk increasing its net housing equity position. The amount of his additional investment in real estate (a "longer" position) depends on the risk-aversion of the household and on his expectations about future house prices (see....portfolio model with real estate....Campbell and Cocco). In a model with optimal portfolio allocation that includes investment in real estate such characteristics drive the demand and supply of houses. However, here we want to focus the theoretical analysis on other characteristics that we can precisely quantify from our households survey data, such as demographics, the household initial endowments in real estate and their access to the capital markets, leaving out the hedging motive for real estate investment[7].

Equivalence of renting and buying at equilibrium under the conditions of no uncertainty The assumption of no uncertainty simplifies the analysis of the life-cycle model in a crucial way: with no borrowing constraints the amount invested in real estate is irrelevant for the optimal consumption

[5] Of course we assume that nobody can go short in housing, $h_{t+1} \geq 0$.
Also, if $\overline{h}_t - h^*_{t+1} < 0$ the household is actually increasing his real estate owning buying at price P_t.

[6] We assume that the house prices are "ex-rent", that is houses are valuated at the end of the period. Hence, if you sell the house at the end of period t (that coincides with the beginning of period $t+1$), you earn P_t.

[7] n.d.r.: Since we would not be able to disentangle risk-aversion and expectations in our data.
n.d.r = nota di riccardo.
Giusto??

profile. Indeed, markets are complete, and households can transfer wealth intertemporally simply saving (or borrowing) cash (at rate r). At equilibrium, the investment in real estate must provide as well the return r (net of transaction costs), since no risk is attached to it, and is then redundant.

The equilibrium price of housing equity is equal to the present value of future rents, net of the transaction costs[8]:

$$P_t = \frac{1}{1-tc} \sum_{j=t+1} \frac{\rho_j}{(1+r)^{j-(t+1)}} \tag{2}$$

The equilibrium price (2) also allows us a further remark concerning the reverse mortgages. For such a contract to be in demand, it must be that any home-owner is (at least) indifferent between selling his/her house at the (end of) period t (earning $(1-tc)P_t$) and paying the rent in period $t+1$ for the same house ($-\rho_{t+1}$), or live in the owned house and sell it with a reverse mortgage to a bank (cashing in the revenue $+\frac{vP_{t+1}}{1+r}$).

Thus, using (2), v cannot be lower than $1 - tc$[9] to be attractive for any house-owner. More costly reverse mortgage schemes would not have demand (check the costs of reverse mortgage market in the Italian case).

Moving costs Up to this point we have left out from the analysis the moving costs households pay when they relocate. Moving costs play a role totally different from the transaction costs in our analysis since they represent utility losses. Indeed, they cannot be included in the equilibrium house price since they are idiosyncratic to each household. But high moving costs affect the decision to liquidate a real estate investment (and move) or not; thus they may neutralize any real wealth effect due to an increase in house prices for house-owning households (Skinner (1989), Campbell and Cocco (2005)).

High personal moving costs can then be invoked to explain why we observe that some households are not "downsizing" their real estate net holdings, apparently giving up a net *real* wealth gain[10]. Notice however that high moving costs cannot be invoked to explain why a very little share of the population does not make use of reverse mortgages (that do not require them to relocate).

---

[8] By a simple no-arbitrage argument, one has to be indifferent between selling the house at the end of a period t (earning $(1-tc)P_t$), and selling it one period later (payoff $\frac{(1-tc)P_{t+1}}{1+r}$) cashing in the period rent as well (ρ_{t+1}).

[9] $(1-tc)P_t - \rho_{t+1} \leq \frac{v}{1+r}P_{t+1}$ is the condition for the reverse mortgage not to be dominated by the alternative strategy.

At equilibrium, in order to avoid an infinite demand of reverse mortgage, the relation must hold with equality.

[10] Of course this explanation holds for households owning only the house in which they live, and not for other households with more than one property (or renting and owning a different house).

No financial constraints: a unique intertemporal budget constraint The solution of the model without borrowing constraints follows closely Skinner (1993). If a household is not restricted in his access to the capital market at t, A_t can be negative and combining the two budget constraints we obtain the intertemporal constraint:

$$c_t+\rho_t h_t+\frac{c_{t+1}+\rho_{t+1}h_{t+1}}{1+r}=Y_t+\rho_t\overline{h}_t+\frac{Y_{t+1}+\lambda\left(\overline{h}_t-h^*_{t+1}\right)P_t+\rho_{t+1}h^*_{t+1}}{1+r}+\frac{\upsilon P_{t+1}h^*_{t+1}}{(1+r)^2} \tag{3}$$

Furthermore, using the relation $(1-tc)P_t-\rho_{t+1}=\frac{\upsilon P_{t+1}}{1+r}$ for the equilibrium in the reverse mortgage market in (3), we can rewrite the intertemporal budget constraint as:

$$c_t+\rho_t h_t+\frac{c_{t+1}+\rho_{t+1}h_{t+1}}{1+r}=Y_t+\frac{Y_{t+1}}{1+r}+\rho_t\overline{h}_t+\frac{\lambda P_t\overline{h}_t}{1+r} \tag{4}$$

and we can solve the household maximization problem max(1) in $\{c_t, c_{t+1}, h_t, h_{t+1}\}$ under the constraint (4)[11]. The f.o.c.'s are:

$$\begin{aligned}
\frac{c_{t+1}}{c_t} &= \left(\frac{1+r}{1+\delta}\right)^{\frac{1}{\gamma}}\\
h_t &= \left(\frac{\mu}{\rho_t}\right)^{\frac{1}{\gamma}} c_t\\
h_{t+1} &= \left(\frac{1+r}{1+\delta}\right)^{\frac{1}{\gamma}}\left(\frac{\mu}{\rho_{t+1}}\right)^{\frac{1}{\gamma}} c_t\\
&\Rightarrow \frac{h_{t+1}}{h_t}=\left(\frac{\rho_t}{\rho_{t+1}}\frac{1+r}{1+\delta}\right)^{\frac{1}{\gamma}}
\end{aligned}$$

We can finally substitute for c_{t+1}, h_t and h_{t+1} in terms of c_t in the budget constraint (4) to obtain:

$$c_t=\frac{W(Y_t,Y_{t+1};\rho_t,\lambda,P_t;\overline{h}_t)}{K(\mu,\gamma,\delta;r,\rho_t,\rho_{t+1})} \tag{5}$$

where $W(Y_t,Y_{t+1};\rho_t,P_{t+1;}\overline{h}_t)=Y_t+\frac{Y_{t+1}}{1+r}+\overline{h}_t\left[\rho_t+\frac{\lambda P_t}{1+r}\right]$ is the lifetime wealth of the household, and

$$K(\mu,\gamma,\delta;r,\rho_t,\rho_{t+1})=\left[1+\rho_t\left(\frac{\mu}{\rho_t}\right)^{\frac{1}{\gamma}}+\left(\frac{1+r}{1+\delta}\right)^{\frac{1}{\gamma}}(1+r)^{-1}+\left(\frac{1+r}{1+\delta}\right)^{\frac{1}{\gamma}}(1+r)^{-1}\rho_{t+1}\left(\frac{\rho_t}{\rho_{t+1}}\right)^{\frac{1}{\gamma}}\left(\frac{\mu}{\rho_t}\right)^{\frac{1}{\gamma}}\right]$$

Simply substituting into the f.o.c.'s above one can obtain the solution in c_{t+1}, h_t and h_{t+1}; in particular:

$$c_{t+1}=\left(\frac{1+r}{1+\delta}\right)^{\frac{1}{\gamma}}\frac{W(Y_t,Y_{t+1};\rho_t,\lambda,P_t;\overline{h}_t)}{K(\mu,\gamma,\delta;r,\rho_t,\rho_{t+1})} \tag{6}$$

[11] As stated before, the investment choice in real estate at the beginning of date $t+1$, h^*_{t+1} is irrelevant for the solution.

2.1 Empirical implications of the model

The results in (5) and (6) allow us to compute some comparative statics we will use in our empirical analysis.

First, take the household born at t, and consider an increase in P_{t+1} [12] due to unexpectedly high rents ρ_τ at some future time $\tau > t+1$, i.e. after his lifetime is over[13]. Our model predicts that the response of current consumption to such a shock is positive only for households with positive real estate endowment:

$$\frac{\partial c_t^y}{\partial \rho_\tau} = \frac{\partial c_t^y}{\partial P_{t+1}} = \frac{\frac{\lambda \overline{h}_t}{1+r} \frac{\partial P_t}{\partial P_{t+1}}}{K} = \frac{\frac{\lambda \overline{h}_t}{1+r} \frac{1}{1+r}}{K} > 0$$

Notice also that young households (with a positive endowment in real estate at the beginning of their life) increase their current consumption more than their future consumption if $\gamma > 1$[14] (interpret gamma) after such a shock:

$$\frac{\partial c_{t+1}^y}{\partial \rho_\tau} = \left(\frac{1+r}{1+\delta}\right)^{\frac{1}{\gamma}} \frac{\partial c_t}{\partial P_{t+1}}$$

Alternatively, consider a shock in the house prices due to an increase in the rent ρ_{t+1}: this will result in a direct increase in P_t.

$$\begin{aligned}
\frac{\partial c_t^y}{\partial \rho_{t+1}} &= \frac{\partial \left(\frac{W(.)}{K(.)}\right)}{\partial \rho_{t+1}} = \frac{\frac{\partial W}{\partial \rho_{t+1}} K - W \frac{\partial K}{\partial \rho_{t+1}}}{K^2} = \frac{\frac{\partial W}{\partial P_t} K - W \frac{\partial K}{\partial \rho_{t+1}}}{K^2} \\
&= \frac{\overline{h}_t \lambda K - W \left(\frac{\mu}{\rho_t}\right)^{\frac{1}{\gamma}} \left(\left(1 - \frac{1}{\gamma}\right) \frac{1}{(1+r)} \left(\frac{\rho_t}{\rho_{t+1}}\right)^{\frac{1}{\gamma}} \left(\frac{\mu}{\rho_t}\right)^{\frac{1}{\gamma}} \left(\frac{r+1}{\delta+1}\right)^{\frac{1}{\gamma}}\right)}{K^2}
\end{aligned}$$

where the first term is the wealth effect and the second term is a substitution effect[15] (negative for $\gamma > 1$). We predict that the response of consumption to shocks in rents occurring during the lifetime of the household is lower than the one due to shocks occurring more far in the future[16].

[12] Announced at the beginning of period t: remember that we consider consumption choices in condition of certainty, so the household knows the realized value of rents.

[13] Insert here a graph explaining the precise timing of rents/prices.

[14] At equilibrium $r = \delta$ (the interest rate must be equal to the intertemporal discount factor).

[15] Higher rents make more expensive the consumption of the housing service in the second period.

[16] Notice that it is less clear cut to interpret $\frac{\partial c_t}{\partial P_t}$: ndr: non e' molto sensato assumere uno shock inatteso su ρ_t a t perche' nel momento in cui decidono, household nati a t hanno il dato su ρ_t.

Let us analyze the consumption reaction of an household born at $t-1$ to a shock in ρ_{t+1} (hence in P_t) or in later rents[17].

Their current consumption c_t^o reacts more to a shock in P_t than the consumption of young households. This is because of two reasons: first, they entirely consume in their last lifetime period the unexpected total wealth gain $\lambda\overline{h}_{t-1}\left[\frac{\partial P_t}{1+r}\right]$[18]. Secondly, they do not suffer any substitution effect, since they will not have to pay during their lifetime the cost of a higher rent ρ_{t+1}. The same argument holds of course for an increase in later rents (captured by an increase in P_{t+1})[19].

Thus, our model predicts that, absent moving costs and bequests motives, the consumption of the older generations should be more reactive to shocks in rents and/or house prices. All the effects are stronger for households with higher real estate endowments.

Frictions on the financial markets: some households are financial constrained (hints) Iacoviello (2004) suggests that financially constrained households may show a higher sensitivity of consumption to house prices.

We can sketch this effect as well using our simple model described above. Take for a example a positive (unexpected) shock on P_t (due to an increase in future rents), and consider the household i (born at t) endowed with $\overline{h}_{i,t}$ units of housing (in which he currently leaves), against which it can borrow to finance additional consumption at time $t+1$.

If the amount the household can borrow depends on the value of his real estate endowment at the market price then his borrowing capacity increases. Additionally to the effects showed above, this constrained household experiences as well an increase in the total resources available for consumption in the first period: if his degree of impatience was so high to make the borrowing constraint binding, such a shock in the house price will undoubtedly increase his current consumption c_t. So for financially constrained households $\frac{\partial c_t^y}{\partial P_{t+1}}$ is higher than for unconstrained (patient) households.

Finally, notice that selling his housing endowment (and renting another one equivalent to the first) could be suboptimal in the presence of high moving costs.

3 The Italian households wealth: some stylized facts

In 2005, Italian household net wealth was estimated to be equal to 350,000 Euro per household, and 135,000 Euro per capita (Ministry of Finance, 2005). Net wealth has grown rapidly between 1995 and 2005, by 48%, equivalent to

[17] A change in ρ_t for this household corresponds to a change in ρ_{t+1} for young households born in t, studied above.

[18] There is no bequest motive.

[19] Again, because of the absence in any substitution effect.

an average annual growth rate of 2.7%.The rate has not been homogenous over time, ranging from 5.7% in 1997 to 0.3% in 2001, after then recovering to 4.3%.

An increase in wealth can be generated by either higher savings or capital gains. While additional savings have been equally responsible along with capital gains of wealth increase between 1995 and 2000, capital gains have been responsible for the subsequent increase in wealth (D'Alessio et al.). Indeed, over the whole period, capital gains accounted for 57% of real wealth growth.

As housing has played the role of key actor in shaping households asset, we now turn to examine how housing investments have evolved over time to detect whether housing has driven the wealth increase.

Italy shares with (most of the) other OECD countries a raising of house prices in the last 15 years. The magnitude of the price increase has been comparable with that of other European countries, with a real annual increase of 6.6% for the time period 1989-2005.

What makes Italy of particular interest for our study, is that Italy shares, along with the UK the peak of housing investment out of total disposable income, with a value of about 8 times disposable income (Bartiloro et al. 2007).

In Italy, there are no official estimates available for house prices at macro level; however, data are collected at a regular basis by the Ministry of finance ("Osservatorio del Mercato Immobiliare dell'Agenzia del Territorio") and by two private sources ("Nomisma" and "Il Consulente Immobiliare"). Moreover. micro data on household belongings have been collected since the 1960's in the Bank of Italy's Survey of Household Income and Wealth (SHIW).

A recent work by Cannari and Faiella (2007) compares the house prices from the SHIW survey with the those coming from the other two sources. Their results show that prices do not differ consistently according to the source form which they are drawn.

4 The SHIW dataset

We use the survey of Household Income and Wealth to examine whether housing price appreciation have displaced savings in other forms. The Bank of Italy's first Survey of Household Income and Wealth (SHIW) was conducted in 1965. Since then, the survey was conducted yearly until 1987 (except 1985) and every two years thereafter.

The primary purpose of the Bank of Italy Survey of Income and Wealth is to collect detailed information on demographics and the socio-economic behaviour of Italian households, such as households' consumption, income and balance sheets.

The SHIW surveys a representative sample of the Italian resident population. Sampling takes place in two stages, first Municipalities and then households . Households are randomly selected from registry office records. From 1987 through 1995 the survey was conducted every other year and covered about 8,000 households, defined as groups of individuals related by blood, marriage or adoption and sharing the same dwelling. Starting in 1989, each SHIW has re-interviewed some households from the previous surveys. Respondents included in the panel component of the dataset have increased over time: 15 percent of the sample was re-interviewed in 1989, 27 percent in 1991, 43 percent in 1993, 45 percent in 1995, 37 percent in 1998 and 48 percent in the year 2000.

The SHIW data has the advantage of being representative of the universe of Italian dwellings owned or rented by the households. The dataset contains several features that make it particularly suitable for our research. First, detailed information on household asset, including housing asset are provided in the dataset. More in detail, every respondent has to declare the subjective value of the house where s/he resides. Moreover, every household is asked about its outstanding debt on real estate asset. The net value of housing can thus be generated using the information available in the data.

Moreover, information on socio-economic status (such as age, education, income, geographical residence) of each household component is asked every wave.

5 Empirical strategy and estimation results

Empirical Strategy and Estimation Results

In our empirical specification, we want to estimate the effect of housing capital gains on household saving, hence our estimation strategy is as follows:

$$S_{ht} = X'_{ht}\beta + \gamma\Delta H_{ht} + \varepsilon_{ht}$$

where S is annual household saving, X is a set of socio-demographic regressors, ΔH is the change in housing wealth and ε is the error term. The subscript h is to indicate household and t to indicate time. The main regressors of interest in our analysis are those related to the house capital gains (ΔH).

Saving is defined as the difference between net available income and consumption. Saving does not include capital gains as it is not calculated as the difference of wealth over time.

From our theoretical predictions, we expect that a positive change in housing value will increase consumption, thus decreasing saving. Thus, we expect the coefficient γ to be negative.

An additional test of our predictions focuses on the role played by age on the impact of housing wealth increase on saving. More specifically, the older the age at which the (unexpected) price increase materializes, the higher the impact of housing is on consumption. Thus, interacting housing capital gains with the age of the household head could shed some light on the different effect that real estate price boost had on consumption, according to the age of the owner. For this reason, we also add a set of interaction terms, capturing the impact of housing wealth change for households whose head is under 40, between 40 and 55 and older than 55, respectively.

Table 4 illustrates our estimation results. House price increases have opposite effects if we compare the young with the old cohorts. Those households who are in their middle-age seem not to be significantly affected by house price changes. Young households do not react to house price increase. If anything, they actually increase their savings when facing a real estate capital gain.

Conversely, older households (whose household head is aged over 55) do take into account the house capital gains by increasing their standard of living and decreasing resource accumulation, in accordance with theory predictions.

Those households who experience a house price increase after they are 55 show a reduction in saving by 0.6%. Thus an increase in house net value of 10,000 Euro would generate less savings by about 60 Euro each year.

One possible interpretation for such findings is that young cohorts, having to face a longer time period of higher housing services than older cohorts, do not consider the raise in housing wealth as a cause of welfare gain. Housing wealth capital gains are entirely wiped out by the future higher prices for housing services for younger cohorts.

6 References

Bartiloro L., M. Coletta and R. De Bonis, (2007), "Italian household wealth in a cross-country perspective", mimeo, Bank of Italy.

Bertola G,. and s. Hochguertel, (2007), "Household Debt and Credit: Economic issues and data problems", mimeo.

Bover, O., (2006), "Wealth Effects on Consumption: Microeconometric Estimates from a new survey of household finance", CEPR DP Series No. 5847.

Cannari L. and I. Faiella, (2007), "House Prices and Housing Wealth in Italy", Bank of Italy, mimeo.

Carroll, C. D., (2004), "Housing Wealth and Consumption Expenditure", mimeo,Johns Hopkins University.

D'Alessio G., I.Faiella, R.Gambacorta and S. Iezzi, (2007), "Household Wealth in Italy 1995-2005", mimeo.

Disney R., S.Bridges and J.Gatherhood, (2006), "Housing Wealth and Household Indebtedness: Is there a Household 'Financial Accelerator'?", University of Nottingham, mimeo.

Dreger C and H.E. Reimers, (2006), "Consumption and disposable income in the EU countries: the role of wealth effects", *Empirica* n.33.

Iacoviello, M., (2004), "Consumption, house prices and collateral constraints: a structural econometric analysis", *Journal of Housing Economics* 13, 304-320.

Ministry of Finance, (2005), *Il patrimonio dello Stato Informazioni e Statistiche.*

Muellbauer J., (2007), "Housing and Personal Wealth in a Global Context", WIDER Research paper, 2007/27.

Skinner, J., (1989), "Housing Wealth and Aggregate Saving", NBER WP Series, No. 2842.

Skinner, J., (1993), "Is Housing Wealth a Sideshow?", NBER WP Series, No. 4552.