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EVIDENCE FROM THE EURO AREA

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In 2009 all ECB publications feature a motif taken from the €200 banknote.

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CONTENTS

Abstract

This paper estimates the wealth effects on consumption in the euro area as a whole. I show that: (i) financial wealth effects are relatively large and statistically significant; (ii) housing wealth effects are virtually nil and not significant; (iii) consumption growth exhibits strong persistence and responds sluggishly to shocks; and (iv) the immediate response of consumption to wealth is substantially different from the long-run wealth effects. By disaggregating financial wealth into its major components, the estimates suggest that wealth effects are particularly large for currency and deposits, and shares and mutual funds. In addition, consumption seems to be very responsive to financial liabilities and mortgage loans.

Keywords: consumption, housing wealth, financial wealth.

JEL Classification: E21, E44, D12.

Non-technical summary

Conventional macroeconomic analysis typically includes wealth in models of output, income and prices' determination, namely, by considering that it impacts on both private consumption and money demand.

Wealth can influence economic activity through four major channels: (*i*) the (wealth) effect on consumption, which is the focus of the present work; (*ii*) the Tobin's Q effect on investment, at it increases asset prices, reduces the cost of capital and, therefore, increases investment demand; (*iii*) the credit channel, by increasing the value of collateral (and, therefore, affecting the balance sheets of households and firms) and reducing the problem of adverse selection and the risk associated to investment; and (*iv*) the confidence effect on private spending.

Household consumption is determined by income and asset wealth, namely, real estate and stock ownership. The positive impact on consumption due to the increase in housing wealth is called housing wealth effect, whereas the effect that is due to the increase in financial wealth is called financial wealth effect.

Authors have used different econometric techniques and databases to address the issue of wealth effects on consumption. Nevertheless, the interest on the topic has recently revived as a consequence of the financial turmoil and the severe drop in housing prices. Not surprisingly, numerous academics, central banks and governments have started to question the potential macroeconomic implications of a downturn in house and equity prices.

Although most of the empirical evidence refers to advanced economies and the US (mainly, due to the data availability), the existing literature on the impact of asset wealth fluctuations in the euro area is scarce or inexistent, despite its importance as a key engine of growth in the world.

The main goal of this work is, therefore, to measure wealth effects for the euro area as a whole. Using data at quarterly frequency and for the period 1980:1-2007:4, I show that: (*i*) financial wealth effects are relatively large and statistically significant; (*ii*) housing wealth effects are virtually nil and not significant; (*iii*) consumption growth exhibits strong persistence and responds sluggishly to shocks; and (*iv*) the immediate response of consumption to wealth is substantially different from the long-run wealth effects.

Looking at the composition of financial wealth, the estimates suggest that wealth effects are particularly large for currency and deposits, and shares and mutual funds. In addition, consumption seems to be very responsive to financial liabilities and mortgage loans.

1 Introduction

Conventional macroeconomic analysis typically includes wealth in models of output, income and prices' determination, namely, by considering that it impacts on both private consumption and money demand.

Wealth can influence economic activity through four major channels: (*i*) the (wealth) effect on consumption, which is the focus of the present work; (*ii*) the Tobin's Q effect on investment, at it increases asset prices, reduces the cost of capital and, therefore, increases investment demand; (*iii*) the credit channel, by increasing the value of collateral (and, therefore, affecting the balance sheets of households and firms) and reducing the problem of adverse selection and the risk associated to investment; and (*iv*) the confidence effect on private spending.

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The main goal of this work is, therefore, to measure wealth effects for the euro area as a whole. In a related paper, Slacalek (2006) provides evidence of substantial heterogeneity in the wealth effects across countries, where the euro area emerges as another economic/geographical block. The author studies housing wealth effects on consumption and finds that they are typically lower than in the US and quite often not significant. In accordance with these findings, Skudelny (2008) shows that, for the euro area, the marginal propensity to consume out of financial wealth ranges between 1.3 to 3.5 cents per euro, while housing wealth effects do not seem to be significant.

In this work, I aim at improving the existing literature by emphasizing the importance of wealth composition, that is, I look at the effects on consumption of financial wealth, housing wealth, and their major components. In order to do so, I consider two main econometric methodologies: (*i*) the Dynamic Ordinary Least Squares (DOLS); and (*ii*) the Instrumental Variables / Generalized Method of Moments (IV/GMM). Using quarterly data for the period 1980:1-2007:4, I show that (*i*) financial wealth effects are relatively large and statistically significant; and (*ii*) housing wealth effects are virtually nil and not significant. The marginal propensity to consume out of financial wealth typically ranges between 0.7 cents per euro (the immediate response) and 1.9 cents per euro (the long-run impact) and consumption is also strongly responsive to changes in financial wealth: a 10% increase in financial wealth leads to an increase of between 0.6% and 1.5% in consumption.

By looking at the composition of financial assets, the estimates suggest that wealth effects are particularly large for currency and deposits, and shares and mutual funds. Similarly, consumption seems to be very sensitive to financial liabilities and mortgage loans.

Finally, consumption growth exhibits strong persistence and responds sluggishly to shocks. As a result, the long-run response of consumption to wealth tends to be substantially larger than its short-run effect.

The rest of the paper is organized as follows. Section 2 reviews the existing literature on wealth effects on consumption. Section 3 presents the estimation methodologies and Section 4 describes the data. Section 5 discusses the results, while Section 6 presents the sensitivity analysis. Section 7 concludes with the main findings and policy implications.

2 A Brief Review of the Literature

The research designed to quantify the effect of changes in wealth on consumption goes back to Ando and Modigliani (1963) and an extensive empirical literature has been presented since then.[1]

In the US, the estimates of the marginal propensity to consume out of wealth range between 4 and 7 cents of increase in consumer spending from a dollar increase in aggregate wealth (Gale and Sabelhaus, 1999; Kiley, 2000; Davis and Palumbo, 2001).[2]

Other studies find evidence of small and transitory wealth effects (Cochrane, 1994; Mayer and Simons, 1994; Brayton and Tinsley, 1996; Campbell et al., 1997; Desnoyers, 2001; Lettau and Ludvigson, 2001), which typically reflects its concentrated nature, the bequests' motives and the precautionary savings behaviour (Poterba, 2000).[3]

The international evidence is also diversified. In Australia, the estimates for the marginal propensity to consume out of wealth are in the range of 2 and 5 cents (McKibbin and Richards, 1988; Bertaut, 2002; Tan and Voss, 2003). For Canada, Macklem (1994), Boone et al. (2001) and Pichette (2000) suggest a wealth effect of the order of 0.03 to 0.08. In France, there is no evidence of a significant wealth effect (Bonner and Dubois, 1995; Grunspan and Sicsic, 1997). In Italy, Rossi and Visco (1995) show that the marginal propensity to consume out of wealth ranges between 0.03 and 0.035, while Paiella (2003), Grant and Peltonen (2008), and Guiso et al. (2005) suggest a magnitude of around 2 cents. In Japan, Mutoh et al. (1993) and Ogawa (1992), Horioka (1996) and Ogawa et al. (1996) provide estimates for the marginal propensity to consume out of wealth of between 0.01 and 0.04. In Portugal, Castro (2007) estimates the marginal propensity to consume out of wealth to be 0.03. For Spain, Balmaseda and Tello (2002) and Willman and Estrada (2002) estimate an elasticity of 0.26, Estrada et al. (2004) suggests a magnitude of 0.04, and Bover (2005) does not find a significant wealth effect. In Sweden, Clapham et al. (2002) report an elasticity for non-human net wealth of 0.06, while it ranges between 0.07 to 0.014 for Finland. In the UK, Fernandez-Corugedo et al. (2003) quantify the marginal propensity to consume out of wealth at 0.05.

3 Methodology Strategies

In order to quantify the wealth effects on consumption, I follow two approaches: (*i*) the dynamic ordinary least squares (DOLS); and (*ii*) the instrumental variables / generalized

[1] See Altissimo et al. (2005) for a review of the topic.

[2] Ludvigson and Steindel (1999) show that the wealth effect on consumption is unstable. Maki and Palumbo (2001) emphasize the role of the exceptional stock market performance over the second half of the nineties in boosting consumption.

[3] Caporale and Williams (1997) suggest a modest marginal propensity to consume out of wealth, but emphasize that wealth effects have been strengthened by financial liberalization or deregulation.

method of moments (IV/GMM). The next Sub-Sections describe both approaches in detail.

3.1 DOLS

The trend relationship among consumption, asset wealth and labor income is estimated in accordance with Davidson and Hendry (1981), Blinder and Deaton (1985), Ludvigson and Steindel (1999), and Davis and Palumbo (2001).[4]

Following Saikkonen (1991) and Stock and Watson (1993), I use a dynamic ordinary least squares (DOLS) technique, specifying the following equation

$$\log C_t = \mu + \beta_w \log W_t + \beta_y \log Y_t + \sum_{i=-k}^{k} b_{w,i} \Delta \log W_{t-i} + \sum_{i=-k}^{k} b_{y,i} \Delta \log Y_{t-i} + \varepsilon_t, \qquad (1)$$

where C_t stands for consumption, W_t for asset wealth, and Y_t for labor income, the parameters β_w, β_y represent, respectively, the long-run elasticities of consumption with respect to asset wealth, and labor income, Δ denotes the first difference operator, μ is a constant, and ε_t is the error term. The parameters β_w and β_y should in principle equal $R_w W/(Y + R_w W)$ and $Y/(Y + R_w W)$, respectively, but, in practice, may sum to a number less than one, because only a fraction of total consumption expenditure is observable (Lettau and Ludvigson, 2001).

3.2 IV/GMM

Despite the unpredictability of consumption advocated by Hall (1978),[5] several authors (Flavin, 1981; Campbell and Mankiw, 1989; Lettau and Ludvigson, 2001) have argued that future consumption growth is significantly affected by past information (consumer confidence, consumption growth, lagged income). As a result, consumption growth equations should include a lag of consumption growth, which is simultaneously a test of the permanent income hypothesis.

Carroll (2004), Carroll and Otsuka (2004) and Carroll et al. (2006) have, therefore, proposed an alternative method to estimate the wealth effect, which follows from the first-order approximation of the Euler equation for an habit-formation consumer:

$$\Delta \log C_t = \mu_0 + \chi \Delta \log C_{t-1} + \epsilon_t. \qquad (2)$$

where $\Delta \log C_t$ represents consumption growth, χ is a parameter that captures the persistence of consumption growth, μ_0 is a constant, and ε_t is the error term.[6]

Assuming that the disturbance term can be decomposed into a part due to the current changes in household income, wealth and the rest, $\epsilon_t = \alpha_y \Delta \log Y_t + \alpha_w \Delta \log W_t + \eta_t$, the coefficients α_y and α_w will be, respectively, the immediate responses of consumption growth to income and wealth growth. Consistently, the effect of one percentage point increase in

[4] I first use the Augmented Dickey and Fuller (1979) and the Phillips and Perron (1988) tests to determine the existence of unit roots in the series and conclude that all series are first-order integrated, $I(1)$. Next, I analyze the existence of cointegration among the series using the methodology of Engle and Granger (1987) and Phillips and Ouliaris (1990), and find evidence that supports that hypothesis.

[5] The author shows that the consumption expenditure of a household with preferences described by a time-separable quadratic utility function follows a random walk.

[6] See Dynan (2000). Other potential sources of the sluggish response of consumption growth are: adjustment costs to changing consumption, evaluation of household finances only at periodic intervals (Kennickell and Starr-McCluer, 1997), and household inattention.

wealth growth at time $t-s$ on consumption growth is $\alpha_w \chi^s$. In addition, the long-run effects of income and wealth are the sums of the partial effects, that is, $\alpha_y \sum_{i=0}^{\infty} \chi^i = \alpha_y/(1-\chi)$ and $\alpha_w \sum_{i=0}^{\infty} \chi^i = \alpha_w/(1-\chi)$, respectively.

By backward iterating the Euler equation, one gets

$$\Delta \log C_t - \chi^k \Delta \log C_{t-k} = \tilde{\mu}_k + \epsilon_t + \chi^2 \epsilon_{t-2} + ... + \chi^{k-1} \epsilon_{t-k+1}, \tag{3}$$

where $\tilde{\mu}_k = \tilde{\mu}_0 \times (1-\chi^k)/(1-\chi)$. This equation can be rewritten (for $k > 2$) as

$$\Delta \log C_t - \chi^k \Delta \log C_{t-k} = \hat{\mu}_k + \sum_{i=2}^{k-1} \chi^i (\alpha_y \Delta \log Y_{t-i} + \alpha_w \Delta \log W_{t-i}) + \tilde{\eta}_{k,t}, \tag{4}$$

where $\tilde{\eta}_{k,t} = \epsilon_t + \chi \epsilon_{t-1} + \sum_{i=2}^{k-1} \chi^i \eta_{t-i}$.

4 Data

This Section provides a summary description of the data employed in the empirical analysis. A detailed description can be found in the Appendix. In the estimation of the wealth effects, I use quarterly, seasonally adjusted data for the euro area and all variables are measured in logs of real per capita terms. The main data source is the European Central Bank (ECB) and euro area aggregates are calculated as weighted average of euro-11 before 1999 and, thereafter, as break-corrected series covering the real-time composition of the euro area.

Consumption corresponds to private consumption while income refers to disposable income. Original data on wealth correspond to the end-period values. Therefore, I lag once the data, so that the observation of wealth in t corresponds to the value at the beginning of the period $t+1$. Aggregate wealth is the sum of financial wealth and housing wealth. Regarding financial wealth, I consider the following measures: (*i*) gross financial wealth; and (*ii*) net financial wealth, that is, either gross financial wealth minus total financial liabilities or the difference between gross financial wealth and financial liabilities (excluding mortgage loans). Financial assets include: (*i*) currency and deposits; (*ii*) debt securities; (*iii*) shares and mutual fund shares; (*iv*) insurance reserves; and (*v*) net others. Financial liabilities correspond to the difference between total liabilities and mortgage loans. Regarding housing wealth, the following measures are used: (*i*) gross housing wealth; and (*ii*) net housing wealth, that is, either gross housing wealth minus financial liabilities or the difference between gross housing wealth and mortgage loans.

Due to the coverage of the study, some data limitations need to be referred. First, while previous studies have focused on evidence for the US and/or the UK, I use data for the euro area. This has some drawbacks such as the fact that the historical data originates from the time prior to EMU when the member economies experienced different monetary policy regimes and the possibility of aggregation bias (Beyer et al. 2001). There are, in fact, two alternative approaches: (*i*) to construct separate models of the member economies and link them to form a multi-country model of the euro area; and (*ii*) to start by aggregating the

relevant macroeconomic time series across member economies and then estimate a model for the euro area as a whole. I follow the last approach, because the objectives and instruments of Eurosystem monetary policy are defined in terms of euro area aggregates.[7] Second, I cannot distinguish between non-durable and durable consumption, as I use an aggregate measure of consumption. In fact, since durable consumption can be thought of as a replacement and addition to the capital stock, conventional theories typically look at the flow of non-durable and services consumption. Note, however, that. (*i*) total consumption is the variable of interest when investigating the link between consumption and wealth (Mehra, 2001); (*ii*) a fall in the stock market is more likely to lead to a postponement of durable consumption decisions, while the reduction of non-durable consumption might be of minor importance (Romer, 1990); and (*iii*) durable consumption goods are among the major categories of spending funded by mortgage refinancing (Brady et al., 2000).

Figure 1 plots the evolution of the wealth shares in the euro area. It suggests housing wealth is the largest component of the net worth, with a share of 60%. The Figure also shows that the share of net housing wealth has fallen until around 2000 when it represented 50% of the net worth, a trend that is related with the extraordinary performance of the stock markets during the nineties. After the stock market downturn and the housing boom that took place in most countries of the euro area, housing wealth regained its importance.

Figure 2 plots the evolution of the ratios of financial and housing wealth to income. The average ratio of housing wealth to income was 11.6 while for financial wealth the average ratio was 7.7. Because income is typically smoother than wealth, the dynamics of the wealth to income ratios are primarily driven by wealth: a high value of the wealth–income ratio may, therefore, signal that stock prices or housing prices are above their equilibrium levels. In fact, the Figure suggests the ratio of housing wealth to income has substantially increased since 2000.

Figure 3 shows the evolution of the composition of financial assets. It is possible to see that: (*i*) currency and deposits, which represented 53.3% of the financial assets in the eighties, lost relative importance and now correspond to 31.4%, although they are still the most important financial asset; (*ii*) debt securities also lost their relative importance (from 12.4% in the beginning of the eighties to 7.9% in the period 2005:1-2007:4); (*iii*) shares and mutual fund shares almost doubled their share, from 15.8% in 1980:4-1984:4 to 29.7% in 2005:1-2007:4, and represent the second most important financial asset; and (*iv*) similarly, insurance tradable reserves almost doubled their share from 15.4% in 1980:4-1984:4 to 28.8% in 2005:1-2007:4, and represent the third largest financial asset.

Finally, Figure 4 plots the evolution of the ratio of financial liabilities to financial wealth and the ratio of mortgage loans to housing wealth. While financial liabilities have been loosing importance (from 18% in early eighties to 14% in 2007), the relative weight of mortgage loans has substantially risen (from 7% in early eighties to 13% in 2007). This last feature of the data clearly reflects the importance of the downward trend in interest rates observed, in particular, since the early nineties.

[7] This approach is also pursued by Brand and Cassola (2000), Fagan et al. (2001), Gerdesmeier and Roffia (2003), and Coenen and Wieland (2005).

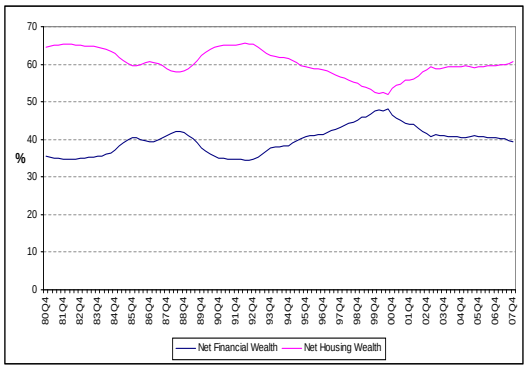

Figure 1: The wealth shares.

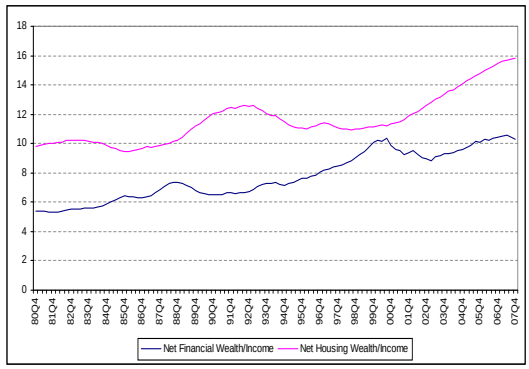

Figure 2: The wealth-income ratios.

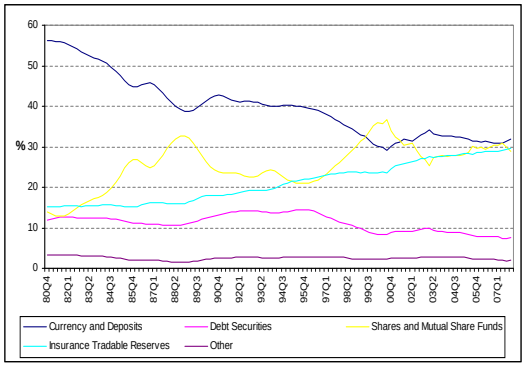

Figure 3: The relative importance of different financial assets.

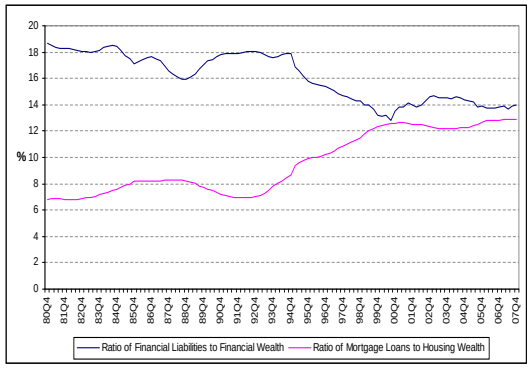

Figure 4: The relative importance of liabilities.

5 Results and Discussion

I now present and discuss the results of estimation of the wealth effects on consumption. I start by using an aggregate measure of wealth, and Table 1 presents a summary of the findings. Columns 1 and 2 provide the estimates from the DOLS estimation while Columns 3 to 6 report the results from the IV/GMM estimation.

Column 1 shows that the long-run elasticity of consumption with respect to aggregate wealth is relatively large (0.0921).[8] Column 2 suggests that the marginal propensity to consume out of aggregate wealth is statistically significant although relatively small (0.4 cents per euro of increase in consumption). Column 3 provides evidence supporting that consumption exhibits strong persistence as the coefficient associated with the lag of consumption is statistically significant and large in magnitude (0.7969). Both the short-run elasticity of consumption with respect to aggregate wealth and the marginal propensity to consume out of aggregate wealth are small (respectively, 0.0100 and 0.0456). A similar conclusion regarding

[8] In what follows, long-run elasticities are computed using the (unrestricted) estimates of consumption persistence, that is, the long-run elasticity equals short-run elasticity/(1-coefficient on lagged consumption growth). The estimates for the marginal propensities to consume are calculated by multiplying elasticities with consumption-wealth ratios.

the long-run estimates can be drawn from the observation of Columns 5 and 6: while the long-run elasticity of consumption is 0.0492, the long-run marginal propensity to consume is 0.2242. Although somewhat smaller in magnitude, the IV/GMM estimates are in accordance with the ones produced by the DOLS estimation.

Table 1: Wealth effects on consumption: aggregate wealth.

	DOLS		IV/GMM			
	Elasticity^{LR}	MPC^{LR}	Elasticity^{SR}	MPC^{SR}	Elasticity^{LR}	MPC^{LR}
Consumption(-1)			0.7969***			
			[0.0738]			
Aggregate Wealth	0.0921***	0.4197***	0.0100	0.0456	0.0492	0.2242
	[0.0242]		[0.0089]			
Income	0.8440***	72.3710***	0.1841***	15.7861***	0.9065***	77.7302***
	[0.0514]		[0.0671]			
Constant	-0.3457***		-0.0462***			
	[0.0404]		[0.0266]			

Note: The DOLS estimation includes 1 lead and 1 lag of the explanatory variables.
Heteroscedasticity and serial correlation robust standard errors in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%.

While the theoretical and empirical studies previously mentioned suggest that the marginal propensity to consume out of wealth should be the same no matter what asset categories are considered, another strand of the literature has argued that stock market or housing wealth may have a different impact on consumption (see, for instance, Zeldes (1989) and Poterba and Samwick (1995)). In fact, the responsiveness of consumers to financial and housing asset shocks can be different: liquidity reasons (Pissarides, 1978), utility derived from the property right of an asset as housing services or bequest motives (Poterba, 2000; Bajari et al., 2005), different distributions of assets across income groups, expected permanency of changes of different categories of assets, mismeasurement of wealth,[9] segregation of different kinds of wealth into separate "mental accounts",[10] and 'psychological factors' (Shefrin and Thaler, 1988). Each of these motives suggests a distinction between the impact of financial wealth and housing wealth on consumption (Imbens et al., 2001; Case et al., 2005).[11]

The empirical findings are not yet conclusive, namely, in what concerns the significance of housing wealth effect: an increase in housing wealth forces young renters to save more today in order to become homeowners tomorrow, implying that the increase in consumption

[9] This may be especially so for houses which are less homogenous and less frequently traded than shares. Also many consumers may not be aware of the exact value of their indirect share holdings: Sousa (2003, 2008a) shows that directly held stock market wealth effects are significantly different from indirectly held stock holdings.

[10] Cocco (2000) analyzes the benefits of housing as a hedge against income shocks. Englund et al. (2002) and Iacoviello and Ortalo-Magné (2003) show the importance of housing as a hedge against the risk of financial portfolios. Sinai and Souleles (2005) point out its benefits as a hedge against rent risk. Sousa (2008b) highlights the possibility of the use of housing assets as an hedge against unfavorable states.

[11] Boone et al. (1998), Edison and Sløk (2001), Bertaut (2002), Ludwig and Sløk (2002), Case et al. (2005), Labhard et al. (2005) present some international comparisons of wealth effects. For instance, Ludwig and Sløk (2002) show that in market-based economies the estimates imply an elasticity of consumption to equity prices of 0.1, while for bank-based economies the estimated elasticity is around 0.04. Edison and Sløk (2001) compare the effects on consumption of changes in telecommunications, media and information technology (TMT) *versus* non-TMT stocks.

by current owners may be offset by the increase in savings by renters.[12] Elliott (1980), Levin (1998), Mehra (2001), and Sierminska and Takhtamanova (2007) find that the wealth effect is independent of the category of asset considered. Thaler (1990), Sheiner (1995), and Hoynes and McFadden (1997) find a weak relation between individual savings rates and changes in house prices. These results were challenged by Peek (1983) and Bhatia (1987) who question the methods used to estimate real nonfinancial wealth. Slacalek (2006) shows that housing wealth effects are smaller than financial wealth effects for most countries, with the exceptions of the US and the UK. In contrast, Case (1992), Kent and Lowe (1998), Skinner (1999), Case et al. (2005), and Dvornak and Kohler (2003) find evidence of a substantial housing wealth effect. Carroll et al. (2006) distinguish between short-run and long-run wealth effects by exploring the persistence of consumption growth, and find that housing wealth effects are substantially larger than for stock market wealth. Peltonen et al. (2008) show that wealth effects are significant and relatively large in emerging countries, and that: (*i*) housing wealth effects range between 2.8 and 5.0 cents; (*ii*) stock market wealth effects lie between 2.6 and 3.0 cents; and (*iii*) money wealth effects range between 4.3 and 5.4 cents.[13]

For the euro area as a whole, only Slacalek (2006) and Skudelny (2008) have studied housing wealth effects and found that these are typically lower than in the US and quite often not significant. While the focus of the authors is at providing evidence of substantial heterogeneity in the wealth effects across countries - where the euro area emerges as additional economic/geographical block -, this work aims at improving the existing literature by emphasizing the impact of different wealth measures and their major components.

Following the abovementioned discussion, I now drive the attention towards the wealth effects on consumption by disaggregating between net financial wealth, that is, gross financial wealth minus total liabilities (excluding mortgage loans), and net housing wealth (that is, gross housing wealth minus mortgage loans).

Table 2 summarizes the results. Column 1 suggests that the long-run elasticity of consumption with respect to net financial wealth is statistically significant and relatively large: a 10% increase in net financial wealth leads to an increase of consumption by 1.2%. The marginal propensity to consume out of financial wealth is also important (1.4 cents per euro). In contrast, both the elasticity of consumption with respect to net housing wealth and the marginal propensity to consume out of net housing wealth are small: a 10% increase in net housing wealth increases consumption by just 0.2%; and consumption increases by 0.15 cents per euro of increase in net housing wealth. The IV/GMM estimation (Columns 3 to 6) once again confirms the large persistence of consumption: the coefficient associated with the lag of consumption is statistically significant and large in magnitude (0.4770). As a result, the long-run estimates are almost the double of the short-run estimates. For instance, the long-run marginal propensity to consume out of net financial wealth is 1.5157, which compares with a short-run marginal propensity to consume of 0.7927. As for net housing wealth, both the elas-

[12] Yoshikawa and Ohtake (1989) find that, in Japan, savings rates for renters is higher with higher land prices, but the purchase of housing is sufficiently lower, so that the net effect of higher prices is to increase consumption of both renters and owners. Similarly, in Canada, Engelhardt (1994) show that higher housing prices substantially reduce the probability that renters save for a down payment. In the US, transfers from family members or others provide a sizeable down payment assistance for homebuyers (Engelhardt and Mayer, 1994; Engelhardt and Mayer, 1998). Using UK data, Campbell and Cocco (2007) find a statistically significant impact of housing prices on consumption among older homeowners, but no significant impact among young renters.

[13] Funke (2004) finds a small but statistically significant stock market wealth effect in emerging market economies.

ticity of consumption and the marginal propensity to consume are small and not statistically significant.

Table 2: Wealth effects on consumption: net financial wealth versus net housing wealth.

	DOLS		IV/GMM			
	Elasticity^{LR}	MPC^{LR}	Elasticity^{SR}	MPC^{SR}	Elasticity^{LR}	MPC^{LR}
Consumption(-1)			0.4770***			
			[0.0694]			
Net Financial Wealth	0.1234***	1.4344***	0.0682***	0.7927***	0.1304***	1.5157***
	[0.0114]		[0.0091]			
Net Housing Wealth	0.0202**	0.1527**	0.0047	0.0355	0.0090	0.0681
	[0.0088]		[0.0046]			
Income	0.6883***	59.0201***	0.3626***	31.0921***	0.6933***	59.4488***
	[0.0391]		[0.0514]			
Constant	-0.2337***		-0.1161***			
	[0.0135]		[0.0205]			

Note: The DOLS estimation includes 1 lead and 1 lag of the explanatory variables.
Heteroscedasticity and serial correlation robust standard errors in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%.

6 Sensitivity Analysis

This Section provides the sensitivity analysis. I estimate wealth effects on consumption by disaggregating between: (*i*) net financial wealth and gross housing wealth; (*ii*) gross financial wealth and net housing wealth; and (*iii*) the major components of gross financial wealth.

6.1 Net Financial Wealth *versus* Gross Housing Wealth

Table 3 presents a summary of the results of the disaggregation between net financial wealth (that is, financial wealth minus total liabilities) and gross housing wealth. Columns 1 and 2 report the estimates from the DOLS estimation, while Columns 3 to 6 describe the results from the IV/GMM estimation. Column 1 suggests that consumption is strongly responsive to changes in the net financial wealth (0.1273), but the elasticity of consumption with respect to gross housing wealth is small (0.0462). This feature is also supported by the estimates of the marginal propensity to consume (Column 2): while the marginal propensity to consume out of net financial wealth is 1.75 cents per euro, for gross housing wealth that figure is just 0.32 cents. In both cases, the disaggregation of wealth is statistically significant. The IV/GMM estimation also corroborates the DOLS findings: the long-run marginal propensity to consume out of net financial wealth is 1.9320, while the long-run marginal propensity to consume out of gross housing wealth is just 0.2076. These figures are substantially larger than the short-run estimates (respectively, 0.76 cents and 0.08 cents per euro of increase in net financial and gross financial wealth), reflecting the sluggishness of the response of consumption.

Table 3: Wealth effects on consumption: net financial wealth versus gross housing wealth.

	DOLS		IV/GMM			
	Elasticity^{LR}	MPC^{LR}	Elasticity^{SR}	MPC^{SR}	Elasticity^{LR}	MPC^{LR}
Consumption(-1)			0.6044***			
			[0.0680]			
Net Financial Wealth	0.1273***	1.7505***	0.0556***	0.7645***	0.1405***	1.9320***
	[0.0159]		[0.0087]			
Gross Housing Wealth	0.0462***	0.3165***	0.0120**	0.0822**	0.0303**	0.2076**
	[0.0108]		[0.0059]			
Income	0.6476***	55.5302***	0.2569***	22.0286***	0.6494***	55.6845***
	[0.0534]		[0.0513]			
Constant	-0.27348***		-0.1007***			
	[0.0173]		[0.0222]			

Note: The DOLS estimation includes 1 lead and 1 lag of the explanatory variables.
Heteroscedasticity and serial correlation robust standard errors in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%.

6.2 Gross Financial Wealth *versus* Net Housing Wealth

I now disaggregate wealth in gross financial wealth and net housing wealth (that is, gross housing wealth minus total liabilities). Table 4 summarizes the results. Column 1 suggests that the long-run elasticity of consumption with respect to gross financial wealth is statistically significant and relatively large: a 10% increase in net financial wealth leads to an increase of consumption by 1.4%. The marginal propensity to consume out of gross financial wealth is also important in magnitude (1.4 cents per euro of increase in gross financial wealth). In contrast, both the elasticity of consumption with respect to net housing wealth and the marginal propensity to consume out of net housing wealth are small: a 10% increase in net housing wealth increases consumption by just 0.1%; and consumption increases by 0.11 cents per euro of increase in net housing wealth. The IV/GMM estimation reveals the large persistence of consumption: the coefficient associated with the lag of consumption is statistically significant and large in magnitude (0.5104). The long-run estimates are, therefore, about twice as much as the short-run estimates. For instance, while the immediate response of consumption to gross financial wealth is 0.72 cents (per euro of increase in gross financial wealth), its long-run impact is 1.46 cents. As for net housing wealth, both the elasticity of consumption and the marginal propensity to consume are small.

Table 4: Wealth effects on consumption: gross financial wealth versus net housing wealth.

	DOLS		IV/GMM			
	Elasticity^{LR}	MPC^{LR}	Elasticity^{SR}	MPC^{SR}	Elasticity^{LR}	MPC^{LR}
Consumption(-1)			0.5104***			
			[0.0689]			
Gross Financial Wealth	0.1447***	1.4052***	0.0737***	0.7157***	0.1505***	1.4615***
	[0.0144]		[0.0102]			
Net Housing Wealth	0.0132*	0.1144*	0.0008	0.0069	0.0016	0.0139
	[0.0078]		[0.0041]			
Income	0.6653***	57.0479***	0.3317***	28.4425***	0.6775***	58.0940***
	[0.0432]		[0.0509]			
Constant	-0.2720***		-0.1301***			
	[0.0152]		[0.0222]			

Note: The DOLS estimation includes 1 lead and 1 lag of the explanatory variables.
Heteroscedasticity and serial correlation robust standard errors in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%.

6.3 Dis(Aggregate) Financial Wealth *versus* (Dis)Aggregate Housing Wealth

Wealth accumulation emerges as the outcome of household's savings which is driven by a wide range of factors, namely: (*i*) the provision for retirement and bequest motives; (*ii*) precautionary reasons; and (*iii*) the need to reach a target level. Consequently, the investment in housing or financial/business products is the response of consumers to perceptions about the trade-off between return and risk. In the case of housing, it is also normally seen as the only investment that can be funded by borrowing, given its collateral services.

Wealth is not, therefore, money. In fact, money includes paper currency, savings and time accounts, and travellers checks and refers to a specific asset of household's financial wealth. As a result, I disaggregate gross financial wealth into its major components (currency and deposits, debt securities, shares and mutual fund shares, insurance reserves, and other) and look at their effects on consumption.

The results are summarized in Table 5. Column 1 suggests that consumption is strongly responsive to changes in currency and deposits: an increase of 10% in the holdings of currency and deposits leads to an increase of 2.4% in consumption. Column 2 shows that the marginal propensities to consume out of currency and deposits and shares and mutual fund shares are important, with magnitudes of, respectively, 5.8 and 1.2 cents per euro. The marginal propensities to consume out of net financial liabilities and out of mortgage loans are also large (respectively, 7.1 and 7.3 cents per euro), probably, reflecting the use of these categories of financial wealth to refinance consumption. Column 3 suggests that consumption exhibits large persistence as the coefficient associated with the lag of consumption is statistically significant and large in magnitude (0.5801). This helps explaining the substantial difference in magnitude between the immediate response of consumption to changes in wealth (Columns 3 and 5) and the long-run impact (Columns 4 and 6). The IV/GMM estimates for the long-run marginal propensities to consume (Column 6) are in line with the DOLS findings, although somewhat smaller (3.7 cents per euro in the case of currency and deposits, and 0.7 cents per euro for shares and mutual fund shares). Similarly, the long-run marginal propensities to consume out of net financial liabilities and out of mortgage loans are also smaller (3.4 cents per euro).

Table 5: Wealth effects on consumption: dis(aggregate) financial wealth versus (dis)aggregate housing wealth.

	DOLS		IV/GMM			
	Elasticity^{LR}	MPC^{LR}	Elasticity^{SR}	MPC^{SR}	Elasticity^{LR}	MPC^{LR}
Consumption(-1)			0.5801***			
			[0.0538]			
Currency and Deposits	0.2359***	5.7529***	0.0635***	1.5486***	0.1512***	3.6873***
	[0.0612]		[0.0255]			
Debt Securities	-0.0178	-1.5525	-0.0065	-0.5669	-0.0155	-1.3519
	[0.0134]		[0.0066]			
Shares and Mutual Fund Shares	0.0287**	1.2127***	0.0073	0.3084	0.0174	0.7352
	[0.0120]		[0.0049]			
Insurance Reserves	-0.1048**	-5.3155**	-0.0120	-0.6086	-0.0286	-1.4506
	[0.0525]		[0.0197]			
Other	0.0364***	14.3811*	0.0025	0.9877	0.0060	2.3705
	[0.0142]		[0.0041]			
Gross Housing Wealth	-0.0641***	-0.4391***	-0.0287***	-0.1966***	-0.0683***	-0.4679***
	[0.0206]		[0.0101]			
Net Financial Liabilities	0.1181***	7.0695***	0.0242*	1.4486*	0.0576*	3.4480*
	[0.0489]		[0.0142]			
Mortgage Loans	0.0928***	7.3008***	0.0181	1.4240	0.0431***	3.3908***
	[0.0287]		[0.0124]			
Income	0.6560***	56.2504***	0.3447***	29.5572***	0.8209***	70.3902***
	[0.1043]		[0.0503]			
Constant	-0.2291*		-0.0674			
	[0.1245]		[0.0459]			

Note: The DOLS estimation includes 1 lead and 1 lag of the explanatory variables.
Heteroscedasticity and serial correlation robust standard errors in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%.

7 Conclusion

In this work, I estimate the magnitude of the effects on consumption from different wealth components in the euro area as a whole. Using quarterly data for the period 1980:1-2007:4, I show that (*i*) financial wealth effects are relatively large and statistically significant; and (*ii*) housing wealth effects are virtually nil and not significant.

The marginal propensity to consume out of financial wealth typically ranges between 0.7 cents per euro (immediate response) and 1.9 cents per euro (long-run impact) and consumption is also strongly responsive to changes in financial wealth: a 10% increase in financial wealth leads to an increase of between 0.6% and 1.5% in consumption.

By disaggregating financial wealth into its major components, the estimates show that: (*i*) wealth effects are particularly large for currency and deposits, and shares and mutual funds; and (*ii*) consumption seems to be very sensitive to financial liabilities and mortgage loans. This piece of evidence is especially important as it suggests that the volatility of consumption may increase in the outcome of a wider exposure to financial markets. Moreover, it supports the idea that a broader integration of the housing finance system with the capital markets - for instance, through the shift from a regulated system dominated by savings, loans and mutual savings banks to a relatively unregulated system dominated by mortgage bankers and brokers, the process of mortgage securitization, and a greater competitiveness in the primary mortgage market - can also contribute to a larger response of consumption to unexpected wealth variation.

Finally, consumption growth exhibits a strong persistence and responds sluggishly to shocks. As a result, the long-run response of consumption to wealth tends to be substantially larger than its short-run effect. This characteristic of consumption growth that one observes for the euro area should capture the attention of academics, central banks and governments. In fact, it poses complex challenges, in particular, regarding the amplification of the macroeconomic consequences of a downturn in asset markets.

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Appendix

A Detailed Data Description

Euro area aggregates are calculated as weighted average of euro-11 before 1999 and, thereafter, as break-corrected series covering the real-time composition of the euro area. The weights are computed using GDP at irrevocable fixed conversion rates.

Disposable Income

Total compensation of employees. From 1999:1 onwards, this series covers nominal disposable income of the real-time composition of the euro area, correcting for the breaks caused by the several enlargements, i.e. currently the observations from 2007:4 backwards are extrapolations based on growth rates calculated from the levels series compiled for the euro area 15 in 2008. For period before 1999, the nominal disposable income series for the euro area is constructed by aggregating national disposable income data for euro 11 using the irrevocable fixed exchange rates of 31 December 1998 for the period 1980:1-1998:4. Again, growth rates from this series are used to backward extend the euro area disposable income series.

The euro area seasonally adjusted real disposable income series (at 2005 constant prices) has been constructed before 1999 by aggregating national real disposable income data using the irrevocable fixed exchange rates. As for the euro area nominal disposable income, an artificial euro area real disposable income series has also been constructed using the procedure illustrated above. Data are quarterly, seasonally adjusted, expressed in million of euro, and comprise the period 1980:1-2007:4.

Consumption

Total final private consumption. Data are quarterly, seasonally adjusted, expressed in million of euro, and comprise the period 1980:1-2007:4. The construction principle is similar to that described for disposable income.

Deflator

All variables are expressed in real terms by using the Harmonised Index of Consumer Prices (HICP). The HICIP is computed using consumption expenditure weights at irrevocable fixed

conversion rates. The year base is 2005 (2005 =100). Data are quarterly (based on averages of monthly data), seasonally adjusted, and comprise the period 1980:1-2007:4.

Financial Wealth

Net financial wealth is the difference between financial assets (currency and deposits, debt securities, shares and mutual fund shares, insurance reserves, and net others) and financial liabilities (excluding mortgage loans) held by households and non-profit institutions serving households. Original series are provided at quarterly frequency from the euro area quarterly sectoral accounts for the period 1999:1-2007:4 and at annual frequency from the monetary union financial accounts for the period 1995-1998 and from national sources for the period 1980-1994. Quarterly data before 1999 are back-casted and interpolated using quadratic smoothing and corrected for breaks. Data are quarterly, seasonally adjusted, expressed in million of euro, and comprise the period 1980:1-2007:4.

Housing Wealth

Net housing wealth is the difference between gross housing wealth and mortgage loans held by households and non-profit institutions serving households. Original series are provided at annual frequency and quarterly data are backcasted and interpolated using quadratic smoothing. Housing wealth data are at current replacement costs net of capital depreciation based on ECB estimates. Data are quarterly, seasonally adjusted, expressed in million of euro, and comprise the period 1980:1-2007:4.

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