

Sousa, Ricardo M.

Working Paper

Wealth effects on consumption: evidence from the euro area

ECB Working Paper, No. 1050

Provided in Cooperation with:

European Central Bank (ECB)

Suggested Citation: Sousa, Ricardo M. (2009) : Wealth effects on consumption: evidence from the euro area, ECB Working Paper, No. 1050, European Central Bank (ECB), Frankfurt a. M.

This Version is available at:

<https://hdl.handle.net/10419/153484>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



EUROPEAN CENTRAL BANK

EUROSYSTEM

WORKING PAPER SERIES

NO 1050 / MAY 2009

**WEALTH EFFECTS
ON CONSUMPTION
EVIDENCE FROM THE
EURO AREA**

by Ricardo M. Sousa



EUROPEAN CENTRAL BANK

EUROSYSTEM



WORKING PAPER SERIES

NO 1050 / MAY 2009

WEALTH EFFECTS ON CONSUMPTION

EVIDENCE FROM THE EURO AREA¹

by Ricardo M. Sousa²



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

This paper can be downloaded without charge from <http://www.ecb.europa.eu> or from the Social Science Research Network electronic library at http://ssrn.com/abstract_id=1392703.



¹ The author would like to thank Björn Fischer and Mika Tujula for very helpful insights and the provision of data for the euro area, to Frauke Skudelny, Thomas Westermann and other participants to an internal ECB seminar, and the Monetary Policy Stance Division (MSN) of the European Central Bank (ECB) for its hospitality. Any views expressed in this paper represent those of the author and not necessarily those of the European Central Bank.

² Economic Policies Research Unit (NIPE) and Department of Economics, University of Minho, Campus of Gualtar, 4710-057 - Braga, Portugal; Financial Markets Group (FMG) and Department of Economics, London School of Economics, Houghton Street, London WC2 2AE, United Kingdom; e-mail: rjsousa@eeg.uminho.pt; r.j.sousa@lse.ac.uk

© European Central Bank, 2009

Address

Kaiserstrasse 29
60311 Frankfurt am Main, Germany

Postal address

Postfach 16 03 19
60066 Frankfurt am Main, Germany

Telephone

+49 69 1344 0

Website

<http://www.ecb.europa.eu>

Fax

+49 69 1344 6000

All rights reserved.

Any reproduction, publication and reprint in the form of a different publication, whether printed or produced electronically, in whole or in part, is permitted only with the explicit written authorisation of the ECB or the author(s).

The views expressed in this paper do not necessarily reflect those of the European Central Bank.

The statement of purpose for the ECB Working Paper Series is available from the ECB website, <http://www.ecb.europa.eu/pub/scientific/wps/date/html/index.en.html>

ISSN 1725-2806 (online)

CONTENTS

Abstract	4
Non-technical summary	5
1 Introduction	6
2 A brief review of the literature	7
3 Methodology Strategies	7
3.1 DOLS	8
3.2 IV/GMM	8
4 Data	9
5 Results and discussion	11
6 Sensitivity analysis	14
6.1 Net financial wealth <i>versus</i> gross housing wealth	14
6.2 Gross financial wealth <i>versus</i> net housing wealth	15
6.3 Dis(aggregate) financial wealth <i>versus</i> (Dis)aggregate housing wealth	16
7 Conclusion	18
References	18
Appendix	25
European Central Bank Working Paper Series	27

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.

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. 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

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

²Ludvigson 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.

³Caporale 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

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

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:

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

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

⁴I 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.

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

⁶See 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

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

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

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

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 losing 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.

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

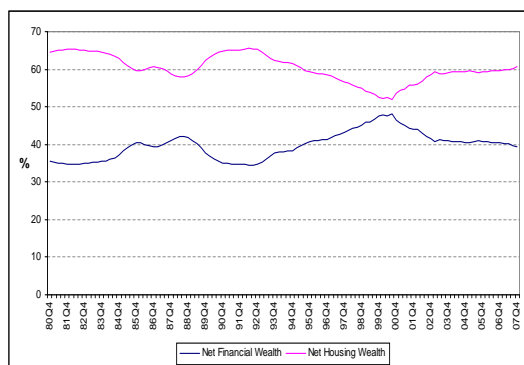


Figure 1: The wealth shares.

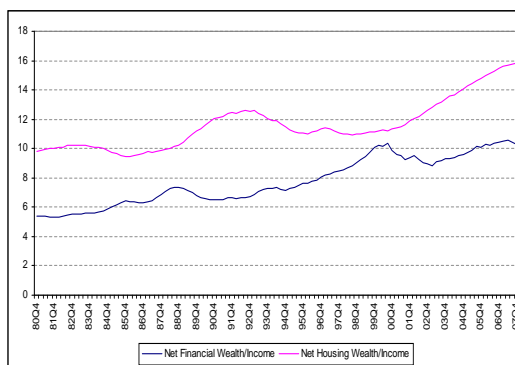


Figure 2: The wealth-income ratios.

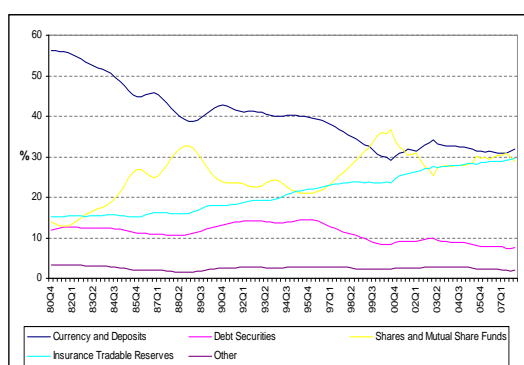


Figure 3: The relative importance of different financial assets.

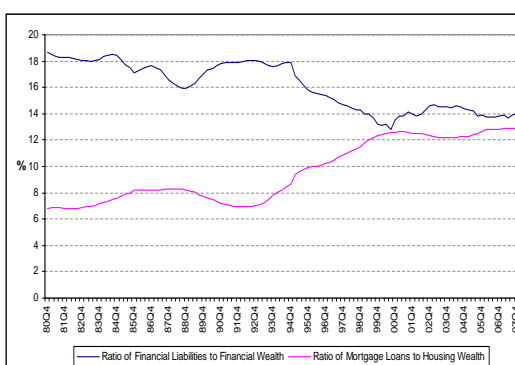


Figure 4: The relative importance of liabilities.

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

⁸In 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*** [0.0242]	0.4197***	0.0100 [0.0089]	0.0456	0.0492	0.2242
Income	0.8440*** [0.0514]	72.3710***	0.1841*** [0.0671]	15.7861***	0.9065***	77.7302***
Constant	-0.3457*** [0.0404]		-0.0462*** [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

⁹This 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.

¹⁰Cocco (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.

¹¹Boone 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-

¹²Yoshikawa 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.

¹³Funke (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*** [0.0114]	1.4344***	0.0682*** [0.0091]	0.7927***	0.1304***	1.5157***
Net Housing Wealth	0.0202** [0.0088]	0.1527**	0.0047 [0.0046]	0.0355	0.0090	0.0681
Income	0.6883*** [0.0391]	59.0201***	0.3626*** [0.0514]	31.0921***	0.6933***	59.4488***
Constant	-0.2337*** [0.0135]		-0.1161*** [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*** [0.0159]	1.7505***	0.0556*** [0.0087]	0.7645***	0.1405***	1.9320***
Gross Housing Wealth	0.0462*** [0.0108]	0.3165***	0.0120** [0.0059]	0.0822**	0.0303**	0.2076**
Income	0.6476*** [0.0534]	55.5302***	0.2569*** [0.0513]	22.0286***	0.6494***	55.6845***
Constant	-0.27348*** [0.0173]		-0.1007*** [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*** [0.0144]	1.4052***	0.0737*** [0.0102]	0.7157***	0.1505***	1.4615***
Net Housing Wealth	0.0132* [0.0078]	0.1144*	0.0008 [0.0041]	0.0069	0.0016	0.0139
Income	0.6653*** [0.0432]	57.0479***	0.3317*** [0.0509]	28.4425***	0.6775***	58.0940***
Constant	-0.2720*** [0.0152]		-0.1301*** [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*** [0.0612]	5.7529***	1.5486*** [0.0255]	0.1512***	3.6873***
Debt Securities	-0.0178 [0.0134]	-1.5525	-0.0065 [0.0066]	-0.0155	-1.3519
Shares and Mutual Fund Shares	0.0287** [0.0120]	1.2127***	0.0073 [0.0049]	0.0174	0.7352
Insurance Reserves	-0.1048** [0.0525]	-5.3155**	-0.0120 [0.0197]	-0.0286	-1.4506
Other	0.0364*** [0.0142]	14.3811*	0.0025 [0.0041]	0.0060	2.3705
Gross Housing Wealth	-0.0641*** [0.0206]	-0.4391***	-0.0287*** [0.0101]	-0.0683***	-0.4679***
Net Financial Liabilities	0.1181*** [0.0489]	7.0695***	1.4486* [0.0142]	0.0576*	3.4480*
Mortgage Loans	0.0928*** [0.0287]	7.3008***	0.0181 [0.0124]	0.0431***	3.3908***
Income	0.6560*** [0.1043]	56.2504***	0.3447*** [0.0503]	29.5572***	70.3902***
Constant	-0.2291* [0.1245]		-0.0674 [0.0459]	0.8209***	

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.

References

- [1] Altissimo F., Georgiou E., Sastre T., Valderrama M.T., Sterne G., Stocker M., Weth M., Whelan K., and A. Willman, 2005. Wealth and asset price effects on economic activity. ECB Occasional Paper N^o. 29.
- [2] Ando, A., and F. Modigliani, 1963. The 'life cycle' hypothesis of saving: aggregate implications and tests. *American Economic Review* 53, 55-84.
- [3] Bajari, P., Benkard, C., and J. Krainer, 2005. House prices and consumer welfare. *Journal of Urban Economics* 58(3), 474-487.
- [4] Balmaseda, M., and P. Tello, 2002. Have the determinants of private consumption in Spain changed? BBVA, *Situación Española*, 33-39.
- [5] Banks, J., Blundell, R., and J. Smith, 2002. Wealth portfolios in the UK and the US. NBER Working Paper N^o. 9128.
- [6] Barrell, R., and J. In't Veld, 1992. Wealth effects and fiscal policy in the National Institute Global Econometric Model. *National Institute Economic Review*, 140, 78-85.

- [7] Bertaut, C., 2002. Equity prices, household wealth, and consumption growth in foreign industrial countries: wealth effects in the 1990s. Board of Governors of the Federal Reserve System, International Finance Discussion Paper N^o. 724.
- [8] Bhatia, K., 1987. Real estate assets and consumer spending. *Quarterly Journal of Economics* 102, 437-443.
- [9] Blinder, A., and A. Deaton, 1985. The time-series consumption function revisited. *Brookings Papers on Economic Activity* 2, 465-511.
- [10] Bonner, X., and E. Dubois, 1995. Peut-on comprendre la hausse imprévue du taux d'épargne des ménages depuis 1990? Ministère de l'Economie, Economie et Prévisions, 121.
- [11] Boone, L., Giorno, C., and P. Richardson, 1998. Stock market fluctuations and consumption behavior: some recent evidence, OECD Working Paper N^o. 208.
- [12] Boone, L., Girouard, N., and I. Wanner, 2001. Financial liberalization, wealth and consumption. OECD Working Paper N^o. 308.
- [13] Bover, O., 2005. Wealth effects on consumption: microeconomic estimates from the Spanish Survey of Household Finances. Bank of Spain Working Paper N^o. 522.
- [14] Brand, C., and N. Cassola, 2000. A money demand system for Euro Area M3. ECB Working Paper N^o. 39.
- [15] Brayton, F., and P. Tinsley, 1996. A guide to FRB/US. Board of Governors of the Federal Reserve System, Finance and Economics Discussion Paper N^o. 42.
- [16] Cagan, P., 1974. The channels of monetary effects on interest rates. *Journal of Business* 47(1), 94-96.
- [17] Campbell, J. Y., and J. F. Cocco, 2007. How do house prices affect consumption? Evidence from micro data. *Journal of Monetary Economics* 54(3), 591-621.
- [18] Campbell, J. Y., and J. Cochrane, 1999. By force of habit: a consumption-based explanation of aggregate stock market behavior. *Journal of Political Economy* 107, 205-251.
- [19] Campbell, J. Y., Lo, A., and C. MacKinlay, 1997. *The Econometrics of Financial Markets*, Princeton: Princeton University Press.
- [20] Campbell, J. Y., and G. Mankiw, 1989. Consumption, income and interest rates: re-interpreting the time series evidence. In Blanchard, O., and S. Fischer, eds., *NBER Macroeconomics Annual*, MIT Press, Cambridge, MA.
- [21] Caporale, G., and G. Williams, 1997. Revisiting forward looking consumption and financial liberalization in the United Kingdom. London Business School Discussion Paper N^o. 20.
- [22] Carroll, C. D., 2004. Housing wealth and consumption expenditure. Johns Hopkins University, manuscript.

- [23] Carroll, C. D., Otsuka, M., and J. Slacalek, 2006. How large is the housing wealth effect? A new approach. NBER Working Paper N^o. 12746.
- [24] Case, K., 1992. The real estate cycle and the economy: consequences of the Massachusetts boom of 1984-1987. *Urban Studies* 29(2), 171-183.
- [25] Case K., Shiller R., and J. Quigley, 2005. Comparing wealth effects: the stock market versus the housing market. *Advances in Macroeconomics* 5(1), 1-32.
- [26] Castro, G. L., 2007. The wealth effect on consumption in the Portuguese economy. Bank of Portugal, *Economic Bulletin*, 37-55.
- [27] Cho, S., 2006. Evidence of a stock market wealth effect using household level data. *Economic Letters* 90(3), 403-406.
- [28] Clapham, E., Hytinen, A., and K. Takala, 2002. Household wealth, credit and consumption: evidence from Finland and Sweden. Bank of Finland, manuscript.
- [29] Cocco, F., 2000. Hedging house price risk with incomplete markets. London Business School, manuscript.
- [30] Cochrane, J., 1994. Permanent and transitory components of GDP and stock prices. *Quarterly Journal of Economics* 109(1), 241-265.
- [31] Coenen, G., and V. Wieland, 2005. A small estimated Euro Area model with rational expectations and nominal rigidities. *European Economic Review* 49, 1081-1104.
- [32] Constantinides, G., 1990. Habit-formation: a resolution of the equity premium puzzle. *Journal of Political Economy* 98, 519-543.
- [33] Davidson, J., and D. Hendry, 1981. Interpreting econometric evidence: the behavior of consumers' expenditure in the UK. *European Economic Review* 16(1), 177-192.
- [34] Davis, M., and M. Palumbo, 2001. A primer on the economics and time-series econometrics of wealth effects. Federal Reserve Board of Governors, Finance and Economics Discussion Paper N^o. 09.
- [35] Desnoyers, Y., 2001. L'effet de la richesse sur la consommation aux Etats-Unis, Banque du Canada. Document de Travail N^o. 14.
- [36] Dickey, D. A., and W. A. Fuller, 1979. Distributions of the estimators for autoregressive time series with a unit root. *Journal of American Statistical Association* 74, 427-431.
- [37] Dvornak, N., and M. Kohler, 2003, Housing wealth, stock market wealth and consumption: a panel analysis for Australia. Reserve Bank of Australia, Research Discussion Paper N^o. 07.
- [38] Dynan, K. E., 2000. Habit formation in consumer preferences: evidence from panel data. *American Economic Review* 90(3), 391-406.
- [39] Edison, H., and T. Sløk, 2001. Wealth effects and the new economy. IMF Working Paper N^o. 77.

- [40] Elliott, J., 1980. Wealth and wealth proxies in a permanent income model. *Quarterly Journal of Economics* 95(3), 509-535.
- [41] Engelhardt, G. V., and C. J. Mayer, 1998. Intergenerational transfers, borrowing constraints and saving behavior: evidence from the housing market. *Journal of Urban Economics* 44, 135-157.
- [42] Engelhardt, G. V., and C. J. Mayer, 1994. Gifts, down payments, and housing affordability. Federal Reserve Bank of Boston Working Paper N^o. 5.
- [43] Engle, R., and C. Granger, 1987. Co-integration and error-correction: representation, estimation and testing. *Econometrica* 55(2), 251-276.
- [44] Englund, P., Hwang, M., and J. M. Quigley, 2002. Hedging housing risk. *Journal of Real Estate Finance and Economics* 24(1/2), 167-200.
- [45] Estrada, A., Fernández, J. L., Moral, E., and A. V. Regil, 2004. A quarterly macro-econometric model of the Spanish economy. Bank of Spain Working Paper N^o. 0413.
- [46] Fagan, G., Henry, J., and R. Mestre, 2001. An area-wide model (AWM) for the Euro Area. ECB Working Paper N^o. 42.
- [47] Fernandez-Corugedo, E., Price, S., and A. Blake, 2003. The dynamics of consumers' expenditure: the UK consumption ECM redux. Bank of England Working Paper N^o. 204.
- [48] Flavin, M., 1981. The adjustment of consumption to changing expectations about future income, *Journal of Political Economy* 89(5), 974-1009.
- [49] Friedman, M., 1968. The role of monetary policy. *American Economic Review* 58(1), 1-17.
- [50] Funke, N., 2004. Is there a stock market wealth effect in emerging markets? *Economics Letters* 83, 417-421.
- [51] Gale, W., and J. Sabelhaus, 1999. Perspectives on the household savings rate. *Brookings Papers on Economic Activity* 1, 1181-224.
- [52] Gerdesmeier, D., and B. Roffia, 2003. Empirical estimates of reaction functions for the Euro Area. ECB Working Paper N^o. 206.
- [53] Girouard, N., and S. Blöndal, 2001. House prices and economic activity. OECD Working Paper N^o. 279.
- [54] Grant, C., and T. A. Peltonen, 2008. Housing and equity wealth effects of Italian households. ECB Working Paper N^o. 857.
- [55] Grunspan, T., and P. Sicsic, 1997. Les effets de richesse. Conseil National du Crédit et du Titre, Rapport annuel, 187-192.
- [56] Guiso, L., Paiella, M., and I. Visco, 2005. Do capital gains affect consumption? Estimates of wealth effects from Italian households' behaviour. Bank of Italy, manuscript.

- [57] Hall, R., 1978. Stochastic implications of the life cycle-permanent income hypothesis: theory and evidence. *Journal of Political Economy* 86(6), 971-987.
- [58] Horioka, C., 1996 Capital gains in Japan: their magnitude and impact on consumption. *Economic Journal* 106(436), 560-577.
- [59] Hoynes, H., and D. McFadden, 1997. The impact of demographics on housing and non-housing wealth in the United States. In Hurd, M., and Y. Naohiro, eds., *The economic effects of aging in the United States and Japan*, Chicago: Chicago University Press, 153-194.
- [60] Iacoviello, M., and F. Ortalo-Magné, 2003. Hedging housing risk in London. *Journal of Real Estate Finance and Economics* 27(2), 191-209.
- [61] Imbens, G. W., Rubin, D. B., and B. I. Sacerdote, 2001. Estimating the effect of unearned income on labor earnings, savings and consumption: evidence from a survey of lottery players. *American Economic Review* 91(4), 778-794.
- [62] Julliard, C., 2004. Labor income risk and asset returns. Princeton University, Primary Job Market Paper.
- [63] Kennickell, A. B., and M. Starr-McCluer, 1997. Retrospective reporting of household wealth: evidence from the 1983-89 Survey of Consumer Finances. *Journal of Business and Economic Statistics* 15, 452-463.
- [64] Kent, C., and P. Lowe, 1998. Property-price cycles and monetary policy. in *The role of asset prices in the formulation of monetary policy*, BIS Papers N°. 5, Basel, 239-263.
- [65] Kiley, M., 2000. Identifying the effect of stock market wealth on consumption: pitfalls and new evidence. Board of Governors of the Federal Reserve System.
- [66] Labhard, V., Sterne, G., and C. Young, 2005. The wealth effects on consumption in industrialised countries. Bank of England, manuscript.
- [67] Lettau, M., and S. Ludvigson, 2001. Consumption, aggregate wealth, and expected stock returns, *Journal of Finance* 56(9), 815-849.
- [68] Lettau, M., Ludvigson, S., and N. Barczi, 2001. A primer on the economics and time series econometrics of wealth effects: A comment. Federal Reserve Bank of New York, Working Paper N°. 131.
- [69] Levin, L., 1998. Are assets fungible? Testing the behavioral theory of life-cycle savings. *Journal of Economic Organization and Behavior* 36, 59-83.
- [70] Levin, A., Lin, C. F., and C. Chu, 2002. Unit root tests in panel data: asymptotic and finite-sample properties, *Journal of Econometrics* 108, 1-24.
- [71] Ludvigson, S., and C. Steindel, 1999. How important is the stock market effect on consumption. FRBNY Economic Policy Review, 29-51.
- [72] Ludwig, A., and T. Sløk, 2002. The impact of changes in stock prices and house prices on consumption in OECD countries. IMF Working Paper N°. 1.

- [73] Macklem, T., 1994. Wealth, disposable income and consumption: some evidence for Canada. Banque du Canada, Rapport technique, 71.
- [74] Maki, D. M., and M. G. Palumbo, 2001. Disentangling the wealth effect - A cohort analysis of household saving in 1990s. Board of Governors of the Federal Reserve System, Finance and Economics Discussion Paper N^o. 23.
- [75] Mayer, C., and K. Simons, 1994. Reverse mortgages and the equity of housing wealth. *Journal of the American Real Estate and Urban Economics* 22(2), 235-255.
- [76] McKibbin, W., and A. Richards, 1988. Consumption and permanent income: the Australian case. Reserve Bank of Australia Discussion Paper N^o. 8808.
- [77] Mehra, Y. P., 2001. The wealth effect in empirical life-cycle aggregate consumption equations. *Federal Reserve Bank of Richmond Economic Quarterly* 87(2), 45-68.
- [78] Mutoh, H., H. Kawai, and M. Sano, 1993. Consumption and adverse wealth effect. *Nihon Keizei Kenkyu* 26, 57-92.
- [79] Newey, W., and K. West, 1987. A simple positive semi-definite, heterokedasticity, and autocorrelation consistent covariance matrix. *Econometrica* 55(3), 703-708.
- [80] Ogawa, K., 1992. An econometric analysis of Japanese households behavior. *Financial Review* 25, 112-134.
- [81] Ogawa, K., Kitasaka, S., Yamaoka, H., and Y. Iwata, 1996. An empirical re-evaluation of wealth effect in Japanese household behavior. *Japan and the World Economy* 8(4), 423-442.
- [82] Paiella, M., 2003. Does wealth affect consumption? Evidence for Italy. Bank of Italy, manuscript.
- [83] Peek, J., 1983. Capital gains and personal saving behavior. *Journal of Money, Credit, and Banking* 15, 1-23.
- [84] Peltonen, T. A., Sousa, R. M., and I. S. Vansteenkiste, 2008. Wealth effects in emerging market economies. European Central Bank, manuscript.
- [85] Phillips, P. C. B., and S. Ouliaris, 1990. Asymptotic properties of residual based tests for cointegration. *Econometrica* 58, 165-193.
- [86] Phillips, P. C. B., and P. Perron, 1988. Testing for a unit root in time series regression. *Biometrika* 75, 335-346.
- [87] Pichette, L., 2000. Les effets réels du cours des actions sur la consommation. Banque du Canada, Document de travail N^o. 21.
- [88] Pissarides, C., 1978. Liquidity considerations in the theory of consumption. *Quarterly Journal of Economics* 92(2), 279-296.
- [89] Poterba, J. M., 2000. Stock market wealth and consumption. *Journal of Economic Perspectives* 13, 91-118.

- [90] Poterba, J., and A. Samwick, 1995. Stock ownership patterns, stock market fluctuations, and consumption, *Brookings Papers on Economic Activity* 2, 295-372.
- [91] Romer, C., 1990. The great crash and the onset of the great depression. *Quarterly Journal of Economics* 105, 597-624.
- [92] Rossi, N., and I. Visco, 1995. National saving and social security in Italy. *Ricerche Economiche* 49(4), 329-356.
- [93] Saikkonen, P., 1991. Asymptotically efficient estimation of cointegrating regressions. *Economic Theory* 7(1), 1-21.
- [94] Shefrin, H., and R. Thaler, 1988. The behavioral life-cycle hypothesis. *Economic Inquiry* 26(4), 609-643.
- [95] Sheiner, L., 1995. House prices and the savings of renters. *Journal of Urban Economics* 38(1), 94-125.
- [96] Sierminska, E., and Y. Takhtamanova, 2007. Wealth effects out of financial and housing wealth: cross country and age group comparisons. Federal Reserve Bank of San Francisco Working Paper N° 1.
- [97] Sinai, T., and N. Souleles, 2005. Owner-occupied housing as a hedge against rent risk. *Quarterly Journal of Economics* 120(2), 763-789.
- [98] Skinner, J., 1999. Housing wealth and aggregate saving. *Regional Science and Urban Economics* 19, 305-324.
- [99] Skudelny, F., 2008. Euro Area private consumption: is there a role for housing wealth effects? European Central Bank, manuscript.
- [100] Slacalek, J., 2006. What drives personal consumption? The role of housing and financial wealth. DIW Berlin Discussion Paper N° 647.
- [101] Stock, J., and M. Watson, 1993. A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica* 61(4), 783-820.
- [102] Sousa, R. M., 2008a. Financial wealth, housing wealth, and consumption. *International Research Journal of Finance and Economics*, 19, 167-191.
- [103] Sousa, R. M., 2008b. Wealth shocks and risk aversion. London School of Economics and Political Science, manuscript.
- [104] Sousa, R. M., 2003. Property of stocks and wealth effects on consumption. University of Minho, NIPE Working Paper N° 2/2003.
- [105] Stock, J., and M. Watson, 1993. A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica* 61(4), 783-820.
- [106] Sundaresan, S., 1989. Intertemporally dependent preferences and the volatility of consumption and wealth. *Review of Financial Studies* 2, 73-89.

- [107] Tan, A., and G. Voss, 2003. Consumption and wealth in Australia. *The Economic Record* 79(244), 39-56.
- [108] Thaler, R., 1990. Anomalies: saving, fungibility and mental accounts. *Journal of Economic Perspectives* 4, 193-206.
- [109] Willman, A., and A. Estrada, 2002. The Spanish block of the ESCB-multi-country model. Bank of Spain Working Paper N°. 0212.
- [110] Yoshikawa, H., and F. Ohtake, 1989. An analysis of female labor supply, housing demand and the saving rate in Japan. *European Economic Review* 33, 997-1030.
- [111] Zeldes, S., 1989. Optimal consumption with stochastic income: deviations from certainty equivalence. *Quarterly Journal of Economics* 104(2), 275-298.

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.

European Central Bank Working Paper Series

For a complete list of Working Papers published by the ECB, please visit the ECB's website (<http://www.ecb.europa.eu>).

- I002 “Assessing portfolio credit risk changes in a sample of EU large and complex banking groups in reaction to macroeconomic shocks” by O. Castrén, T. Fitzpatrick and M. Sydow, February 2009.
- I003 “Real wages over the business cycle: OECD evidence from the time and frequency domains” by J. Messina, C. Strozzi and J. Turunen, February 2009.
- I004 “Characterising the inflation targeting regime in South Korea” by M. Sánchez, February 2009.
- I005 “Labor market institutions and macroeconomic volatility in a panel of OECD countries” by F. Rumler and J. Scharler, February 2009.
- I006 “Understanding sectoral differences in downward real wage rigidity: workforce composition, institutions, technology and competition” by P. Du Caju, C. Fuss and L. Wintr, February 2009.
- I007 “Sequential bargaining in a new-Keynesian model with frictional unemployment and staggered wage negotiation” by G. de Walque, O. Pierrard, H. Sneessens and R. Wouters, February 2009.
- I008 “Liquidity (risk) concepts: definitions and interactions” by K. Nikolaou, February 2009.
- I009 “Optimal sticky prices under rational inattention” by B. Maćkowiak and M. Wiederholt, February 2009.
- I010 “Business cycles in the euro area” by D. Giannone, M. Lenza and L. Reichlin, February 2009.
- I011 “The global dimension of inflation – evidence from factor-augmented Phillips curves” by S. Eickmeier and K. Moll, February 2009.
- I012 “Petrodollars and imports of oil exporting countries” by R. Beck and A. Kamps, February 2009.
- I013 “Structural breaks, cointegration and the Fisher effect” by A. Beyer, A. A. Haug and B. Dewald, February 2009.
- I014 “Asset prices and current account fluctuations in G7 economies” by M. Fratzscher and R. Straub, February 2009.
- I015 “Inflation forecasting in the new EU Member States” by O. Arratibel, C. Kamps and N. Leiner-Killinger, February 2009.
- I016 “When does lumpy factor adjustment matter for aggregate dynamics?” by S. Fahr and F. Yao, March 2009.
- I017 “Optimal prediction pools” by J. Geweke and G. Amisano, March 2009.
- I018 “Cross-border mergers and acquisitions: financial and institutional forces” by N. Coeurdacier, R. A. De Santis and A. Aviat, March 2009.
- I019 “What drives returns to euro area housing? Evidence from a dynamic dividend-discount model” by P. Hiebert and M. Sydow, March 2009.
- I020 “Opting out of the Great Inflation: German monetary policy after the break down of Bretton Woods” by A. Beyer, V. Gaspar, C. Gerberding and O. Issing, March 2009.
- I021 “Rigid labour compensation and flexible employment? Firm-level evidence with regard to productivity for Belgium” by C. Fuss and L. Wintr, March 2009.

- 1022 “Understanding inter-industry wage structures in the euro area” by V. Genre, K. Kohn and D. Momferatou, March 2009.
- 1023 “Bank loan announcements and borrower stock returns: does bank origin matter?” by S. Ongena and V. Roscovan, March 2009.
- 1024 “Funding liquidity risk: definition and measurement” by M. Drehmann and K. Nikolaou, March 2009.
- 1025 “Liquidity risk premia in unsecured interbank money markets” by J. Eisenschmidt and J. Tapking, March 2009.
- 1026 “Do house price developments spill over across euro area countries? Evidence from a global VAR” by I. Vansteenkiste and P. Hiebert, March 2009.
- 1027 “Long run evidence on money growth and inflation” by L. Benati, March 2009.
- 1028 “Large debt financing: syndicated loans versus corporate bonds” by Y. Altunbaş, A. Kara and D. Marqués-Ibáñez, March 2009.
- 1029 “The role of fiscal transfers for regional economic convergence in Europe” by C. Checherita, C. Nickel and P. Rother, March 2009.
- 1030 “Forecast evaluation of small nested model sets” by K. Hubrich and K. D. West, March 2009.
- 1031 “Global roles of currencies” by C. Thimann, March 2009.
- 1032 “Assessing long-term fiscal developments: a new approach” by A. Afonso, L. Agnello, D. Furceri and R. Sousa, March 2009.
- 1033 “Fiscal competition over taxes and public inputs: theory and evidence” by S. Hauptmeier, F. Mittermaier and J. Rincke, March 2009.
- 1034 “The role of the United States in the global economy and its evolution over time” by S. Déés and A. Saint-Guilhem, March 2009.
- 1035 “The role of labor markets for euro area monetary policy” by K. Christoffel, K. Kuester and T. Linzert, March 2009.
- 1036 “Search in the product market and the real business cycle” by T. Y. Mathä and O. Pierrard, March 2009.
- 1037 “What do asset prices have to say about risk appetite and uncertainty?” by G. Bekaert, M. Hoerova and M. Scheicher, March 2009.
- 1038 “Are ‘intrinsic inflation persistence’ models structural in the sense of Lucas (1976)?” by L. Benati, March 2009.
- 1039 “‘Real Time’ early warning indicators for costly asset price boom/bust cycles: a role for global liquidity” by L. Alessi and C. Detken, March 2009.
- 1040 “The external and domestic side of macroeconomic adjustment in China” by R. Straub and C. Thimann, March 2009.
- 1041 “An economic capital integrating credit and interest rate risk in the banking book” by P. Alessandri and M. Drehmann, April 2009.
- 1042 “The determinants of public deficit volatility” by L. Agnello and R. M. Sousa, April 2009.
- 1043 “Optimal monetary policy in a model of the credit channel” by F. De Fiore and O. Tristani, April 2009.

- I044 “The forecasting power of international yield curve linkages” by M. Modugno and K. Nikolaou, April 2009.
- I045 “The term structure of equity premia in an affine arbitrage-free model of bond and stock market dynamics” by W. Lemke and T. Werner, April 2009.
- I046 “Productivity shocks and real exchange rates: a reappraisal” by T. A. Peltonen and M. Sager, April 2009.
- I047 “The impact of reference norms on inflation persistence when wages are staggered” by M. Knell and A. Stiglbauer, April 2009.
- I048 “Downward wage rigidity and optimal steady-state inflation” by G. Fagan and J. Messina, April 2009.
- I049 “Labour force participation in the euro area: a cohort based analysis” by A. Balleer, R. Gómez-Salvador and J. Turunen, May 2009.
- I050 “Wealth effects on consumption: evidence from the euro area” by R. M. Sousa, May 2009.

