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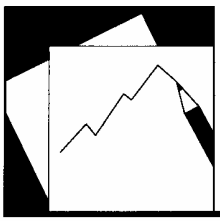

IMF Working Paper

Wealth Effects in Europe: A Tale of Two Countries (Italy and the United Kingdom)

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Abstract

This paper investigates the increasing exposure of European households to risky financial assets and the consequent impact on the economy. I analyze household data for Italy and the United Kingdom, countries that differ dramatically in their financial structure and capital markets. I estimate an endogenous switching model with bivariate switching to overcome two important obstacles in this line of research, namely, the consumption Capital Asset Pricing Model Puzzle and the excess sensitivity puzzle. The results show that there are wealth effects in both countries. I find some evidence of liquidity constraints only in Italy and habit formation exclusively in the United Kingdom.

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I. Introduction

A common monetary policy for "Euroland" may have different macroeconomic consequences from one country to another because of differences in the speed and magnitude of a monetary impulse into economic activity. These differences depend in part on dissimilarities in the financial structure and on households' and firms' portfolios composition. Different liquidity constraints will also affect consumption directly. In this context, national transmission mechanisms can differ, and the implementation of a common monetary policy by the European Central Bank (ECB) could lead to varying results among different countries.

The differences between capital markets and portfolio composition across European economies are marked. First, stock markets and privately issued debt are highly developed in some European countries (e.g., the United Kingdom), but not others (e.g., Italy and Germany). In addition, financial structures have evolved differently in recent years, with growth of non-bank intermediaries in some countries but not others, and different evolution of stock markets and changes in household and firm asset and liabilities composition. For instance, in households' portfolios there are relevant differences in the choice of fixed-income assets versus equity, which reflect differences in market capitalization. In particular, equity ownership has broadened in general, but to different degrees depending on the country. These trends have resulted in different ways of distributing liquidity among households and firms. Secondly, huge differences exist in the use of short-term versus long-term financing, in the share of fixed versus floating rates, and in the degree and composition of indebtedness of individuals.

At the same time, stock markets have experienced substantial fluctuations. These developments in the financial structure have increased the interest in the potential impact of major asset price movements on the real economy. In particular, the large swings in wealth induced by these movements might have effects on consumption. The logic goes as follows: an increase in the stock market makes households wealthier and that increases their spending. Concern about how to measure these wealth effects has increased following the changes in participation and volatility in securities.

Goodhart and Hofmann (2000) argue that due to the fact that some prices and wages are sticky, asset prices are likely to be the most flexible. Therefore, monetary policy shocks are likely to have their first effects via asset prices and the transmission mechanism will work through the effect of asset prices on output via wealth effects on consumption, exchange rates on net trade and Tobin's q on investment. In this paper, I examine the wealth effect.

There may be several, possibly related, channels: causation can go from monetary shocks to asset prices to output, or from asset price shocks to monetary and real variables (by raising the value of collateral and encouraging more borrowing from individuals, resulting in increased consumption). If part of the credit is used to buy more assets, a "financial

accelerator"[2] effect is in place. In addition, in some cases expectations of capital gains appear to lead to increases in bank lending and expenditures.

Research on the transmission mechanism across countries using the same framework, the same monetary policy reaction function, and constraining exchange rate movements for Europe; is still lacking[3]. The existing literature only contains partial comparative studies, which are not adequate to draw strong conclusions about the dissimilarities among European countries. Consequently, as Guiso, Kashyap, Panetta, and Terlizzesse (1999) point out, findings at the aggregate level should be supplemented by systematic comparisons at the micro level. There are various rationales for this. First, micro data offer a richer variety of information for each group of individuals in each country. This makes it easier to analyze the differences among them and to study differences among similar groups of agents in different countries. Second, they allow a better understanding of the causes and the persistence of those differences. Third, they eliminate the aggregation problems raised by the fact that similar households and firms in different countries can act differently but can be compensated at the aggregate level. And, finally, they might help to identify policy interventions that could help to modify micro-level behavior in order to generate more uniform monetary policy effects. Nevertheless, although firm data has been used extensively to study the balance sheet channel, household data used for that purpose has been more limited.

The aim of this paper is to evaluate whether structural differences in the financial system lead to differences in the transmission mechanism. Specifically, the role of wealth effects, liquidity constraints and habit formation in two countries, the UK and Italy, will be studied. The comparison is particularly interesting since these countries' household portfolios have a specific financial structure (i.e., high exposure of households to equities and bonds respectively). In the UK, 24 percent of households in 2000 held shares either directly or in mutual funds or pension plans, while in Italy only 18 percent did. The effect of a monetary shock in these two countries could be different and have a bigger impact here than in the rest of Europe. This disparity might result from agents being subject to greater wealth volatility, different liquidity constraints and habit formation.

The model in this paper brings together two key elements so far analyzed separately by a number of studies. The contribution of the paper is in dealing simultaneously with two sample selection biases. Using only households –which either do or do not hold assets, and either are liquidity constrained or not– results in biased estimates of the consumption elasticities of labor income and risky financial assets.

I present results of an application to the stochastic life-cycle consumption model under rational expectations as developed by Hall (1978). Since his seminal paper, the model has been extended by several contributions such as Zeldes (1989) for the United States and Attanasio and Weber (1993) for the UK. The major innovation of this paper is to account

[2]See Kiyotaki and Moore (1997) and Bernanke, Gertler and Gilchrist (1999).
[3]See Guiso, Kashyap, Panetta and Terlizzese (1999) for a review.

for endogeneity in the choice of financial wealth and liquidity constraints. The empirical study is carried out using a generalized approach to selectivity bias for a joint decision of households with data from the UK and Italy. For the former, the British Household Panel Survey (BHPS) is used, and for the latter, the Bank of Italy Survey of Household Income and Wealth (SHIW).

The rest of the paper is organized as follows: Section II describes briefly the available micro datasets on asset holdings and consumption in Europe. Section III provides an overview on capital markets in Europe and in particular the financial structure of household portfolio compositions of risky assets for two countries of the European Union (UK and Italy). Section IV develops the life-cycle model and illustrates its drawbacks. Section V outlines the basic model and describes the estimation procedure. Section VI presents the results of the application of the stochastic life-cycle consumption model under rational expectations. Section VII concludes and discusses the policy implications. Variable definitions and constructions are discussed in an Appendix.

II. Household Data on Wealth and Consumption

Household data are more appropriate than aggregate statistics to study wealth effects for various reasons.

First, due to the existence of incomplete markets, the standard separation theorems do not apply because individuals are heterogenous and this fact affects portfolio composition. Sources of heterogeneity are nonparticipation and lack of diversification. The former is clearly at odds with the simple two-asset portfolio model without transaction costs in which risky assets yield a higher expected return than the safe asset. The use of micro data avoids aggregation assumptions and representative agent frameworks.

Secondly, they allow us to study the distribution of wealth of the mass of the population, which has not been received much attention due to its small share in total wealth. Studies based on official statistics have little to say regarding the majority of the population, since they are concerned with those in the upper echelons of wealth distribution.

Finally, aggregate financial accounts do not allow us to disentangle whether the increase in asset shares in the data is due to a change in participation or in the amount invested. In addition, they cannot tell much about either portfolio mobility or how it is affected by wealth or demographic characteristics. European differences in household portfolios can be attributed to wealth, or to demographic characteristics such as age, education and family size, or to other differences.

An ideal dataset to study wealth effects, liquidity constraints and habit formation would include consumption, income, household characteristics and wealth disaggregated into

different types of assets by type of individual. In what follows, major European household surveys are described.

Household surveys in the UK contain reliable information on consumption and income, but limited wealth data. On the one hand, the Financial Research Survey (FRS) is a dataset privately compiled by National Opinion Polls for about 8000 households per year. Unfortunately, the survey contains limited demographic data. In addition, it has not been collected on a comparable basis over a long period of time and lacks information on consumption. On the other hand, the Family Expenditure Survey (FES) is a cross-sectional dataset that has been mostly used in the UK to study consumption and savings behavior. It contains information on demographic characteristics, income, and expenditure for 7000 households per year since 1968. However, wealth information in these datasets is limited.

One exception is the BHPS, where, in wave 5 (1995) and 10 (2000), detailed questions on wealth were asked in addition to detailed demographic characteristics, income and consumption information. The BHPS from 1991–2001 is an important source of data on the experiences of the same households over time, and panel members are followed wherever they move in the UK. Each wave consists of some 5,000 households drawn from 250 different areas of Great Britain. The only drawback of this dataset is that the consumption variables are not complete (for example, expenditure in clothes and shoes is not included).

The Italian SHIW is the only European panel which contains information on wealth, consumption, income and demographic characteristics in every wave. The SHIW is a biannual survey of about 8,000 households collected by the Bank of Italy. From 1989 it offers a rotating panel containing a set of portfolio data, demographic characteristics, expenditures and income information. The survey provides information on 20 financial assets but they are only available for heads of households.

The Spanish *Encuesta Continua de Presupuestos Familiares* (ECPF) is a rotating-sample survey of consumption patterns of 3,200 households from 1985. The same household is interviewed for eight consecutive quarters (two years). It contains information on consumption, income and demographic characteristics but lacks information on wealth.

The Dutch Socio Economic Panel (SEP) of 5,000 households and since 1993 the Dutch VSB-panel (VSBP) of 3000 households both contain wealth, income and demographic characteristics but lack information on consumption.

The Swedish National Survey of Living Conditions (ULF) began in 1979, and since 1986 a panel of 12,000 people has been followed as part of the ULF. The survey covers health, financial situation, education, working environment, and housing, but has no consumption information.

The German Income and Expenditure Survey (*Einkommens-und Verbrauchsstich-proben,*

EVS) for the period 1978-1998 has detailed information on consumption by type, wealth by portfolio category and income by source. However, the EVS is repeated cross-section data –not panel data– and is collected every five years. Another source is the German Socio-Economic Panel (SOEP), which has been collected since 1984. However, this panel does not have information on consumption and contains few questions on wealth. The same applies to the Panel Study on Belgian Households (PSBH) that started in 1990 and collects information from more than 4000 households.

The French *Budget des Familles* is a survey on household consumption collected every five years from 1979 but it is not a panel and the financial asset information is very poor. Detailed information on only financial assets can be found on *L'Enquête Patrimoine*. The situation in Portugal is similar with information on consumption and wealth found in two different surveys.

The European Community Household Panel (ECHP) survey is a longitudinal coordinated social panel for European countries. The survey started in 1994 with a sample of some 60,500 nationally representative households in 12 member states. Wave 2 also includes Austria and wave 3 included Finland. Unfortunately, questions on quantitative values of consumption and financial assets were not included.

The data sources that I use in this paper are the BHPS and the SHIW. These are the most comparable sources of information across the two countries that include detailed wealth and consumption information (see Appendix for some comparative statistics based on this data). Since both are panels, they allow us to follow the same household over time.

III. Capital Markets in Europe and Household Portfolios

The expansion of capital markets in Europe has been encouraged by both transitory and permanent developments. On the one hand, the experience of high stock returns in the 1990s can be considered transitory. On the other hand, the last two decades have been characterized by several permanent changes in the financial systems stemming from deregulation, as well as capital liberalization, the introduction of the single market, and technological innovations. Deregulation has played a role both in the banking sector (abolition of interest-rate controls and abolition of direct controls on credit expansion) and in the capital markets (abolition of regulations on fees and commissions and on the establishment of foreign institutions). As a consequence, an "equity culture" among households has emerged as a response to the proliferation of mutual funds and the systematic education of employees regarding retirement accounts.

Despite these changes, European capital markets are still heterogeneous. This section presents some stylized facts emphasizing both the differences in the degree of development

of capital markets and portfolio compositions in Europe, especially in the UK and Italy, by presenting some statistics on asset ownership. In what follows, I will focus on household portfolios since I am interested in wealth effects on consumption, particularly those operating with risky financial assets such as stocks, long-term government bonds and mutual funds. Efficiency of the financial industry might imply differences in the level of entry costs. Equally, differences in participation may be explained by differences in average household wealth and in the distribution of wealth even where entry costs are similar.

Individuals can opt for two types of financing: direct financing, where they invest directly in stocks or bonds issued by non financial institutions in the capital markets, or indirect financing, where savings are intermediated by financial institutions. The relative use of each of them characterizes the relationship between the private sector and the rest of the economy.

	France		Germany		Italy		United Kingdom		United States	
	1980	2000	1980	2000	1980	2000	1980	2000	1980	2000
Deposits	59	26	59	36	58	25	43	22	33	14
Bonds	9	2	12	11	8	18	7	1	10	7
Equities	14	38	4	17	10	26	12	18	21	25
Institutional Investment	7	33	17	36	6	30	30	59	28	50

Note: Percentage share of total financial assets.

Source: Davis (2001, 2002)

Table 1: Financial Assets of Households

Table 1 shows that direct stockholdings have been growing in recent years, especially in France and Italy, where they have increased from 14 to 38 percent and from 10 to 26 percent respectively. This increase is mainly due to the privatization process. Transaction costs and bid-ask spreads still prevent households with low means from having direct stockholdings, because the cost of controlling the risk that a household would incur in order to diversify will not be compensated by the higher return. The evolution of assetholdings via institutions has been different: it has increased in all countries and significantly in France and the UK. Anglo-Saxon countries are the most developed in this respect. The UK has the highest percentage in institutional investment (59 percent), while that in Italy (30 percent) and France (33 percent) is much lower. This fact is in accordance with differences in market capitalization (in percent of GDP): in 2000 it was 180 percent in the UK, 68 percent in Germany, 78 percent in Italy and 110 percent in France (World Development Indicators, World Bank).

Institutional investors play an important role when securities entail fixed costs. They are able to combine and repackage a very large number of existing securities and make them available to individual investors that did not find it feasible to invest on their own. Institutional investors are "financial institutions that manage savings collectively on behalf of small investors, towards a specific objective in terms of acceptable risk,

return-maximization and maturity of claims"[4]. Their fast growth in the last two decades is due to the decrease in institutional costs coming from improvements in price information, development of derivatives in risk control and improvements in capital markets with lower transaction costs. In addition, their success is a result of being able to match the increasing demand of long term savings at high return and low risk. Mutual funds differ from pension funds and life insurance companies by offering short-term liquidity at rates based on current market price. They can offer these rates via direct redemption of holdings (open-ended funds) or by trading shares in the funds on exchanges (closed-ended funds). Money market mutual funds can offer redemption of holdings at par and provide payment facilities by holding only liquid short term money market assets. Hedge funds are a type of closed-end fund that seeks to pursue high returns at the cost of taking high-risk leveraged positions. Guiso, Haliassos and Jappelli (2003) show, however, how available data on transaction costs and on characteristics of mutual funds suggest that Italy and France are likely to face higher production and distribution costs of investing in mutual funds notwithstanding the effects of less competition and fewer choices.

In addition, a general trend in Europe has been a decline in the share of deposits amongst assets, as Table 1 illustrates, although this trend differs among countries. The shares in Italy, the UK, the US and France dropped significantly, while in Germany the decrease has been lower. Bond holdings have remained relatively stable but in the case of Italy they increased from 8 to 18 percent and in the UK they dropped from 7 to 1 percent. The case of Italy shows that the high debt burden is highly financed by bonds, while in the UK households appear to be more keen to hold shares. Following the bank lending and balance sheet channels, one implication of the above facts is that small borrowers are more responsive to a monetary tightening than large borrowers, since small borrowers are bank dependent and face severe credit market imperfections.

This picture can be misleading, however, because it does not reveal whether the increasing proportion of share holdings comes from an increase in participation in capital markets or an increase in the value of assets. Aggregate data do not allow one to distinguish whether the change in asset shares comes from a change in participation or to the amounts invested. Micro data is therefore needed.

Specifically there are various factors that can lead to an increase in the share of risky assets: first, an increase in participation; secondly, an increase in the amount invested by the participants; and finally, an increase in assets accruing to risky asset holders because of a change in wealth distribution. The first factor seems to explain more than 60 percent of the increase in the share of risky assets in Italy, according to Guiso and Japelli (2002), while the latter is negligible.

In what follows, I will focus on two countries, the UK and Italy, and in particular on participation. In the former country, households directly hold more stocks and they do not put large amounts of savings into deposits. In the latter, bonds are the most widespread

[4]Davis (2001).

instrument. Italy is characterized as a country that is bank-dominated, with a large proportion of small firms, poor contract enforcement and rigid labor markets. In contrast, the UK is characterized by very developed capital markets, the existence of large firms, good contract enforcement and flexible labor markets. One might say that the rest of the European countries are somewhere in the middle[5]. France has more developed capital markets but borrowing is still not very high, while Germany has less developed capital markets and less flexible labor markets, but enjoys good contract enforcement and large firms.

Data from the BHPS and SHIW is used to analyze the case of the UK and Italy respectively. Table 2 shows the participation in capital markets of households in the UK.[6] British households saw dramatic changes during the 1980s in the distribution of wealth, having enormous increases in ownership of housing, private pensions[7] and stocks, but this trend has started to slow down.

Financial Assets	1978[1]	1988[1]	1995[2]	2000[2]
National Savings Certificates			5.16	2.69
Premium Bonds			24.16	17.07
Unit Trusts/Investment Trusts			6.28	8.05
Personal Equity Plan			9.04	4.46
Shares (UK or Foreign)			23.99	21.97
NS/NB Insurance Bond			11.98	2.09
Government or Corporate Bonds			3.24	3.93
Equity[3]	9.10	22.10	25.96	24.04
Risky Bonds[4]			3.24	3.93
Risky Assets[5]			27.47	26.14

Sources: [1]FES dataset from Banks and Tanner (2002). Table 6A.1.
[2]Author's calculations from BHPS dataset.
Notes: Percentage of households owning a specific asset.
[3]Shares, Unit Trusts/Investment Trusts or Personal Equity Plans.
[4]Government or Corporate Bonds.
[5]Risky Bonds or Equity.

Table 2: United Kingdom: Household Portfolio Ownership

The worry that employed people were not saving enough to provide for their consumption in old age led the Conservative Government to introduce tax incentives for various types of savings, such as TESSAs, PEPSs, PPPs, BESs between 1979 and 1984.[8] In addition,

[5]See Guiso, Kashyap, Panetta and Terlizzesse (1999) for more details.
[6]Following Banks et al. (2002) I use the original BHPS panel members (who were a representative sample of the population at large).
[7]There is no survey in the UK that collects information on defined-contribution pension funds.
[8]Tax Exempt Special Savings Schemes (TESSAs), tax favoured Personal Equity Plans (PEPs), Personal Pension Plans (PPPs), Business Expansion Schemes (BESs).

during the 1980s there was a much advertised privatization impulse, especially from 1985 to 1988 with the privatization of British Telecom and British Gas and the building society demutualisations (the so-called "share-owning democracy"). These changes altered the wealth holdings of the majority of the population with equity holdings moving down income and wealth distributions into segments of the population that were not typically holding other forms of risky financial assets.

Information on the first category of assets in Table 2 comes from the National Savings (NS) government agencies which provide savings and investment instruments in order to finance national borrowing. These assets include National Savings Certificates that are long-term savings deposits, NS Premium Bonds that are liquid assets offering returns from a monthly prize draw and NS Insurance Bonds that can be considered as government bonds bought at Post Offices directly by households. The main change over time has been within different types of financial assets.

There has been a decline in wealth held in cash and bank and building society accounts, and the same has occurred with short-term government bonds. The highest decline has been in premium bonds and insurance bonds.

The increase in awareness of investment opportunities brought by PEPs, privatization and mutual funds have helped spread the ownership of equities across the country. Nine percent of households held shares at the end of the 1970s while 26 percent of the sample held shares in 1995. In that year, 24 percent of the households held shares directly and 6 percent did so through unit trusts. In 2000, however, the percentage of share ownership declined slightly to 24 percent, breaking the increasing trend. While the number of households holding shares directly declined, the proportion holding unit trusts increased.

Not many households held a large number of assets but ownership rates of stocks, shares and bonds among middle-aged married couples was very high. Even in the 1990s, many households only owned shares in privatized companies. The advertisements at the time of the privatization resulted in an increase in asset owners among more young and less well educated people, but shareowners were still predominantly drawn from those at the top of the income distribution. Only recently was there an increase in share-ownership among poorer households due to the de-mutualization of building societies. Twenty-eight percent of households held risky financial assets in 1995 but this figure decreased to 26 percent in 2000.

There is a well-known trade-off between the accessibility (or liquidity) of wealth and the rate of return. Less wealthy households hold small amounts of risky assets due to the fact that transactions costs are too high to allow them to hold shares or other illiquid assets. Moreover, households that use their wealth as a buffer against uncertainty will tend to hold more liquid assets like bank and building society accounts. Therefore, low wealth households hold more interest-bearing assets (even though they are highly taxed[9]) and less

[9]The income paid into such an account is taxed at the marginal rate and also the nominal interest income

non-liquid assets such as PEPs and TESSAs (which enjoy tax preferential treatment[10]). TESSAs aimed to eliminate double taxation for household savings held for 5 years; in fact, both PEPs and TESSAs were held more extensively by richer households. In this context, in 1999, the government launched ISAs (Individual Savings Accounts) aiming to be more widespread since the accounts do not require a minimum lock-in period. Then, PEPs and ISAs are tax-advantaged savings accounts that typically have a substantial component invested in stocks. Banks, Blundell and Smith (2003) show that higher house price volatility in the UK combined with much younger entry into home ownership explains the relatively small participation of young British households in the stock market.

The introduction of tax-incentive programs has been wide-spread. In France, the *Plan d'Épargue* was introduced in 1990, Germany has been using the *Vermögensbildungsgetz;* and the United States has been using the Individual Retirement Account (IRA) and 401(k) plans in order to encourage retirement savings.

In comparison to other European countries, Italian portfolios are still poorly diversified and still focus on transactions accounts and government bonds with a very small proportion of shares in them. In addition, savings have very short-maturities and life insurance and pension funds are poorly developed. However, Italy is moving towards household portfolios more similar to other European countries, with higher proportions of riskier assets, especially in long-term bonds and mutual funds. This change has been due to an increase in participation. However, more than half of the population still have no risky assets. Guiso and Jappelli (2002) give some explanations for the lack of participation in risky assets. First, transaction costs are important for households with low wealth since brokerage fees and other transaction costs can amount to 4 percent of the investment. Secondly, background risk such as local unemployment can induce people to be more conservative at the time of investing. Third, information costs can prevent portfolio diversification. Fourth, the stock market has been very volatile due to its small size and illiquidity until very recently.

Table 3 illustrates how short-term government bonds are more widespread than long-term government bonds using data drawn from the SHIW.[11] Nevertheless, although the former remained stable until 1995, since then, they have declined dramatically. Long-term bonds -riskier bonds- issued by the government, and especially by private companies, have increased significantly. The spread between the long- and the short-term rate explains the shift. In addition, stocks and investment funds have increased during the 1990s as the

is taxed at the 20% or at the 40% depending on the tax-payer. Stocks and shares contributions and returns are taxed but capital gains are only taxed on realisation and then only after a threshold.

[10] Payments into the accounts are taxed but returns and withdrawals are tax-free.

[11] Guiso and Jappelli (2002) point out that underreporting of financial assets in the SHIW causes particular understatement of risky assets when it is compared to official statistics. The reason is that the survey is not focused specifically on rich household wealth, which still hold the majority of risky financial assets.

Financial Assets	1991	1993	1995	1998	2000
Postal Interest Bearing Bonds	4.09	5.14	7.04	6.55	5.32
Short-term Treasury Bonds	21.56	20.31	21.65	9.67	10.26
Treasury Certificates	7.10	6.81	7.56	4.74	3.57
Long-term Treasury Bonds	2.69	2.84	4.46	2.70	2.04
Other Government Bonds, Zero Coupon and Foreign Bonds	0.95	0.89	1.49	1.53	1.16
Corporate Bonds	1.39	2.41	2.57	5.55	6.40
Shares of Stock Companies Held	2.85	4.19	5.16	8.33	10.32
Investment Fund Shares Held	2.31	4.29	4.50	10.86	12.12
Shareholding in Limited Companies	0.60	0.37	0.16	0.53	0.27
Shareholding in Partnership	0.67	0.53	0.07	0.15	0.17
Equity[1]	5.53	7.80	8.44	15.53	18.14
Risky Bonds[2]	4.25	5.25	6.82	7.88	8.44
Risky Assets[3]	8.49	10.83	12.29	18.60	21.06

Source: Author's calculations from SHIW dataset

Notes: Percentage of households owning a specific asset.

[1] Stocks, Investment Funds, or Shareholdings.

[2] Long-term Bonds, Zero Coupon Bonds, Foreign Bonds or Corporate Bonds.

[3] Equity or Risky Bonds.

Table 3: Italy: Household Portfolio Ownership

return on equities and mutual funds increased dramatically during that period[12], particularly after 1995. In addition, financial innovation reduced minimum investment requirements and offered new diversification opportunities. Moreover, as in the UK, there has been a large privatization process of public utilities and state-owned companies with advertisement campaigns making households more aware of investment possibilities. Another factor that explains the different behavior of young households in the 1990s from their predecessors is the removal of capital controls since 1989, which has led to an increase in foreign asset holdings, decreasing the home bias. Finally, the reform of the social security system (1992, 1996) and the lower expectations of pension benefits has led households to increase their own savings.

It seems plausible that a long-run wealth effect exists. It is not clear, however, if the relationship in the short-run between asset prices and consumption is merely a statistical correlation. Asset prices may simply lead to economic activity that eventually translates into an increase in consumption in the short-run and does not explain changes in consumption. Therefore, in order to analyze the implications of these changes in household portfolios, I look at the predictions of theoretical models in the following section.

[12]Italy has a very favourable tax treatment limiting the tax rate on capital gains to 1 percent (Guiso, Haliassos, and Jappelli, 2003).

IV. The Life-Cycle Model of Consumption

Following Ludwig and Sloek (2002), Friedman (1957), Ando and Modigliani (1963) and Modigliani and Brumberg (1979) there are two transmission channels relating to stock market wealth:

1. Wealth effects: These can be realized or unrealized. When the value of consumers' stock holdings increases and households realize their gains then consumption would increase. This would be a direct effect as a consequence of higher current liquid assets. In addition, an increase in stock prices can also have an expectation effect where the value of stocks in pension accounts and other locked-in accounts increases. If these assets increase in value but are not realized, consumption would be higher today as expected future income and wealth would be higher.

2. Liquidity constraints effects: Increases in stock market prices raise the value of portfolios. Borrowing against the value of this portfolio in turn allows the household to increase consumption. Haliassos and Hassapis (2002) find that the "equity culture" creates incentives to increase loans that lead to an increase in current consumption. This is due to the fact that better prospects for future financial wealth accumulation (because of the equity premium) dominate the increase in riskiness of future income streams (that could discourage current consumption).

There are, however, some stylized facts from the literature that characterize life-cycle consumption and portfolio behavior. First, the majority of households hold no equity - the participation puzzle. Second, levels of asset holdings in equity are very small. Third, the covariance of consumption growth and equity returns is low.

In what follows I would like to show evidence of wealth effects by controlling for liquidity constraint effects. Specifically, I will study the implications of changes in consumption that develop the equity culture, and how these changes are influenced by credit market conditions.

A. First Approach

Let us consider the conventional life-cycle consumption model under uncertainty with multiple periods. The consumer with additively separable utility wants to pick a sequence of consumption and asset stocks which maximize the expected value of his life-time utility subject to each period's budget constraint plus the boundary condition that requires that the consumer cannot die in debt, as follows:

$$Max_{\{C_s,A_s\}} E_t \left[\sum_{s=t}^{T} U(C_s)/(1+\delta)^{s-t} \right] \tag{1}$$

$$\begin{aligned} s.t.\ A_s &\leq (1+r_s)A_{s-1} + Y_s - C_s \\ A_T &\geq 0 \end{aligned} \tag{2}$$

where δ ($0< \delta \leq 0$) is the consumer rate of time preference, Y_s is a non-property income sequence (labor income and grants), r_s is the real rate of interest, T is the length of the economic life, A_s is the end of period assets (including the interest income on them) and U is the instantaneous felicity function which is a Van-Neumann Morgensten utility function.

The constraints will be equalities providing that this utility function is always increasing in consumption. Then I can write

$$Max_{\{A_s\}} E_t \left\{ \sum_{s=t}^{T} U\left[(1+r_s)A_{s-1} + Y_s - A_s\right]/(1+\delta)^{s-t} \right\} \tag{3}$$

to get the Intertemporal Optimality Condition:

$$E_t \left[U'(C_s)/(1+\delta)^{s-t} \right] = E_t \left[(1+r_{s+1})U'(C_{s+1})/(1+\delta)^{s+1-t} \right] \tag{4}$$

with $s = t$:

$$U'(C_t) = E_t \left[(1+r_{t+1})U'(C_{t+1})/(1+\delta) \right] \tag{5}$$

that is, the relative consumption levels at different dates.

Under rational expectations with ε_{t+1} orthogonal to the information set available at time t, the fundamental first order condition or the observable equation is:

$$(1+r_{t+1})U'(C_{t+1}) = (1+\delta)U'(C_t) + \varepsilon_{t+1} \tag{6}$$

I now impose some assumptions about the utility function in order to generate an expression that can be related to real data. Hall (1978) gives two possibilities: a quadratic and an isoelastic utility function. With the latter, also called Constant Relative Risk Aversion, $U(C) = (C^{1-\gamma} - 1)/(1-\gamma)$, and equation 6 becomes,

$$C_{t+1}^{-\gamma} = [(1+\delta)/(1+r)]C_t^{-\gamma} + \varepsilon_{t+1}/(1+r) \tag{7}$$

where γ is the coefficient of risk aversion.

To sum up, Hall's paper shows that consumption is a random walk. That is, no variable apart from current consumption has any value in predicting future consumption, and time profile of income is irrelevant. The permanent income hypothesis/life-cycle hypothesis (PIH/LCH) under rational expectations implies that changes in consumption should be uncorrelated with anticipated changes in income and other variables that are in the consumers' information set. Hall's specification can be expressed in terms of the following log-normal approximation of the Euler equation with $\gamma = 1$:

$$\Delta lnC_{t+1} = \alpha + \varepsilon_{t+1} \tag{8}$$

where Δ is the first-difference operator taken with respect to time. Consequently, the permanent income/life-cycle model of consumption, under rational expectations, would predict that consumer expenditure should approximately follow a random walk with drift.

Extensions Without denying the intuitive appeal of the PIH, some drawbacks have been pointed out in subsequent papers. These follow from the two major discrepancies that have been found between the model's predictions and empirical estimations.

Excess Sensitivity Puzzle One deficiency of the standard model is the failure to adequately capture the dynamic interaction of consumption, income and interest rates. This failure has much to do with the underlying assumption that capital markets are perfect so that agents can transfer their resources from one period to another. However, capital markets are far from perfect. Altonji and Siow (1987) point out the asymmetry of the response of consumption to predictable income growth. If predicted income increases, consumers want to borrow but are prevented from doing so, hence consumption responds to income (liquidity constraint binding). But if predicted income decreases, they will save and not borrow (liquidity constraint not binding).

One of the leading alternatives to the basic model is obtained by relaxing this assumption and allowing the existence of Keynesian-type consumers. In this case, consumption changes are no longer orthogonal to predictable, or lagged, income changes, since a correlation exists between consumption growth and lagged income growth. This is the excess sensitivity puzzle that has been investigated by Zeldes (1989) among others.

To allow for credit constraints, Zeldes (1989) modifies the second equation of the budget constraints 2 by $A_s \geq 0$. The Intertemporal Optimality Condition for $s = t$ then becomes:

$$U'(C_t) = E_t[(1+r_{t+1})U'(C_{t+1})/(1+\delta)] + \lambda_t \tag{9}$$

where λ_t is the Lagrange multiplier on the borrowing constraint.

By assuming iso-elastic preferences, joint log normality, $\gamma = 1$, and constant interest rates I get:

$$\Delta lnC_{t+1} = \alpha + \lambda_t' + \varepsilon_{t+1} \tag{10}$$

where λ_t' is a renormalisation of λ_t.

Zeldes divides the sample into consumers who are life-cycle optimizers and Keynesian-type consumers who are supposed to be consuming proportional to their existing income. Zeldes then finds that the *time profile of income is relevant*, not just the present value.

Borrowing restrictions –limited access to financial markets– have effects on consumption that are not clear cut. When restrictions are directly binding, they make households consume their disposable income. When restrictions are not binding, they also affect consumption through the individual's usual intertemporal optimisation concerns.

The evidence from microdata has yielded mixed results. Zeldes (1989) and Eberly (1994) find excess sensitivity to liquidity constraints - a significant relationship between changes in consumption and lagged income using the Panel Study of Income Dynamics (PSID) for US households. On the other hand, Altonji and Siow (1987) and Runkle (1991) find no evidence of liquidity constraints. Recently, studies have also tested for liquidity constraints. For the US, Hajivassiliou and Ioannides (1998) establish excess sensitivity for the low-asset income group while allowing for liquidity constraints to be endogenously determined. Garcia, Lusardi and Ng (1997) find excess sensitivity for the low wealth group as well as for the high wealth one, due to the fact that households do not have time-separable preferences as assumed by the classical theory. Instead, there is inertia in preferences, hence households adjust their behavior slowly.

In the case of Italy, Japelli and Pistaferri (2000) find that consumption growth is uncorrelated with predicted income growth. Attanasio and Weber (1993, 1995) point out the possible biases created by aggregation and by omitting demographic variables which are important in models with nonseparable preferences, and find that consumption growth does not exhibit excess sensitivity to labor income for the UK. The excess sensitivity seems to disappear when changes in family composition and labor supply are controlled for.

These contradictory findings in the literature can be explained by the fact that some of these studies consider that λ_t does not vary over time. The fact that a consumer is liquidity-constrained does not mean that he will be a Keynesian type of consumer forever. λ_t can still vary over time because the consumer could save transitory increases in income. This is allowed, for example, by Hajivassiliou and Ionnides (1998).

In the following sections, I present further evidence on liquidity constraints and habit formation using data from the BHPS and the SHIW.

Risk Asset Puzzle or Participation Puzzle Another key prediction of the pure LCH model is that lagged wealth should have no predictive power for consumption because the previous value of consumption incorporates all information about the well-being of consumers at that time. To test this hypothesis, Hall (1978) uses stock prices lagged by a single quarter as a proxy for wealth and finds that changes in stock prices have a predictive value for consumption. He justifies the finding as being consistent with a modified random-walk hypothesis that allows for a brief lag between changes in permanent income and changes in consumption.

Poterba and Samwick (1995) find some effects of changes of stock prices on consumption for United States aggregated data for the period 1947-1995. However, they justify the correlation between consumption and stock prices as the role of share prices as a leading indicator[13]. Ludvigson and Steindel (1999) analyze the short-run effects of wealth on aggregate consumption and find that changes in wealth are not correlated with the next quarter's consumption growth, because the response of consumption growth to an unanticipated change in wealth is largely contemporaneous. Attanasio and Banks (1998) claim that aggregate household savings data are inappropriate for the analysis of household savings and that only data relating to the life-time experiences of households will help to understand recent trends and patterns in saving rates. They question the fact that capital gains can explain the evolution of savings because people do not always cash capital gains and claim that it is not clear if changes in asset prices are perceived as permanent.

Parker (1999) also estimates a Euler equation by adding the lag of wealth to test for wealth effects and controlling for stock ownership exogenously. He finds a negative but insignificant coefficient on wealth.

The puzzle that remains is why so few households hold risky assets. This is the micro analogue of the equity premium puzzle. Equilibrium portfolio theory predicts that individuals will diversify risks and maximize returns by holding a diversified portfolio containing a large number of different assets such as equity, government bonds, housing, etc. Despite this, the level of risky assets that are held is still low given the size of their returns.

Some studies have addressed the issue of limited participation in capital markets for risky assets. Haliassos and Bertaut (1995) point out that the excess returns to shares remains as a puzzle since 75 percent of American households do not hold shares despite the expected-utility model predictions.

Mankiw and Zeldes (1991) study the failure of the consumption-based Capital Asset Pricing Model (CAPM) based on a Euler equation estimated for the United States. The equity premium puzzle is explained by the fact that aggregate consumption growth covaries too little with the return on equities to justify the large observed risk premium on

[13]Stock prices may rise in anticipation of strong economic activity, including consumption.

stocks. The authors claim that this is because the CAPM relies on consumption data aggregated across stockholders and non-stockholders whose behavior differs substantially. They find that aggregate consumption of stockholders is more highly correlated with the stock market than the aggregate consumption of non-stockholders. In addition, the consumption of stockholders is more volatile than the consumption of non-stockholders and the coefficient of relative risk aversion calculated from the PSID falls from 100 to 35 if only consumption of stockholders is considered. Even though 35 is still implausibly high, it moves in the right direction. Therefore, as the share of equity holdings in income increases, consumption should become more sensitive to asset price fluctuations.

Attanasio, Banks and Tanner (2002) find that the Consumption CAPM model works for the group of households who hold risky assets, once separated from the rest, thereby reaffirming the results of Mankiw and Zeldes (1991). They improve the Mankiw and Zeldes analysis by using a more complete measure of consumption and allowing shareownership to be endogenous. Mankiw and Zeldes used only food consumption and shareownership in the last period of the sample. In addition, they find that the largest increase in shareownership comes from households with high incomes but low levels of education. Therefore the fact that the Consumption CAPM model holds for risky assetholders raises the possibility that stock returns affect consumption through wealth effects.

Attanasio (1998) analyses the decline in aggregate personal saving in the US in the 1980s and concludes that households in their 40's and 50's during this period are responsible for the decline in savings. He is unable to say, however, why those households did not save enough. He controls for financial asset ownership and rejects the hypothesis that the decline in savings in the 1980s is explained by unmeasured capital gains on real estate and/or financial assets[14]. However, Maki and Palumbo (2001), using a cohort-level, times series data, show that aggregate trends in household consumption and savings over the 1990s can be explained by the existence of wealth effects on consumption.

Since the econometric techniques employed above ignore the two puzzles already stated, I think it makes sense to study both phenomena jointly. This is the approach taken in the next section.

A Euler equation is an equilibrium condition for a set of consumers that are unconstrained. To test it, variables are included that might be important in alternative settings, in particular expected income and expected wealth. The Euler equation, however, is not an equation which explains consumption or even consumption growth. For instance it does not tell us what consumption growth will be for an unexpected change in wealth, income, interest rate or any other variable. Therefore the possible rejection of the Euler equation gives valuable information but it is not clear how to interpret the coefficients on wealth. An alternative is to estimate consumption functions.

[14]He uses a very rough measure of capital gains by interacting the value of stocks of assets with year dummies.

B. Second Approach

In this section I study consumer behavior via the estimation of household consumption functions. The advantage of this approach is that the consumption function can be used to understand consumer behavior rather than simply to estimate intertemporal substitution (as is the case with Euler equations). The old-style consumption function was derived by Friedman (1957) and Modigliani and Brumberg (1979) where each household (h) chooses at age (t) an amount of nondurable expenditures ($C_{h,t}$)[15] that provides utility through an intertemporally-separable, increasing, and concave utility function ($u(.)$). The function can be written as follows (See Parker (1999) for details):

$$Max_{\{C_{h,t}\}} E_S \left[\sum_{t=s}^{T} \beta^{t-s} \nu_a u \left(F_{h,t} C_{h,t} \right) + \beta^{T+1-s} V_{T+1} \left(F_{h,t} X_{h,T+1} \right) \right]$$

where E_S is the expectation operator conditional on all information available at time s; ν shifts utility as households age; β is the discount factor; F is a family-size adjustment that normalizes consumption to per-capita terms; X is household cash-on-hand and wealth; and $V(.)$ captures the possible value of cash on hand and wealth remaining at death. Households choices are constrained by an intertemporal budget constraint, and given their current levels of assets and income:

$$X_{h,t+1} = \tilde{R}_{h,T+1} \left(X_{h,t} - C_{h,t} \right) + Y_{h,t+1}$$

$$X_{h,t} \geq C_{h,t}$$

where $\tilde{R}_{h,T+1}$ is the gross after-tax rate of return on the household's optimal portfolio, and $Y_{h,t+1}$ is disposable non-asset income.

I follow Parker (1999) in assuming that in order to forecast future income, households only use as the basis of their forecast an estimate of the permanent component of its income ($P_{h,t}$). The latter is estimated as the forecast of the log of current income from two lags of income, education and age. Therefore, the consumption function of household h is a function of family size, wealth, income, age, the permanent component of income, and the aggregate state:

$$C_{h,t} = f \left(F_{h,t}, X_{h,t}, age_{h,t}, P_{h,t}, T_t \right) \tag{11}$$

[15] Utility from nondurable consumption is assumed to be additively separable from utility from durable consumption or leasure.

Aggregate, planned consumption is explained above by labor income and wealth. However, actual consumption is not always equal to planned consumption due to several factors such as adjustment costs and liquidity constraints. Adjustment costs can prevent consumers from adjusting their housing services within each period. Capital restrictions prevent individuals from smoothing consumption by borrowing, therefore these liquidity-constrained consumers are more dependent on current consumption.

To sum up, the wealth effect reflected in the coefficient on lagged wealth in the Euler equation in the previous section is different in nature from the wealth effect reflected in the coefficient on current wealth in the consumption function in this section. The former is an excess sensitivity test of the underlying PIH model. The latter measures the (conditional) effect of additional financial wealth on the level of consumption, which is consistent with the PIH null, but close to the notion of wealth effects used to motivate this paper.

V. The Basic Model

The existence of both households who invest in risky financial assets and households who do not invest at all suggests the use of selectivity models to address the issue of data censoring. If assetholders are prevented from investing in the capital markets, then the consumption of the households that are in the market should be higher than those that are outside the market. The key issue is that an increased participation in capital markets affects households already in the market and asset prices, while the expectation of entering the market affects those that are not. Furthermore, endogenous changes in capital stock have effects on all households.

The basic model is divided into a discrete and a continuous part that characterizes consumption demand and corrects for selectivity bias. The former part will be modelled using probit estimation. I will use a parametric model with censored endogenous variables to derive estimates to correct for the selection bias resulting from the unobserved endogeneity in the consumption function. Selectivity bias refers to the bias that arises due to the fact that the underlying discrete decision process is ignored. This bias occurs because the consumption that is observed for household participating in capital markets and being liquidity unconstrained depends on the underlying decision processes. I correct for that by estimating the consumption equations conditional on the asset or non-assetholding decision and the liquidity constrained probability.

In what follows I will introduce two variations on the life-cycle/permanent income hypothesis. First, I introduce a measure of wealth to analyze its possible effect on consumption in Italy and the UK in the 1990s, during which ownership increased. The variable has an obvious rationale, but is less closely related to competing theories of consumption. Theory and prevailing practice agree that contemporaneous wealth has a strong influence on consumption, particularly now that assets are held by a majority of

the population. Secondly, the presence of liquidity constraints prevents consumers from smoothing consumption over transitory fluctuations in income.

A. Two-Step Switching Model with Endogenous Switching

To tackle the two puzzles in the literature, the inconsistency of the rational expectation-permanent income model of consumption and the consumption CAPM puzzle, I propose that:

1) λ_t is endogenous. That is, the degree to which liquidity constraints bind and the length of time over which they bind varies over time. Unfortunately, λ_t is unobservable, hence I follow Zeldes (1989) and Runkle (1991) in grouping households according to variables that determine whether or not households are liquidity constrained.

2) The decision to own risky assets in each period is likely to be endogenous with respect to consumption.

The econometric model extends the classic Heckman-Lee two stage estimation method that allows for double-selection (See Fishe et al. (1981), Maddala (1983) and Tunali (1986) for examples).

I would like to model two selection equations described by the following bivariate probit model:

$$L_{it} = \mathbb{1}\left(z_{it}^{L\prime}\gamma^{L} + u_{it}^{L} \geq 0\right) \tag{12}$$

$$R_{it} = \mathbb{1}\left(z_{it}^{R\prime}\gamma^{R} + u_{it}^{R} \geq 0\right) \tag{13}$$

where the indicator function $\mathbb{1}(\cdot)$ is equal to 1 if the statement in the argument is true, and equal to 0 otherwise. That is, L_{it} and R_{it} are underlying utility indices that enable an individual to make one choice out of two alternatives. These two decision equations are likely to be correlated, so that $E\left[u_{it}^{L} \cdot u_{it}^{R}\right] = \rho_{u_{it}^{L}, u_{it}^{R}}$.

I next consider a choice model with four categories and one regression outcome in each category, following Dubin and McFadden (1984) and Fishe et al. (1981):

$$C_{qit} = x_{qit}\beta_q + \varepsilon_{qit} \quad (q = 1, 2, 3, 4) \tag{14}$$

$$L_{it}^{*} = z_{it}^{L}\gamma^{L} + u_{it}^{L} \quad (i = 1, 2, ..., N) \tag{15}$$

$$R_{it}^{*} = z_{it}^{R}\gamma^{R} + u_{it}^{R} \;\; (i = 1, 2, ..., N)$$

where x_{qit} and z_{it}^{K}, with $K = L, R$, are exogenous variables, ε_{qit} are identically and independently distributed normal variables and u_{it}^{K} are assumed to be normally distributed with zero mean and variance normalized to unity.

When $L_{it}^{*} \geq 0$ the household is liquidity constrained. When $R_{it}^{*} \geq 0$ the household is a risky assetholder. This generates the following probability of the joint decision:

$$Prob\left(L_{it}^{*} \geq 0, R_{it}^{*} \geq 0\right) = Prob\left(u_{it}^{L} < z_{it}^{L}\gamma^{L}, u_{it}^{R} < z_{it}^{R}\gamma^{R}\right) = F\left(z_{it}^{L}\gamma^{L}, z_{it}^{R}\gamma^{R}, \rho\right) \tag{16}$$

To obtain the ML estimates of γ^{L}, γ^{R} and ρ, I maximize the following likelihood function:

$$L = \prod_{I=1} F\left(z_{it}^{L}\gamma^{L}, z_{it}^{R}\gamma^{R}, \rho\right) \cdot \prod_{I=0} \left[1 - F\left(z_{it}^{L}\gamma^{L}, z_{it}^{R}\gamma^{R}, \rho\right)\right] \tag{17}$$

under the assumption of normality of u_{it}^{K}. Since the Σ (variance-covariance matrix of the standardized error terms) is not a diagonal matrix, I will use a maximum likelihood bivariate probit to produce consistent estimates of γ^{L}, γ^{R}, and ρ.

In this model, I have four possible decision combinations:

$$\begin{aligned}
\Delta \ln C_{1it} &= x_{1it}\beta_{1} + \varepsilon_{1it} \;\; iff \;\; i \in PC\,(1) \\
\Delta \ln C_{2it} &= x_{2it}\beta_{2} + \varepsilon_{2it} \;\; iff \;\; i \in PC\,(2) \\
\Delta \ln C_{3it} &= x_{3it}\beta_{3} + \varepsilon_{3it} \;\; iff \;\; i \in PC\,(3) \\
\Delta \ln C_{4it} &= x_{4it}\beta_{4} + \varepsilon_{4it} \;\; iff \;\; i \in PC\,(4)
\end{aligned} \tag{18}$$

where the combination sets are:

$$PC\,(1) = \{\, it \mid L_{it}^{*} \geq 0\ ,\ R_{it}^{*} \geq 0\}$$

$$PC\,(2) = \{\, it \mid L_{it}^{*} < 0\ ,\ R_{it}^{*} \geq 0\}$$

$$PC\,(3) = \{\, it \mid L^*_{it} \geq 0\ ,\ R^*_{it} < 0\} \tag{19}$$

$$PC\,(4) = \{\, it \mid L^*_{it} < 0\ ,\ R^*_{it} < 0\}$$

and ε_{qit} are jointly distributed with u^L_{it} and u^R_{it}, such that

$$E\left[\varepsilon_{qit}\ u^K_{it}\right] = \sigma_{qk}.$$

Since the disturbances in the decision equations are correlated ($Cov(u^L_{it}, u^R_{it}) = \rho$), equation 18 implies that

$$E[\Delta \ln C_{qit} \,|\, i \in PC(q)] = x_{qit}\beta_q - \sum_{q=1}^{Q} \sigma_{qk} \frac{\phi(z^K_{it}\gamma^K)\ .\ \Phi((2 \upharpoonright (i \in PC(q)) - 1)(z^L_{it}\gamma^L, z^R_{it}\gamma^R, \rho))}{\Phi_2((2 \upharpoonright (i \in PC(q)) - 1)(z^L_{it}\gamma^L, z^R_{it}\gamma^R, \rho))} \tag{20}$$

where $q = 1, 2, 3, 4$ and $K = L, R$.

The last term of equation 20, the Heckman correction term or Inverse Mills ratios, can be interpreted in terms of the endogeneity of the two selection equations, M^K_{it} hereafter. $\Phi_2(.)$ is the bivariate standard normal distribution, $\Phi(.)$ is the standard normal distribution function, and $\phi(.)$ is the density function. (see Appendix for details).

By looking at the BHPS and SHIW calculations stated in Table 4[16], I observe that the PC(1) combination of equation 19 -namely, L, R- contains a small proportion of households. As a result I will mostly be concerned with equations defining $\Delta \ln C_{2it}$, $\Delta \ln C_{3it}$ and $\Delta \ln C_{4it}$.

VI. Empirical Results

The principal economic framework underlying the analysis is the life-cycle model, and my aim is to test the model and improve its empirical specification. Once the estimation equations have been obtained, I will discuss the implications for the theoretical model. For the sake of comparison I use the same time period for both countries. The BHPS has only financial information for 1995 and 2000 (while the SHIW has information for the whole period 1991-2000) hence I restrict the analysis to these two years.

[16]The asset-based split is used to calculate the proportion of liquidity constrained households in Table 4. See section 2.6.1. for an explanation on the definition.

1995			
United Kingdom		Italy	
NL,R:0.22	NL,NR:0.27	NL,R:0.12	NL,NR:0.43
L,R:0.05	L,NR:0.46	L,R:0.01	L,NR:0.44
2000			
United Kingdom		Italy	
NL,R:0.18	NL,NR:0.20	NL,R:0.20	NL,NR:0.35
L,R:0.08	L,NR:0.54	L,R:0.01	L,NR:0.44

Source: Author's calculations from BHPS and SHIW.
Note: Percentage of households in each category.
L=Liquidity constrained, NL=no-L; R=Risky Assetholder, NR=non-R.

Table 4: Liquidity Constraints and Assetholdings

A. Liquidity Constraints

Different forms of liquidity constraints have been examined in the literature, usually in the form of a price or quantity restriction on the holding of assets. I consider two measures of liquidity constraints: first, following Zeldes' paper I rely on an asset-based sample separation rule, that is, the ratio of total wealth in t to the average of disposable income in t and $t-1$. Based on the level of assets held, households are divided into liquidity constrained (low wealth) households and those with access to credit markets (high wealth). Second, following Jappelli, Pischke and Souleles (1998) I consider a more direct measure of liquidity constraints, namely, information on credit card holdings. The Appendix contains an explanation of the construction of the variables. In this way I can weaken the spurious problem arising from the correlation between consumption growth, lagged income, and assets when the Euler equation is estimated in a linearized way, omitting the second and higher order terms of the conditional distribution of consumption growth.

Tables 5 and 9 (the latter in the appendix) display the results of the liquidity-constrained equations for the UK and Italy using two measures of liquidity constraints, the asset-based and credit card splits. The explanatory variables in these probit equations include age of head of household, age squared, a dummy for the poorest region, house ownership (with mortgage and without), sex of household head, marital status (married), family size, number of children, employment status of household head, employment status of spouse, education of head, and year effects.

The coefficients on age for the asset split in both countries are negative and significant, implying that aging decreases the probability of being liquidity constrained. The positive sign on age squared suggests that after a certain age, aging increases the probability of being liquidity constrained. Education is highly significant and negative in both countries,

	Italy				United Kingdom			
	Dependent variable:							
	Asset Split		Risky Assets		Asset Split		Risky Assets	
Variables	Coeff.	T-Stat.	Coeff.	T-Stat.	Coeff.	T-Stat.	Coeff.	T-Stat.
Constant	1.682	11.82	-5.151	-22.80	2.310	16.08	-3.614	-21.90
Age	-0.026	-5.52	0.038	5.65	-0.034	-6.33	0.054	8.71
Age^2	0.000	3.77	-0.000	-5.25	0.000	2.71	-0.000	-7.44
Region	0.600	26.08	-0.759	-21.73	0.063	5.02	-0.033	-2.73
Own1mort	0.010	0.16	-0.132	-0.25	-0.344	-8.64	0.764	16.17
Own0mort	-0.282	-11.84	-0.009	-0.20	-0.684	-17.04	0.877	18.25
Sex	-0.152	-5.24	0.163	4.45	-0.153	-4.14	0.161	3.89
MS	-0.048	-1.43	0.086	2.02	-0.126	-3.15	0.080	1.81
Fsize	0.001	0.05	-0.091	-5.67	0.054	2.42	-0.086	-5.12
Child	0.091	3.89	-	-	0.082	3.07	-	-
Adult	-	-	0.101	5.04	-	-	-0.028	-0.88
Emplh	-0.004	-0.14	-	-	-0.143	-3.56	-	-
Empls	-0.177	-6.93	0.127	3.77	0.042	1.11	-0.010	-0.21
Educ	-0.342	-20.05	0.545	22.53	-0.255	-16.45	0.294	18.06
Wage	-	-	0.013	3.59	-	-	0.031	4.78
Selfemp	-	-	0.015	0.37	-	-	-0.045	-0.90
FWealth	-	-	0.121	7.17	-	-	0.041	9.21
YearEffect	0.047	2.33	0.371	14.43	0.180	7.26	0.057	1.96
$\rho_{u_{it}^L, u_{it}^R}$	-0.680 (-31.31)				-0.471(-22.27)			
Log likelihood	-15118.076				-10545.485			
No. Obs	16136				10195			

Notes: t-statistics calculated with robust standard errors clustered by household and corrected for heteroskedasticity. Sample: 1995, 2000.

$\rho_{u_{it}^L, u_{it}^R}$ controls for common determinants of liquidity constrains and asset holding equations, not fully captured by the explanatory variables.

Table 5: Selection Equation. Asset Split

implying that schooling is a predictor of future earnings and ability to repay loans.

Female headed households might have a lower level of expected future income and appear to suffer from additional credit rationing. This difference may be the result of discrimination. On the other hand, sex turns out to be insignificant when the credit card split is used.

The negative sign on the marital status dummy also accords with theory but is only significant in the case of the UK, thus supporting the idea that married couples are less constrained than singles. A big family is likely to be more constrained in the UK although the family size variable is insignificant in the case of Italy. A larger number of children increases the likelihood of being constrained for both countries using the asset split. I include a dummy for the poorest regions and this is significant in both countries; northern regions for the UK and southern regions for Italy.

In the UK, employment status of the household head plays an important role in determining the existence of liquidity constraints when either of the two splits is used. In Italy, however, it is only significant when the credit card split is used. Employment of the spouse is important in the case of Italy (according to both splits). For the UK, it is only significant for the credit card split. The year effect is significant in both countries. Interestingly, the data suggests that households that own a house are less liquidity constrained in the UK. In Italy, however, it is only the case if the household does not have a mortgage.

To sum up, the fraction of constrained households is endogenous, and varies in response to changes in demographic characteristics and future income.

The difference in liquidity constraints results between the credit card measure and the asset ratio measure is due to the fact that the group without credit cards is observed to be different to one with a low asset ratio. The former can be characterized as unmarried, older and with lower education.

B. Asset Holding Ownership

Empirical models of household portfolio choice in the literature are typically of a reduced form, not least because a structural empirical model will require more complete information than typically provided in the data. In this fashion, King and Leape (1998), Hochguertel, Alessie and van Soest (1997), Banks and Tanner (2002), and Guiso and Japelli (2002, 2003) analyze American, Dutch, British and Italian household portfolios respectively.

Among the variables that can affect assetholding ownership, I consider net worth, age, age squared, sex of head, poorest region, family size, number of adults, marital status,

homeownership (with and without mortgage), education of head, employment of spouse, dummy for self-employment, labor income, financial wealth, and year effects.

Tables 5 and 9 present the asset ownership equations for the UK and Italy. They show that ownership of risky financial assets depends strongly on financial wealth in the positive direction predicted by portfolio theory. In addition, the percentage of households that hold risky financial assets increases with average labor income. This is because households have larger portfolios, hence they are more willing to pay for the fixed information cost.

Standard asset portfolio models without transaction costs, in which risky assets have a higher return than safe assets, do not address the issue of participation/ non-participation. Since some households do not hold assets because they are not aware of their existence, models should include transactions costs and incomplete financial information. Education is a good proxy for these variables since it can be interpreted as a measure of the ability to process information about the market and overcome the barriers to shareholding.

Older households are more likely to hold assets than younger ones. The positive sign on age and the negative sign on squared age implies that participation is hump shaped. Households invest a small proportion of their wealth in risky financial assets when they are young, but they increase this proportion as they accumulate more wealth to cover the fixed costs of investing in risky assets. After reaching a maximum at middle age, this proportion starts declining. Young and old people have greater income variability, and therefore they are the groups less likely to hold risky financial assets. In addition, liquidation costs and market imperfections make younger households less willing to invest in risky assets, especially when they are looking for a home purchase. On the other hand, health risk shortens the period of investment payoff and thus makes elder people more reluctant to invest in risky assets.

The significant positive sign of marital status indicates that married couples own more risky assets than single people. Single-parent households tend to have the lowest ownership rates and married couples without children tend to have the highest. Larger households own less risky assets but the larger the number the adults the higher the likelihood of having risky assets in Italy. Employment of the spouse is important for Italy. Homeownership is critical for households in the UK but not Italy. The self-employment dummy turns out to be insignificant. The dummy for poor regions has a negative influence on market participation. Finally, male heads of household are more likely to be risky asset holders in both countries.

The correlation between the error terms of the two equations, $\rho^{u_{it}^L, u_{it}^R}$, is negative and highly significant, showing a negative relationship between the errors of holding shares and liquidity constraints. The results are in line with Paxson (1990) who shows that households exposed to liquidity constraints and facing uncertain liquidity needs will tend to hold relatively liquid and safe assets. This result suggests that liquidity constraints and asset holdings may be determined by common variables omitted from both specifications.

C. Consumption Equations

Focusing on equation 10, I can test two orthogonality restrictions associated with the model. Specifically, under the null hypothesis of no borrowing constraints λ_{it} should equal zero for both constrained and unconstrained households, labor income (Y_{it}) should be insignificant, and parameters should be similar across both types of households. Under the alternative hypothesis of borrowing constraints λ_{it} will not equal zero for the constrained group and will be correlated with Y_{it}. Furthermore, I can test for wealth effects and see whether they can lead to another rejection of the Euler equation. A simple test of these hypotheses is to enter Y_{it} and financial wealth, W_{it}, as additional regressors and test their significance.

In order to fit the equation a number of modifications are necessary. The utility derived from consumption also depends on family composition. Therefore a simple correction is made by assuming that the utility is shifted by a number of demographic variables such as age, family size, number of children, and so forth. Moreover, following Attanasio and Weber (1995) I include a labor supply variable to take into account nonseparability between consumption and leisure.

Euler Equations of Consumption Growth Estimates are based on the typical Euler equation derived from 10:

$$\Delta C^q_{it+5} = \alpha^q + \varphi^q A_{it} + \beta^q \Delta X_{it+5} + \varepsilon^q_{it+5} \tag{21}$$

where the dependent variable, $\Delta C^q_{it+5} = ln(C_{it+5}/C_{it})$, is real non-durable and services consumption, A_{it} represents age variables (controlling for changes in preferences) and $\Delta X_{it+5} = ln(X_{it+5}/X_{it})$ represents demographic characteristics.[17] The elasticity of intertemporal substitution is σ, q is the number of regimes ($q = 1, 2, 3, 4$) and ε^q_{it+5} is a residual uncorrelated with all the information available at time t or earlier for household i at time t in a regime q. The constant α^q depends on conditional second moments of consumption growth and the real interest rate.

I use five-year changes in consumption to maintain comparability with the financial data available from the BHPS. Notice that in these equations the only source of variation is cross-sectional.

According to theory, innovations in the Euler equation are not predictable by the variables on the right-hand-side. However, the existence of positive shocks to wealth could generate a correlation between innovations to wealth and predictable movements in the real interest rates. In other words, increases in consumption will remain unexplained after removing

[17] Following Japelli, Pischke and Souleles (1998), I include directly the change in number of adults and change in the number of children as opposed to using the measure of food needs.

the substitution effect due to movements in real interest rates. In order to avoid possible sample bias on the remaining coefficients, I have allowed for different rates of consumption growth for assetholders and non-assetholders in the four regime model.

To recapitulate, the key hypothesis is that under a simple version of the life-cycle model, there should be no relation between consumption growth and expected income or wealth, since consumers with a concave utility function should smooth expected income and wealth fluctuations. I therefore include $ln\ Y_{it}$ to test for excess sensitivity following Zeldes (1989), and I include the amount of financial assets held ($ln\, W_{it}$) in order to test for wealth effects. I modify equation 21 to make consumption expenditure a function of household wealth and labor income as follows:

$$\Delta\, C^q_{it+5} = \alpha^q + \varphi^q A_{it} + \beta^q \Delta X_{it+5} + \gamma^q \ln\, Y_{it} + \delta^q \ln W_{it} + \varepsilon^q_{it+5} \tag{22}$$

I therefore assume that households only require knowledge of demographic characteristics, current and expected future resources, income and wealth.

Since sections 6.1 and 6.2 have shown that both the probability of being liquidity constrained and of being an assetholder are endogenous, I cannot estimate Euler equations treating both characteristics as exogenous. Consequently, I modify equation 22 to account for selection by including M^K_{it}, the Heckman correction term for the endogenous selection as an additional regressor. The coefficients on the selection correction terms are identified in this analysis by excluding the dummy for the poorest region, house ownership (with mortgage and without), sex of household head, number of adults in the household, employment status of the household head, and education of head from the Euler equation. The analog of 18 will be as follows.

$$\Delta\, C^q_{it+5} = \alpha^q + \varphi^q A_{it} + \beta^q \Delta X_{it+5} + \gamma^q ln\, Y_{it} + \delta^q ln\, W_{it} + \psi^q M^K_{it} + \varepsilon^q_{it+5} \tag{23}$$

The specification of the equation is similar to that estimated by several authors, such as Zeldes (1989), Attanasio and Weber (1995), Shea (1995), Garcia et al. (1997) and Japelli et al. (1998). Following Japelli et al. (1998) and Garcia et al. (1997) I omit the interest rate from the Euler equation (I only have one cross section Euler equation for both samples).[18] As a consequence, I do not need to use instrumental variables in the estimation since all regressors are part of the household information set. Since the analysis is motivated by the existence of wealth effects coming from risky assets, the wealth term is not included in those cases where the household is not a risky asset holder. The inclusion of different components of wealth as separate regressors is ruled out since comparable disaggregated wealth for both countries is not available. Following Zeldes (1989) I assume

[18]Since I am asssuming a constant interest rate, I am not considering the channel of liquidity constrained households whose cost of borrowing is higher than the return to saving.

Dependent Variable: $\Delta C^q_{it+5} = ln(C_{it+5}/C_{it})$						
Select. (K):	Asset Split, Risky Assets					
Regime (q):	UR		CNR		UNR	
Country:	Italy	UK	Italy	UK	Italy	UK
α	0.359	0.91	0.536***	0.995	0.248	2.592***
	(0.43)	(0.76)	(0.184)	(0.36)	(0.21)	(0.78)
Age_{it}	-0.006	-0.06**	-0.015**	-0.031***	-0.012*	-0.03*
	(0.013)	(0.03)	(0.01)	(0.01)	(0.01)	(0.02)
Age^2_{it}	0.410	0.047**	1.194*	0.020	1.092	0.012
	(1.27)	(0.02)	(0.65)	(0.15)	(0.67)	(0.02)
$\Delta\text{Fsize}_{it+5}$	0.350**	0.263*	0.449***	0.349***	0.420***	0.463***
	(0.14)	(0.16)	(0.079)	(0.12)	(0.10)	(0.14)
$\Delta\text{Child}_{it+5}$	0.012	-0.015	-0.244***	-0.178*	-0.115*	-0.015
	(0.10)	(0.18)	(0.06)	(0.09)	(0.07)	(0.16)
ln Y_{it}	-0.00008	0.009	-0.003	-0.006	-0.0003	-0.017
	(0.006)	(0.02)	(0.003)	(0.01)	(0.004)	(0.02)
ln W_{it}	-0.034**	-0.012	-	-	-	-
	(0.017)	(0.02)	-	-	-	-
Married_{it}	-0.037	0.103	-0.004	-0.071	0.079**	0.172*
	(0.07)	(0.09)	(0.04)	(0.06)	(0.06)	(0.10)
Empls_{it}	0.065	0.010	0.040	-0.052	-0.023	-0.210*
	(0.05)	(0.11)	(0.03)	(0.07)	(0.03)	(0.11)
M^L_{it}	-0.030	0.582	-0.089	0.453*	-0.026	0.625**
	(0.49)	(0.47)	(0.065)	(0.24)	(0.09)	(0.30)
M^R_{it}	0.158**	0.580**	0.075	1.286***	-0.035	1.149***
	(0.07)	(0.26)	(0.38)	(0.34)	(0.09)	(0.24)

Notes: U=unconstrained, C=constrained; R=assetholder, NR=non-R.
Dependent variable is the five-year change in log of non-durable consumption. Standards errors in parenthesis. Standards errors obtained by bootstrapping (1000 replications) to adjust for the presence of M^K_{it} .
*, **, and *** denote significance at 10, 5 and 1 percent level respectively.

Table 6: Euler Equation. Asset Split

Dependent Variable: $\Delta C^q_{it+5} = ln(C_{it+5}/C_{it})$						
Select. (K):	Credit Card, Risky Assets					
Regime (q):	UR		CNR		UNR	
Country:	Italy	UK	Italy	UK	Italy	UK
α	-0.684	0.842	0.397**	.891**	0.484***	1.136**
	(0.87)	(0.73)	(0.20)	(0.38)	(0.21)	(0.50)
Age_{it}	0.004	-0.068**	-0.010*	-0.016	-0.019**	-0.054***
	(0.02)	(0.29)	(0.01)	(0.01)	(0.01)	(0.02)
Age^2_{it}	-0.562	0.064**	0.773	0.007	1.600**	0.044**
	(2.40)	(0.03)	(0.67)	(0.01)	(0.70)	(0.02)
$\Delta\text{Fsize}_{it+5}$	0.411	0.327**	0.285***	0.433***	0.579***	0.335**
	(0.26)	(0.16)	(0.09)	(0.12)	(0.08)	(0.13)
$\Delta\text{Child}_{it+5}$	-0.085	0.157	-0.091	-0.091	-0.300***	-0.166
	(0.18)	(0.17)	(0.06)	(0.11)	(0.08)	(0.10)
ln Y_{it}	-0.011	0.018	-0.001	-0.012	-0.002	0.004
	(0.01)	(0.02)	(0.003)	(0.01)	(0.004)	(0.02)
ln W_{it}	-0.012	-0.040*	-	-	-	-
	(0.03)	(0.02)	-	-	-	-
Married_{it}	0.198	0.090	0.056*	0.012	0.017	0.059
	(0.15)	(0.10)	(0.03)	(0.07)	(0.04)	(0.08)
Empls_{it}	0.097	0.035	0.028	-0.097	0.003	-0.100
	(0.10)	(0.10)	(0.03)	(0.10)	(0.04)	(0.08)
M^L_{it}	-0.144	-0.181	-0.135	-0.310**	-0.124	-0.272*
	(0.37)	(0.32)	(0.12)	(0.14)	(0.14)	(0.16)
M^R_{it}	0.409**	0.262*	0.146	0.382*	0.151	0.363**
	(0.16)	(0.16)	(0.12)	(0.21)	(0.13)	(0.16)

Notes: U=unconstrained, C=constrained; R=assetholder, NR=non-R.
Dependent variable is the five-year change in log of non-durable consumption. Standards errors in parenthesis. Standards errors obtained by bootstrapping (1000 replications) to adjust for the presence of M^K_{it} .
*, **, and *** denote significance at 10, 5 and 1 percent level respectively.

Table 7: Euler Equation. Credit Card Split

that family composition (and the number of children) and the age of the head at $t+5$ are known at time t. I include a large number of demographic characteristics (age, age squared, family size, number of children, a dummy that equals unity if the spouse works, and a dummy for married individuals) to address Attanasio and Weber (1995)'s point that excess sensitivity disappears when controlling for those variables. For obvious reasons, I do not include time effects since I do not have enough variability in the data. Moreover, given that the analysis uses only one cross-section observation, the inclusion of a constant prevents the estimation of separate time dummies. This is a strong assumption since there may be aggregate expectations errors.[19] Shea (1995), Japelli et al. (1998) and Garcia et al. (1997), however, only report the estimation without time effects after finding that results were qualitatively and quantitatively similar. In addition, for the same reason, I do not include fixed household effects in the estimation. Japelli et al. (1998) and Garcia et al. (1997) do not include fixed household effects either.

Tables 6 and 7 show the results. In general the negative coefficients on age and sometimes positive coefficients on age-squared are consistent with the hump-squared pattern of consumption over the life-cycle.

The first regime is the group of unconstrained and risky asset households. When the asset split is used in the selection equations, the coefficient of labor income is insignificant, as predicted by the theory of liquidity constraints with both splits (asset and credit card). The coefficient on financial assets, however, is significant. This violates the PIH, and gives room for wealth effects. In the case of Italy, this occurs when the asset split is used, while in the UK this happens with the credit card split. The coefficient for Italy is 0.034 while the coefficient for the UK is a bit higher (0.04). The second column shows the case for constrained households where, contrary to expectations, the labor income coefficients are insignificant for both countries, although the sign is correct. The interpretation of the negative coefficient on the labor income in levels is that if disposable income at time t increases and nothing else in the model changes, consumption will rise today relative to tomorrow, lowering the expected growth in consumption. This interpretation suggests a negative partial correlation between λ_{it} and Y_{it}. In summary, I do not find excess sensitivity although PIH is violated by wealth effects on consumption.

Consumption functions The log-linear approximation of equation 11 will be as follows:

$$\ln C = \delta_0 + \delta_1 fsize + \delta_2 child + \delta_3 \ln W + \delta_4 \ln Y + \delta_5 age + \delta_6 \ln Yp + \delta_7 T + \varepsilon$$

[19] The time average of individual forecast errors over T periods should converge to zero as $T \to \infty$ assuming forecast errors are unbiased; but an average of forecast errors at a given point in time across N individuals surely need not converge to zero as $N \to \infty$, there may be common components in those errors, due to the economy-wide innovations.

where $fsize$ is family size, *child* is number of children, W is wealth, Y is current labor income, *age* is age of the household, Yp is the permanent component of labor income[20] that forecasts expected labor income and T is a year effect.

This equation is estimated based on 1995 and 2000 data for both countries. Results are similar if a two-stage least squares estimation is implemented and more control variables are added.[21] The coefficients on the selection correction terms are identified in the estimation by excluding age squared, the dummy for the poorest region, house ownership (with mortgage and without), sex of household head, marital status, number of adults in the household, employment status of the household head, employment status of the spouse, and education of head from the consumption function.

Tables 8 and 10 show the results. The first thing to note is the significant coefficient of financial wealth in all specifications. The marginal propensity to consume out of risky financial assets is estimated to be around 4 percent in both countries. A common assumption is that the coefficient of stock market wealth is 0.05 for the US. For example, Ludvigson and Steindel (1999) find a marginal propensity to consume out of wealth of 0.04 for aggregate consumption. The fact that this coefficient on equity wealth is different from the coefficients on other kinds of wealth (such as housing) might be explained by the fact that consumers are heterogeneous and stock market owners may be systematically older or younger than other wealth owners, or may have other distinctive characteristics.

All specifications show, consistent with Parker (1999), a significant correlation between consumption and the permanent component of income. Another interesting result is that while current income is significant in all specifications for the UK, it is only significant for constrained households in Italy. In the presence of liquidity constraints, I expect to see a significant coefficient on current income for the constrained households. At the same time, however, habit formation applies to both constrained and unconstrained individuals, hence the current income coefficient is significant in both cases.[22] I might therefore interpret the results as owing to the presence of liquidity constraints in Italy and habit formation in the UK. Caution is needed when interpreting the coefficient on the income variables, since the time effects remove mean long-run correlations (see Parker (1999) for details).

[20] Following Parker (1999), I construct the permanent component of labour income as the forecast of the log of current labour income from two lags of the log of labour income, education, and age-group dummy variables.

[21] Given the limited number of time periods available for the analysis, the use of Generalised Method of Moments estimators in the context of single equation, autoregressive-distributed lag models was not feasible. (See Bond (2002) for a review of dynamic panel data models).

[22] Habit formation assumes inertia in preferences. If this is the case, households will adjust their behaviour slowly, therefore omitting lags of consumption might explain the significant coefficient of income (See Garcia et al., (1997) for a discussion).

Dependent Variable: $C^q_{it1} = ln(C_{it})$						
Select. (K):	Asset Split, Risky Assets					
Regime (q):	UR		CNR		UNR	
Country:	Italy	UK	Italy	UK	Italy	UK
α	11.611***	5.873***	10.907***	6.221***	11.550***	4.628***
	(0.15)	(0.43)	(0.07)	(0.16)	(0.08)	(0.46)
Age_{it}	0.007***	-0.007*	0.004***	0.005**	0.003***	0.005
	(0.001)	(0.004)	(0.001)	(0.002)	(0.0008)	(0.004)
$Fsize_{it}$	0.159***	0.168***	0.157***	0.153***	0.172***	0.177***
	(0.01)	(0.03)	(0.01)	(0.02)	(0.007)	(0.03)
$Child_{it}$	-0.037**	-0.063	-0.049***	-0.125***	-0.030***	-0.105**
	(0.02)	(0.04)	(0.010)	(0.02)	(0.010)	(0.04)
Y_{it}	0.001	0.032***	0.015***	0.063***	-0.001	0.066***
	(0.002)	(0.01)	(0.001)	(0.006)	(0.001)	(0.01)
Yp_{it}	0.017**	0.095***	0.021***	0.059***	0.013**	0.071***
	(0.008)	(0.02)	(0.005)	(0.01)	(0.005)	(0.02)
W_{it}	0.034***	0.037***	-	-	-	-
	(0.007)	(0.01)	-	-	-	-
T_{it}	-0.182***	-0.349***	-0.072***	-0.308***	-0.160***	-0.346***
	(0.02)	(0.05)	(0.009)	(0.03)	(0.01)	(0.051)
M^L_{it}	-0.343**	-0.958***	0.565***	-1.328***	0.163***	-0.938***
	(0.13)	(0.23)	(0.02)	(0.14)	(0.03)	(0.16)
M^R_{it}	-0.442***	-0.02	-1.968***	-2.353***	-0.803***	-0.370***
	(0.02)	(0.15)	(0.08)	(0.17)	(0.025)	(0.14)

Notes: U=unconstrained, C=constrained; R=assetholder, NR=non-R.

Standard errors clustered by household in parenthesis.

Standards errors obtained by bootstrapping (1000 replications) to adjust for the presence of W^K_{it} .

*, **, and *** denote significance at 10, 5 and 1 percent level respectively.

Table 8: Consumption Function Regression

VII. Conclusion

I analyzed the structure of financial household portfolios by looking at the determinants of risky assets for two European countries: the United Kingdom and Italy. Households have shifted towards riskier portfolios by substituting stocks and bonds for bank accounts in both countries. Differences remain, however. In 2000, while 24 percent of households held stocks in the UK, only 18 percent did in Italy (26 and 8 percent respectively in 1995).

I used a standard life-cycle model of consumption, augmented to include liquidity constrained consumers and risky financial assetholders who behave differently from other households. I estimated an endogenous switching model with the switch depending on two criterion functions to analyze the endogeneity process behind liquidity constraints and stocks and bond-ownership. My main argument was that if assetholders are prevented from investing in capital markets, then the consumption of the households that are in the market should be higher than those that are outside the market. An example of that is the case of households that are poor, which do not feel that the fixed costs of investment required to access capital markets are worth the potential payoff. The key issue is that increased participation in capital markets affects both households already in the market and asset prices, while the expectation of entering the market affects those that are not in the market. Furthermore, endogenous changes in capital stock have effects on all households.

I found that the value of financial assets had a significant impact on consumption in both countries, whilst high frequency studies find little relationship (a marginal propensity to consume out of financial assets of 0.04).

Results are not clear with respect to liquidity constraints. I found no evidence of excess sensitivity in the Euler equations. By analyzing the standard consumption function equation, however, I found some evidence of liquidity constraints in Italy and of habit formation in the United Kingdom.

The task of finding empirical differences in the impact of monetary policy on output and prices is difficult. It is clear that there are cross-country differences in the financial structure, as we have seen in the third section of the paper, but their direct translation to output and prices is not clear-cut due to different forces that can offset each other. In addition, using different models can bring different results for the same country as we saw in the case of liquidity constraints.

The financial structures are expected to converge in Europe and effects are expected to become more homogeneous. The convergence, however, can be slow and the asymmetry may have important consequences for the harmonized monetary policy of the European Central Bank.

Appendix: Data and Constructed Variables

A. Description of the Constructed Variables

Asset-based separable rule I use an asset-income ratio split based on Zeldes (1989): specifically, I categorize a household as liquidity constrained if the ratio of wealth to the average disposable income in t and $t-1$ is less than 2/12.

More direct measures of constraints Japelli, Pischke, and Souleles (1998) discuss some drawbacks of splitting the sample on the basis of wealth: 1) Since there is not a monotonic relationship between wealth and liquidity constraints, a household with zero or negative wealth has not necessarily reached the limit. 2) The fact that assets and income are poorly measured overstates the number of low-asset households. Therefore, they use direct indicators of credit constraints:

- Self-reported indicators of whether people were turned down for loans.
- Credit card ownership.
- Availability of a credit line

  Only the second measure is available for both datasets, therefore for comparability reasons I use only credit card ownership.

Real disposable income The disposable income variable is income after taxes deflated by the Department of Social Security monthly price index before housing costs for the BHPS data and the Consumer Price Index for the SHIW data.

Consumption The basic theory of consumption is applicable to the flow of consumption and so durable consumption is excluded from the definition used here. Durable consumption is not a service flow from the existing stock but replacements and additions to the asset stock.

The BHPS consumption measure does not include expenditures on shoes and clothing.

Asset values The value of the different types of wealth were reported in intervals in both datasets (BHPS and SHIW) and for the purposes of this paper, I use mid-points of the bands to estimate asset holdings.

In the BHPS the calculation of single estimates of household wealth in each subcategory of financial wealth is not straightforward since it is not always clear whether assets are

held solely by an individual or jointly with someone else (every individual is asked "Are your investments jointly held with someone else?"). I address this issue by using an upper bounding approach under the assumption that any jointly-held asset classes are actually held solely by the individual.[23]

Drawbacks also exist in using household survey data, such as measurement error, sample size and non-random non-response. In particular, BHPS data on net wealth is not fully comparable between 1995 and 2000 because debt in 2000 includes student loans and overdrafts whereas the 1995 survey did not include them. Moreover, the amount of investments seem to be overstated in 1995 (see Banks et al. (2002) for details).

B. Definition of Variables

BHPS Age: "Age at 1.12.XX".

Region: "Live in north?

1 if Inner London, Outer London, R. of South East, South West, East Anglia, East Midlands.

0 if West Midlands Conurb, R. of West Midlands, Greater Manchester, Merseyside, R. of North West, South Yorkshire, West Yorkshire, R. of Yorks & Humber, Tyne & Wear, R. of North, Wales and Scotland"

Ownhome: "Own home?

1 if Owned or on mortgage, Shared ownership

2 if Rented, Rent free, Other"

Own0mort: "Own home without mortgage?

1 if Owned outright

2 if Buying mortgage/loan, Inapplicable"

Own1mort: "Own home with mortgage?

1 if Buying mortgage/loan

2 if Owned outright, Inapplicable"

Sex: "Sex

[23] Banks et al. (2003) compute two measures, an upper and lower bound. The latter is computed under the assumption that an individual only owns 1/Nth of the asset class in which joint ownership is reported. They show that the results appear not to be sensitive to the choice of measure.

1 if Male

2 if Female"

Ms2: "Marital Status

1 if Married, Living as Couple

2 if Child under 16, Widowed, Divorced, Separated, Never married"

Fsize: "Number of persons in household"

Child: "Number of own children in household"

Adult: "Number of persons in employment in household"

Emplh: "Head employed?

1 if Self-employed, Employed

0 if Unemployed, Retired, Maternity Leave, Family Care, Full Time Student, Long Term Sick/disability, Government training scheme, Waiting the take up a job

Empls: "Spouse employed?

1 if Yes

0 if No"

Educ: "Highest academic qualification:

1 if None, CSE

2 if O Level

3 if HND, HNC, Teaching, A Level

4 if Higher Degree, 1st Degree"

Selfemp: "Self-employed?

1 if Self-Employed

2 if Employee

SHIW Age: "No. of years"

Region: "Live in south?

1 if South

2 if North, Central Regions

Ownhome: "Own home?

1 if Property

2 if Rented, With Right of redemption, usufruct, free use

Housloan: "Debts for real estate purchase-renovation?"

1 if yes

2 if no

Own0loan: "Own home without debt?"

1 if own home and no debts for real estate purchase-renovation

2 otherwise

Own1loan: "Own home with debt?"

1 if own home and debts for real estate purchase-renovation

2 otherwise

Sex: "Sex

1 if Male

2 if Female

Ms: "Marital Status:

1 if Married, Cohabitant

2 if Single, Separated, Divorced, Widow

Fsize: "Number of household members"

Child: "Number of children"

Adult: "Number of income receivers"

Emplh: "Head employed?"

1 if Blue Collar, Apprentice, White Collar (low level), Teacher, White Collar (high level), Manager, Head Master, Magistrate, University Teacher, Professional Man, Entrepreneur, Self Employed, Owner, Assistant of a Family Firm, Partner in a company

2 if seeking first occupation, unemployed, housewife, independently wealthy, retired from work, retired not from work, student, pre-school age child, serving in the army, other not professional conditions, other.

Empls: "Spouse employed?

1 if Blue Collar, Apprentice, White Collar (low level), Teacher, White Collar (high level), Manager, Head Master, Magistrate, University Teacher, Professional Man, Entrepreneur, Self Employed, Owner, Assistant of a Family Firm, Partner in a company.

2 if Seeking first occupation, unemployed, housewife, independently wealthy, retired from work, retired not from work, student, pre-school age child, serving in the army, other not professional conditions, other.

Educ: "Education:

1 if No Schooling

2 if Elementary School (5 years)

3 if Junior High (8 years), High School Diploma (13 years)

4 if B.A./B.S. (17 years), Specialization

Self: "Self-employed?"

1 if self employed

2 otherwise

C. Comparison of Data Between the SHIW and the BHPS

1995,2000	SHIW	BHPS
Variable	Mean	Mean
Age, years	54.60	50.95
Family Size	2.9	2.4
Male, fraction	0.70	0.66
Married, fraction	0.71	0.53
1st degree, fraction	0.08	0.43
A levels, fraction	0.31	0.22

SHIW(1991-2000)	BHPS (1995/2000)
1.Real estate value, firm's assets, valuables	1.Value of property, value of second property, value of car less amount outstanding
2.Bank current account, personal savings, certificates of deposit	2.Regular savings in banks, building societies and Post Office, non-regular savings (including TESSAs and ISAs)
3.Postal accounts and deposits, postal interest bearing bonds	3. Not available
4. Treasury bills, treasury certificates, long term treasury bonds	4. National Savings Certificates
5. Zero coupon bonds, other government bonds, non government bonds, foreign government bonds	5. Premium bonds; National Saving, Building Society, Insurance Bonds
6. Investment funds shares, stocks of listed companies, stocks of privatized companies, stocks of unlisted companies, shareholding (limited companies and partnership), foreign stocks	6. Unit Trusts, Personal Equity Plan, Shares (UK or Foreign), other investment, government or corporate securities
7. Debts for real estate purchase/renoval; valuable goods purchase; transport purchase; furniture, electric appliance purchase; nondurable goods purchase or other reasons	7. Total mortgage on all property; Debts for hire purchase, personal loan, credit card, mail order purchase, DSS Social Fund Loan, loan from individual overdraft, student loan, joint commitment or something else
Net Worth=1+2+3+4+5+6-7	Net Worth=1+2+4+5+6-7

SHIW (1989-2000)	BHPS (1991-2000)
1. Transportation expenditure	
2. Furnishing, electric appliance expenditure	2. Amount spent on consumer durables (TV, VCR, deep freeze, washer, tumble drier, dish washer, microwave, computer, CD player, satellite, cable TV, telephone), home improvements
3. Non durable consumption	3. Food and grocery bill, expenditure on gas/oil/electric, childcare, mortgage or rent costs
Durable Consumption: 1+2	Durable Consumption: 2
Non-durable Consumption: 3	Non-durable Consumption: 3
Consumption: 1+2+3	Consumption: 2+3

D. Correction Terms for Each Sample Selection Regime

Following Tunali (1986), the correction terms for each sample selection regime are as follows:

For $PC\left(1\right)=\left\{\,it\mid L_{it}^{*}\geq 0\ ,\ R_{it}^{*}\geq 0\right\}$:

$$W_{it}^{L}=\frac{\phi\left(z_{it}^{L}\gamma^{L}\right)\Phi\left(\frac{z_{it}^{R}\gamma^{R}-\rho z_{it}^{L}\gamma^{L}}{\left(1-\rho^{2}\right)^{1/2}}\right)}{\Phi_{2}\left(z_{it}^{L}\gamma^{L},z_{it}^{R}\gamma^{R},\rho\right)}$$

$$M_{it}^{R}=\frac{\phi\left(z_{it}^{R}\gamma^{R}\right)\Phi\left(\frac{z_{it}^{L}\gamma^{L}-\rho z_{it}^{R}\gamma^{R}}{\left(1-\rho^{2}\right)^{1/2}}\right)}{\Phi_{2}\left(z_{it}^{L}\gamma^{L},z_{it}^{R}\gamma^{R},\rho\right)}$$

For $PC\left(2\right)=\left\{\,it\mid L_{it}^{*}<0\ ,\ R_{it}^{*}\geq 0\right\}$:

$$M_{it}^{L}=-\frac{\phi\left(z_{it}^{L}\gamma^{L}\right)\Phi\left(\frac{z_{it}^{R}\gamma^{R}-\rho z_{it}^{L}\gamma^{L}}{\left(1-\rho^{2}\right)^{1/2}}\right)}{\Phi_{2}\left(-z_{it}^{L}\gamma^{L},z_{it}^{R}\gamma^{R},-\rho\right)}$$

$$M_{it}^{R}=\frac{\phi\left(z_{it}^{R}\gamma^{R}\right)\Phi\left(-\frac{z_{it}^{L}\gamma^{L}-\rho z_{it}^{R}\gamma^{R}}{\left(1-\rho^{2}\right)^{1/2}}\right)}{\Phi_{2}\left(-z_{it}^{L}\gamma^{L},z_{it}^{R}\gamma^{R},-\rho\right)}$$

For $PC\left(3\right)=\left\{\,it\mid L_{it}^{*}\geq 0\ ,\ R_{it}^{*}<0\right\}$:

$$M_{it}^{L}=\frac{\phi\left(z_{it}^{L}\gamma^{L}\right)\Phi\left(-\frac{z_{it}^{R}\gamma^{R}-\rho z_{it}^{L}\gamma^{L}}{\left(1-\rho^{2}\right)^{1/2}}\right)}{\Phi_{2}\left(z_{it}^{L}\gamma^{L},-z_{it}^{R}\gamma^{R},-\rho\right)}$$

$$M_{it}^{R}=-\frac{\phi\left(z_{it}^{R}\gamma^{R}\right)\Phi\left(\frac{z_{it}^{L}\gamma^{L}-\rho z_{it}^{R}\gamma^{R}}{\left(1-\rho^{2}\right)^{1/2}}\right)}{\Phi_{2}\left(z_{it}^{L}\gamma^{L},-z_{it}^{R}\gamma^{R},-\rho\right)}$$

For $PC\left(4\right)=\left\{\,it\mid L_{it}^{*}<0\ ,\ R_{it}^{*}<0\right\}$:

$$M_{it}^{L}=-\frac{\phi\left(z_{it}^{L}\gamma^{L}\right)\Phi\left(-\frac{z_{it}^{R}\gamma^{R}-\rho z_{it}^{L}\gamma^{L}}{\left(1-\rho^{2}\right)^{1/2}}\right)}{\Phi_{2}\left(-z_{it}^{L}\gamma^{L},-z_{it}^{R}\gamma^{R},\rho\right)}$$

$$M_{it}^{R}=-\frac{\phi\left(z_{it}^{R}\gamma^{R}\right)\Phi\left(-\frac{z_{it}^{L}\gamma^{L}-\rho z_{it}^{R}\gamma^{R}}{\left(1-\rho^{2}\right)^{1/2}}\right)}{\Phi_{2}\left(-z_{it}^{L}\gamma^{L},-z_{it}^{R}\gamma^{R},\rho\right)}$$

	Italy				UK			
	Dependent variable:							
	Credit Card		Risky Assets		Credit Card		Risky Assets	
Variables	Coeff.	T-Stat.	Coeff.	T-Stat.	Coeff.	T-Stat.	Coeff.	T-Stat.
Constant	0.453	3.24	-5.334	-21.97	2.665	18.57	-3.685	-22.07
Age	-0.014	-3.02	0.030	4.49	-0.053	-9.65	0.051	8.21
Age^2	0.000	2.58	-0.000	-4.35	0.000	9.53	-0.000	-7.28
Region	0.502	22.38	0.665	-18.57	0.031	3.25	-0.027	-2.41
Own1mort	-0.056	-1.52	-0.302	-5.20	-0.643	-16.05	0.867	18.57
Own0mort	-0.116	-5.01	-0.289	-5.71	-0.750	-16.99	0.777	16.01
Sex	-0.051	-1.76	0.150	3.95	0.024	0.62	0.145	3.49
MS	-0.058	-1.79	0.081	1.85	-0.221	-5.30	0.047	1.05
Fsize	0.028	1.37	-0.096	-5.87	0.039	1.75	-0.075	-4.48
Child	0.004	0.16	-	-	0.077	2.89	-	-
Adult	-	-	0.104	4.91	-	-	-0.047	-1.42
Emplh	-0.090	-3.17	-	-	-0.511	-12.68	-	-
Empls	-0.100	-3.93	0.076	2.15	-0.085	-2.15	0.012	0.25
Educ	-0.074	-4.49	0.463	18.41	-0.356	-21.61	0.272	16.62
Wage	-	-	0.013	3.17	-	-	0.035	5.11
Selfemp	-	-	0.003	0.06	-	-	0.050	-0.95
FWealth	-	-	0.199	9.80	-	-	0.084	20.27
Year Effect	-0.150	-7.60	0.374	14.23	-0.165	-6.72	0.151	5.13
$\rho_{u_{it}^L, u_{it}^R}$	-0.171 (-10.26)				-0.272(-12.72)			
Log likelihood	-16267.563				-10176.477			
No. Obs	16136				10183			

Notes: t-statistics calculated with robust standard errors clustered by household and corrected for heteroskedasticity. Sample: 1995, 2000.

$\rho_{u_{it}^L, u_{it}^R}$ controls for common determinants of liquidity constrains and asset holding equations, not fully captured by the explanatory variables.

Table 9: Selection Equations. Credit Card Split

Dependent Variable: $C^q_{it1} = ln(C_{it})$						
Select. (K):	Credit Card, Risky Assets					
Regime (q):	UR		CNR		UNR	
Country:	Italy	UK	Italy	UK	Italy	UK
α	11.786***	7.495***	11.501***	6.290***	10.836***	7.640***
	(0.29)	(0.40)	(0.07)	(0.20)	(0.08)	(0.29)
Age_{it}	0.012***	-0.021***	0.003***	-0.006**	0.007***	-0.010***
	(0.002)	(0.004)	(0.001)	(0.003)	(0.001)	(0.003)
$Fsize_{it}$	0.150***	0.168***	0.161***	0.197***	0.161***	0.103***
	(0.02)	(0.03)	(0.007)	(0.02)	(0.009)	(0.02)
$Child_{it}$	-0.027	-0.034	-0.042***	-0.117***	-0.066***	0.021
	(0.02)	(0.04)	(0.008)	(0.03)	(0.01)	(0.03)
Y_{it}	0.0005	0.024**	0.004***	0.063***	0.012***	0.054***
	(0.002)	(0.01)	(0.001)	(0.01)	(0.001)	(0.01)
Yp_{it}	0.033***	0.041*	0.009**	0.019	0.039***	0.046***
	(0.01)	(0.02)	(0.004)	(0.01)	(0.005)	(0.017)
W_{it}	0.036***	0.037***	-	-	-	-
	(0.01)	(0.007)	-	-	-	-
T_{it}	-0.161***	-0.315***	-0.170***	-0.244***	-0.138***	-0.268***
	(0.02)	(0.05)	(0.01)	(0.04)	(0.01)	(0.04)
M^L_{it}	0.214*	0.862***	0.061	0.562***	-0.089**	0.569***
	(0.11)	(0.19)	(0.04)	(0.08)	(0.04)	(0.10)
M^R_{it}	-0.448***	0.398***	-1.096***	0.407***	-1.196***	0.230**
	(0.06)	(0.10)	(0.03)	(0.13)	(0.04)	(0.09)

Notes: U=unconstrained, C=constrained; R=assetholder, NR=non-R.

Standard errors clustered by household in parenthesis.

Standards errors obtained by bootstrapping (1000 replications) to adjustfor the presence of W^K_{it} .

*, **, and *** denote significance at 10, 5 and 1 percent level respectively.

Table 10: Consumption Function Equation. Credit Card Split

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