The Borrowing Behaviour of Households: Evidence from the Cyprus Family Expenditure Surveys†

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Abstract

This study investigates how various factors affect households demand for borrowing in Cyprus using data from the Family Expenditure Surveys for the years 2002/03 and 2008/09. The descriptive statistics show that middle income households with a younger age head have relatively high gross debt-to-income ratios; whereas upper income households with an older age head tend to have relatively high gross deposits-to-income ratios. The econometric analysis uses smooth (over the life cycle) income to investigate the extent to which household borrowing at a given point in time conforms to long term expectations about future income. The results conform to theoretical expectation insofar as demand for loans is determined by smooth, not current, income. This can be interpreted as an indication that the borrowing behavior of households in Cyprus is rational. Nevertheless, the results in the paper need to be confirmed by further analysis to also account for the dynamics of the borrowing-saving behavior of households. This will be possible when the Household Finance and Consumption Survey is available in Cyprus, hopefully in the near future.

Keywords: Household debt, household savings, smooth income, Cyprus family expenditure surveys.

1. Introduction

During the past two decades the level of household borrowing has grown considerably in many countries, both in absolute terms and relative to household income, reaching record levels. Naturally, such a sharp increase has attracted enormous attention because of its significant macroeconomic and financial implications. This major change in the financial industry was

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due to several factors that affect both the demand and supply of household lending (Pearce, 1985).

The life-cycle theory of consumption postulates that households try to maintain a fairly smooth pattern of consumption over their lifetimes. According to the theory, households base their life-time expenditure on the expected flow of income over their lifetimes rather than just their current income (Campbell and Mankiw, 1990; Attanasio and Browning, 1995; DeJuan and Seater, 1999). Credit markets can help households in achieving their consumption objectives in several ways. If, for example, a household expecting higher income in the future wants to consume more than its current income allows, it can do so by borrowing. In addition, households often prefer to buy durable goods (such as houses, cars, household appliances) that provide a flow of services over several years rather than rent these services. Access to credit markets (banks, cooperatives, etc.) allows households to acquire such assets and to start receiving the flow of services without having to reduce life-time expenditure initially to save for an outright purchase.

Additionally, according to the life-cycle model, the borrowing behaviour of households is affected by demographic characteristics such as age. Younger households should have more debt relative to their assets and income. This is because they expect their incomes to rise and are typically willing to borrow in order to consume some of their future income. In addition, they are more likely to have to borrow to acquire houses and consumer durables. Thus, the life-cycle model predicts that demographic characteristics are an important determinant of aggregate household borrowing.

Apart from the incentives to borrow that the life-cycle theory suggests, there are other factors that can affect household borrowing such as changes in the cost of credit. While the nominal interest rate is often identified as the cost of credit, households are more likely to take into account expected inflation and the tax deductibility of nominal interest payments. In addition, changes in business conditions can also affect household borrowing. Uncertainty about future incomes tends to make consumers unwilling to take on long-term financial commitments. They prefer to postpone purchases of houses and consumer durables until they are more confident. On the other hand, borrowing for houses and consumer durables is likely to rise during business expansions when employment and income prospects are high.

The decisions of households to borrow not only affect their own welfare but are equally important for overall consumption, asset demand and financial stability. In recent years households have been encouraged by the

financial sector to take out mortgages and consumer loans. Problems start to become serious when households borrow amounts that are disproportional to their resources. Especially in situations where there are adverse macroeconomic conditions, where unemployment rates rise and houses depreciate in value, it is likely that households will be unable to pay their loans. Meanwhile, the market loses confidence in assets that have been used to secure loans, resulting in further deterioration of the general economic situation. Therefore understanding the conditions that shape the borrowing behaviour of households is very important for policy making (Williams Ross, 2009).

Furthermore, borrowing and saving are identical concepts in the sense that they are actions of individuals and households that are designed to maximise utility through life-time expenditure. Savings represents a decision to postpone consumption. The main question arising is why people choose to save their incomes. The first, and probably most important reason, is precautionary saving (Kazarosian, 1997; Dardanoni, 1991). People might want to save during their lifetime because of a fear of being made unemployed.[1] Thus, savings allow people to smooth their life-time expenditure even though their incomes are fluctuating. The second reason could be people's incentive to build up potential life-time expenditure power. So, saving more today is a choice to defer current life-time expenditure in order to finance other future life-time expenditure commitments, such as saving for the deposit on a house loan, or a car. In addition, people may save in order to build up assets in occupational pension schemes, because of fears that the relative value of the state retirement pension will fall in the years to follow. The third important reason could be the desire of many people to pass bequests of wealth to future generations.

Briefly, various savings incentives exist during the life cycle of a household, and different incentives may be associated with different forms of savings. Understanding the incentives that lead to savings behaviour in various life-cycle stages helps the understanding of some differences in the size of savings; and the past and future trends in savings behaviour of households. This is important because it can affect public policies (for example the reform of social security systems), which directly affect the savings of households.

The aim of this paper is to examine the borrowing behaviour of households in Cyprus and to consider how a variety of factors affect the demand for borrowing (e.g., smooth income, the age of head, the number

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[1] This is more frequent for people working in the private sector.

of children in the household, and the employment sector of the head). Its findings can be of policy interest, as they show the extent of household participation in various loans, and the indebtedness of various demographic groups. Finally, the research in this paper can be applied in different countries for comparison purposes and/or to examine issues related to the borrowing behaviour of households.

The empirical analysis is based on the estimation of a Heckman-type model and is applied to data drawn from the Cyprus Family Expenditure Surveys (CyFES) for the years 2002/03 and 2008/09. The CyFES include information about income (amount and source), expenditure on a detailed commodity breakdown for both durable and non-durable goods and various loans and deposits. They also include a large number of demographic and other personal characteristics of individuals and households, including many that can affect borrowing behaviour, such as family size, number of children, age of head, the financial position of the head, etc. However, information on loans is only provided for the specific year of the survey and not for previous years. Nevertheless, the CyEFS is the only publicly available database that can be used to examine the factors affecting the borrowing behaviour of households in Cyprus.

The structure of the paper is the following: section 2 describes the data, section 3 focuses on the current income and expenditure of households over their lifetime, sections 4 and 5 present a descriptive analysis for loans and savings, section 6 provides the empirical analysis and finally section 7 concludes the paper.

2. Description of Data

For the purposes of this study we used households as the unit of analysis because people do not only benefit from their income but also from the income of other people who make up the household. So, current household income is defined as the sum of all the incomes of the individuals that compose the household. It includes all available sources of income such as employment, non-salary, property and other income, but also unemployment benefits, pensions and other benefits.[2] In addition, it includes all types of household loans such as housing,[3] transport and personal loans. However, as said earlier, information on loans is provided

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[2] The current income measure is constructed according to the definition of current income of the Statistical Services of Cyprus.

[3] One category was created named "housing", which includes loans for house purchase, repairs, and household equipment purchases, due to limited availability of observations in each category.

only for the specific year of the CyFES and not as a stock accumulated over all previous years. The same is true for the case of loan repayments where we can only observe their amounts for the specific year of the survey with no information on repayments already made, duration, interest rates, or balance remaining. Thus, 40.17% and 43.27% of households appeared to take up loans in 2003 and 2009, while the loan repayments were 56.31% and 46.82% for the two years.

The sample used in the empirical analysis excludes households with the following characteristics: self-employed head[4], unknown employment sector and loan repayments or loans for education purposes.[5]

Table 1 presents the different components of current income and life-time expenditure of households. Current income, as defined below, is net of any contributions and taxes. Loans represent about 10% of total current income for both CyFES years; while salaries from employment represent 62.56% and 56.50% of income (excluding loans) for the two years respectively. In the category of expenditure we included households' consumption (82-84%),[6] contributions (3-4%), deposits (6-9%), insurance and investment (about 1.5%), and loan interest payments (about 3.5%). The latter were not available in the datasets, so for different types of loans we calculated the amount of payments using various interest rates[7] according to different scenarios.

Table 2 shows the average value of current income and expenditure for the two CyFES years. These values are very close across one's life cycle in both years, while expenditure is higher when loans are excluded from current income.

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[4]The self-employed are assumed to under-report their incomes, while employees are assumed to report their incomes correctly (see Pissarides and Weber (1989). The self-employed are about 12% (8.5%) of the sample of 2003 (2009).

[5] It is known that students in Cyprus rely on their parents to take out student loans in order to finance their education. Thus, we excluded all households in this category.

[6] This range reflects the two different years. The same is true for contributions, deposits, insurance and investments and loan repayments.

[7] The interest rates used for the calculation of loan payments (both for 2003 and 2009) were available from the Central Bank of Cyprus. Specifically, we used four different interest rates for the different categories of loan repayments, i.e., 6.39% and 5.85% for housing, 7% and 8% for transport, 7.45% and 8.28% for personal and 10.5% and 12% for credit cards, for the two years examined.

TABLE 1

The components of current income and expenditure

Current Income	%	Expenditure	%
Salary employment	56-63%	Consumption: durable and	82-84%
Income from non-salary		non-durable goods	
Property income		Contributions	3-4%
Unemployment benefit		Deposits	6-9%
Other benefits	27-34%	Insurance and investments	3-4%
Other income		Loan interest repayments	3.50%
Pensions			
Loans	10%		
Contributions (-)			
Tax (-)			

Source: CyFES data for 2002/03 and 2008/09.

TABLE 2

Averages (thousands euros)

	2003[1]	2009
Current income	41.50	45.19
Current income (net from loans)	35.24	39.10
Expenditure	40.18	46.18

Note: [1]All values are expressed in 2009 prices.

3. Household Current Income vs. Household Expenditure

The willingness of people to undertake major spending commitments depends on how confident they are about their own financial circumstances, and the general state of the economy. So, possible factors affecting consumer confidence are: expectations of future income and employment, the current level of interest rates and expectations of future interest rate movements, possible trends in unemployment and anticipated changes in government taxation.

During their lives individuals are thought to be seeking to maintain a constant level of consumption that depends on their needs. So, they usually borrow when they have high needs and/or low incomes and save when they have low needs and/or high incomes. Thus, low unemployment, expectations of rising real incomes, low interest rates and

the falling prices of consumer durables are some possible factors that induce consumers to borrow.

On average, income should equal consumption and bequests over a lifetime. This relationship is shown in Figures 1 and 2, which present households' current income and expenditure across the household life cycle for 2003 and 2009 respectively. As expected, both current income and expenditure are increasing up to the age group of 50-59, followed by a significant decline for older households. Figure A1 and A2 in appendix show that when equivalised to take account of the familys size and composition, expenditure is more smooth over the life-cycle.[8]

4. Household Debt

In recent years, credit expanded briskly owing to the lax monetary conditions which prevailed in many countries and the process of financial liberalisation which took place in others. Adoption of the euro, also, led to a decrease in the risk premia and the spreads which, in turn, led to a significant weakening of financial conditions in several previously-high-inflation countries in the EU. The extent of household indebtedness has attracted the attention of policy makers, especially after the financial crisis in 2008-2010. In this section we first investigate the gross debt-to-income ratio of households across European countries using data from Eurostat, and second, we explore this ratio in the case of Cyprus using the CyEFS data of 2002/02 and 2008/09.

Figure 3 presents the gross debt-to-income ratio of households across European countries for 2003 and 2009.[9] The ratio of debt to income is an often-used measure of the debt burden on households. These statistics show Denmark and the Netherlands to have the highest ratios, followed by Switzerland and the UK for 2003. Countries such as Belgium, Czech Republic, Estonia, France, Italy, Latvia, Lithuania, Hungary, Austria, Poland, Slovenia, Slovakia and Finland have lower rates than the average of the Eurozone. However, most countries' rates have doubled in 2009. In the case of Cyprus, this ratio is shown to have reached a moderate-to-high

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[8] The equivalised life-time expenditure is defined as life-time expenditure divided by the equivalised household size. The latter is EHS=1+ 0.5 * (HM_{14+} -1) + 0.3 * HM_{13-}, where HM_{14+} is the number of household members aged 14 and over and HM_{13-} is the number of household members aged 13 or less.

[9] There were no available data for Bulgaria, Greece, Luxembourg, Malta, Romania and Iceland.

level in 2003, while data is not available for 2009.[10] Based on the growth of credit during this period it is most likely that this has increased even more and still remains at a moderate-to-high level. Figure 4 presents the annual growth rates of different type of loans in Cyprus for the years 2007-2009. Housing loans have the highest rates, while consumption and other loans have about the same growth rates during these three years.

FIGURE 1

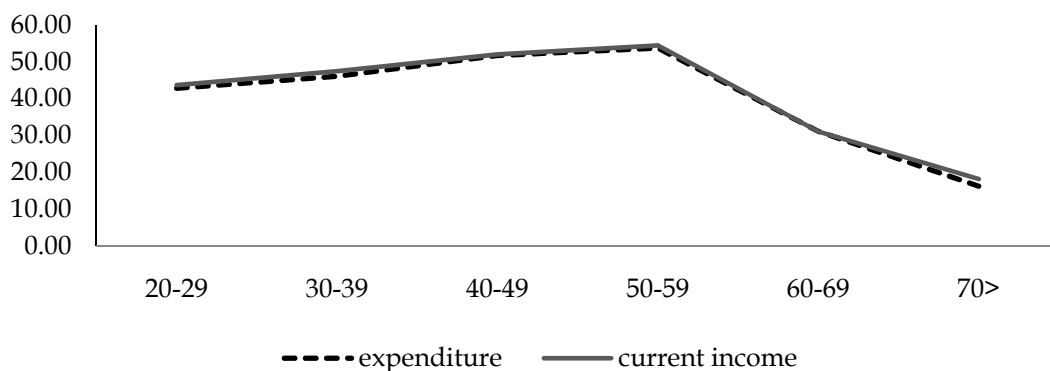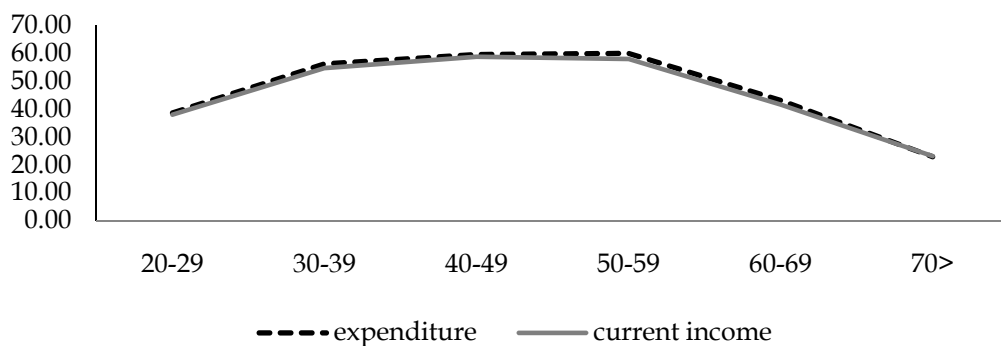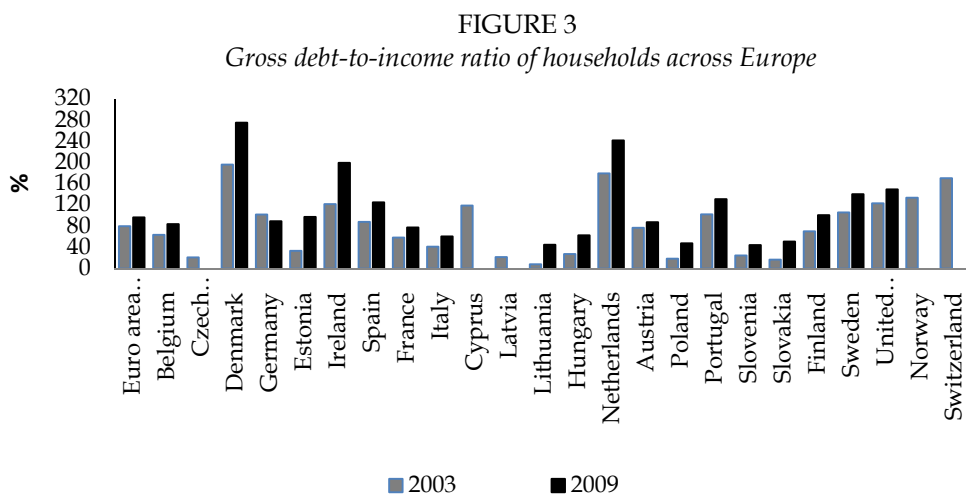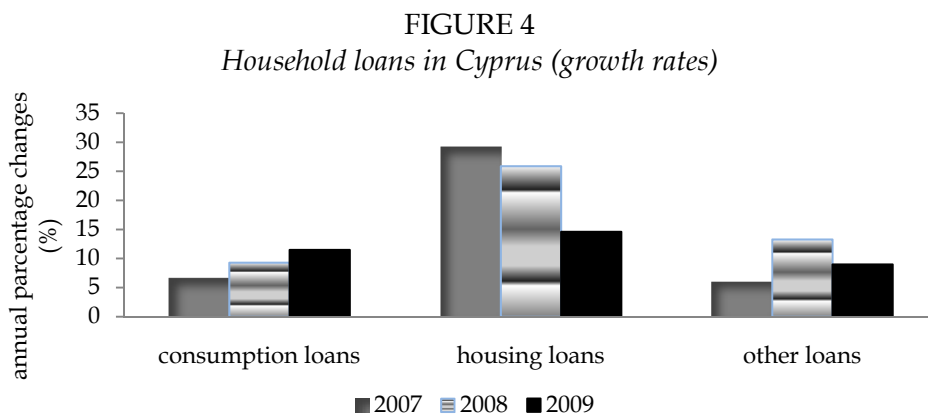*Current income and expenditutre, by head age group (2003)*

FIGURE 2

Current income and expenditure, by head age group (2009)

FIGURE 3

Gross debt-to-income ratio of households across Europe

Source: Eurostat

FIGURE 4

Household loans in Cyprus (growth rates)

Source: Central Bank of Cyprus

Going back to our dataset, as described in the previous section, around 40%-43% of Cyprus households have at least one type of loan in 2003 and 2009. The most popular loan type in Cyprus appears to be a transport loan (21.83% in 2003 and 23.30% in 2009 borrow to buy a vehicle), followed by housing in 2009 (11.76% in comparison to 8.73% in 2003) and other loans in 2003 (11.02% in comparison to 5.60% in 2009). There are differences not only in participation rates among the main categories of loans, but also in the extent of participation among different age groups.

Table 3 shows the debt-to-income ratio of Cyprus households in 2003 and 2009 among different age groups. Households whose head is under 30

years exhibit the highest rate, while this rate gradually drops as age increases. However, in 2009, the ratio appears to be 10% lower in households under 30 compared to 2003. Young people are the individuals most likely to borrow and least likely to have accumulated enough assets.

TABLE 3

Gross debt-to-income ratio, by head age group

	20-29	30-39	40-49	50-59	60-69	70>
2003	35.01	21.54	16.13	18.47	11.71	8.68
2009	25.30	23.08	18.87	15.80	16.46	7.27

Tables 4 and 5 report the debt-to-income ratios for different age groups and loan categories, namely housing, transport and other. There is a long tradition in Cyprus of owning rather than renting consumer durables, items that provide a flow of services to a consumer over a period of time. Examples include houses, cars, household appliances, audio-visual equipment, furniture, etc. Primary residence and private motoring, being widespread in Cyprus, have led to the majority of households to borrow mostly for the purchase of a house or a car. . However, the need for young persons to apply to banks in order to finance such purchases may well be curtailed by these goods often being acquired as parental gifts (monetary or in kind).

TABLE 4

Gross debt-to-income ratio for different type of loans, by head age group (2003)

	20-29	30-39	40-49	50-59	60-69	70>
Type of Loan						
Housing	7.61	6.52	3.99	3.48	0.35	0.41
Transport	6.79	3.59	3.98	3.57	1.15	0.37
Other	2.11	3.14	1.77	1.81	0.54	0.07

In both years, the youngest age group has the highest debt-to-income ratio for housing (the ratio in 2009 is doubled compared to 2003). However, despite the widespread home ownership in Cyprus, this ratio appears to be quite low, suggesting that households with young heads tend to live in homes provided by their parents. Households with head in the age group (30-39) have the highest rate for transport in 2009, while for 2003 the highest rate appears in households with head in the younger age group (20-29). As expected, debt-to-income ratios for other loans are low during

the life cycle, especially in 2009. In all loan categories, the debt-to-income ratio for households with head older than 60 is low. This is probably due to the more limited consumption needs and investment plans among households in this age group. The limited number of people older than 60, who do not need to borrow, may also pose some difficulty in securing a loan at such an advanced stage in their life cycle.

TABLE 5

Gross debt-to-income ratio for different type of loans, by head age group (2009)

	20-29	30-39	40-49	50-59	60-69	70>
Type of Loan						
Housing	14.96	7.55	7.43	2.94	1.82	0.76
Transport	4.75	6.89	5.00	3.78	1.84	0.44
Other	0.46	0.93	0.56	0.92	1.03	0.11

Table 6, shows how debt-to-income ratio differs across income groups. Interestingly, this table shows that households in middle income percentiles (25-75%) appear to have the highest ratios, while higher income households (75-100% percentile) have lower ratios. On the other hand, households in lower income percentiles (0-25%) have the lowest ratios. Tables A1 and A2 in the appendix, also, show how debt-to-income ratio differs across income groups and types of loans.

TABLE 6

Gross debt-to-income ratio,by income group percentiles

	0-25%	25-50%	50-75%	75-100%
2003	12.32	16.99	20.34	15.93
2009	12.05	22.03	15.48	14.39

Finally, it is interesting to explore how some other household characteristics affect demand for loans. Figure 5 shows the average level of loans for households with female and male heads for the two years examined. In both years males seem to borrow higher amounts than females, with the amounts remaining about the same for the two years. Figure 6 shows the level of loans for household heads employed in the private and public sectors. In 2003 loans appear to be a somewhat higher for households with private-sector-employee heads, whereas in 2009 the data shows exactly the opposite trend. Figure 7 presents the average level of household loans for different education levels of head. On average, for

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both years the amount of loans is much higher for households with heads that have completed secondary and higher education relative to those with heads who have attained only primary education.

FIGURE 5
*Average loans by sex
(thousands euros)*

FIGURE 6
*Average loans by employment
sector
(thousands euros)*

■ female ■ male

■ private sector ■ public sector
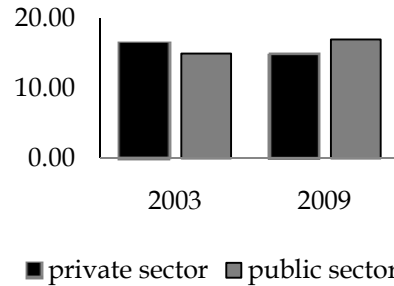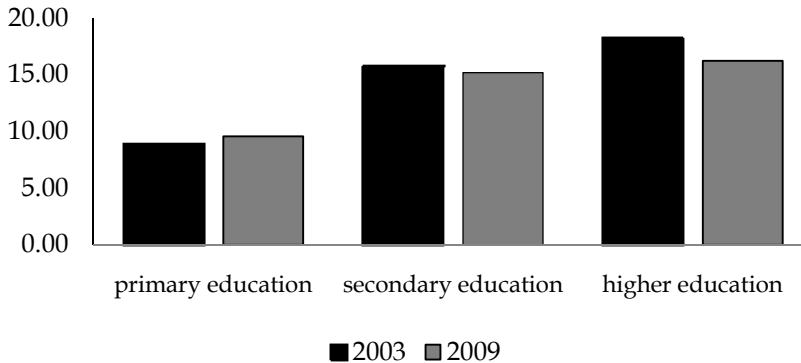
FIGURE 7
*Average loans by education level
(thousands euros)*

■ 2003 ■ 2009

5. Household Savings

Savings represent a decision to postpone consumption and are also often refer to part of one's assets, usually deposits in savings accounts. When faced with a high level of income uncertainty households tend to save more and accumulate more wealth in order to smooth their life cycle

consumption (Lusardi, 1997).[11] So they can lower their income risk by increasing their savings during 'good' times and use these savings to increase their consumption in the future. However, not all households engage in such saving behaviour.

The empirical research based on quantifying the importance of the precautionary motive for saving has either focused on equations of wealth, saving or consumption. However, the results of this research have been highly inconclusive, with some papers finding a strong precautionary saving motive and some others finding almost no evidence of it (see Browning and Lusardi, 1996). Furthermore, Devaney et al (2007) propose that savings motives are organised in a hierarchy, and that individuals move up the hierarchy as lower-level motives are satisfied. The savings motives in the hierarchy are (lower to higher) basic needs, safety, security, love/societal and luxuries.

The CyFES includes information on households' deposits in the specific year of the survey. Particularly, 41.97% and 51% of households appear to have positive deposits in both years examined. Table 9 shows the deposits-to-income ratio for households with head in different age group for the years 2003 and 2009. This ratio peaks in the 60-69 age groups, followed by the 50-59 age groups, while it declines among households with head in the younger age-groups in both years. Younger people are often net borrowers[12] because they need to fund durable good purchases. As people get older, their income tends to rise and their spending commitments decline leading to an increase in net saving. Finally, on average, the ratio is higher by almost 3 percentage points in 2009 compare to 2003. In 2009, we observe lower rates among households with head in the 20-29 and 30-39 age groups compare to 2003, while these rates appear to be higher for households with head in all other age groups.

TABLE 9

Gross deposits-to-income ratio, by head age group

	20-29	30-39	40-49	50-59	60-69	70>	Total Average
2003	7.99	7.20	6.10	10.08	11.10	7.73	8.23
2009	6.12	6.01	7.32	14.51	15.40	12.36	11.11

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[11] Using savings as a buffer against income shocks is the main hypothesis of precautionary savings.

[12] On average 53.87% and 47.16% are net borrowers from the two years samples, while 69.38% and 64% are the rates for the two years of our youngest age group (20-29). For age group (50-59) the rates are 56, 60% and 59, 45% in 2003 and 2009 respectively.

In addition, Table 10 reports the deposits-to-income ratio for different income groups in 2003 and 2009. As expected, this ratio is much high among households in the top income percentile compared to the households in bottom percentiles. The ratios for the middle income households are about the same in the two years.

TABLE 10

Gross deposits-to-income ratio,by income group percentiles

	0-25%	25-50%	50-75%	75-100%
2003	5.06	7.25	8.09	12.52
2009	7.76	10.95	9.24	16.51

Finally, it is interesting to explore how some other household characteristics relate to the level of deposits. Figure 8 shows the average amount of household deposits for female and male heads for the two years examined. In both years males seem to have higher deposits than females. Figure 9 shows the level of loans for household heads employed in the private or public sectors. In both sectors deposits are higher in 2009 compared to 2003, while deposits in the private sector appear to be a little higher than in the public sector. Figure 10 presents the average level of deposits for household heads with different education levels. On average, the amount of deposits is much higher in 2009 compared to 2003, while they appear to have almost the same level for households headed by persons with secondary and tertiary education in 2009.
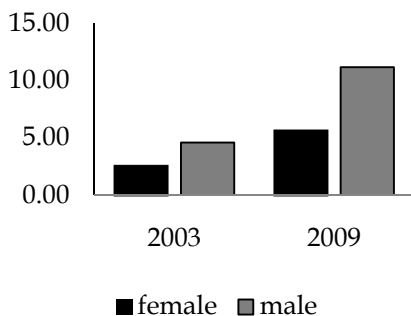
FIGURE 8
Average deposits by sex
(thousands euros)

FIGURE 9
Average deposits by employment sector
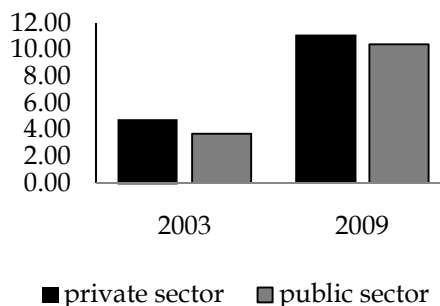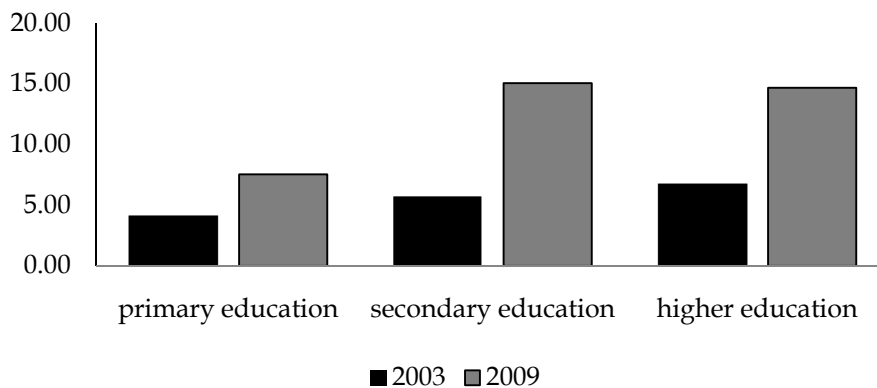*(thousands euros)*

FIGURE 10
Average deposits by education level
(thousands euros)

6. Econometric analysis: Demand for Loans

In general, the descriptive analysis of the previous sections reveal some borrowing patterns among households with different characteristics. The econometric analysis in this section attempts to provide an in-depth understanding of the various interrelationships.

6.1 Estimation of Smooth Income

As already mentioned, according to the life-cycle theory of consumption, the choices made by consumers regarding their consumption patterns are determined not by their current but by longer-term income expectations. The key conclusion of this theory is that transitory, short-term changes in income have little effect on consumer spending behaviour. Hence, individuals and households try to maintain a constant consumption throughout their lifetime through their saving-borrowing behaviour. So, for example, households tend to purchase durable goods (such as houses, cars, household appliances) early on in their lives through borrowing, if they anticipate that their income will increase in the future, thus enabling them to repay these loans. Thus, as Friedman's 'Permanent Income Hypothesis, consumption is linked to the permanent/smooth income of agents rather than to current income. This theory assumes perfect capital markets in the sense that agents are able to finance consumption with borrowing. Nevertheless, it should be noted that empirical evidence suggests that this condition does not hold in practice in many countries, or among different types of households, since important credit constraints prevent individuals from borrowing.

The main aim of the analysis here is to examine how various factors affect household demand for borrowing. As already described, smooth income is one of the most important factors, thus its calculation is necessary for the examination of the borrowing behaviour of households. Estimation of smooth income can be undertaken through a regression of personal income on all individual and household characteristics. However, given income underreporting, as documented in Pissarides and Weber (1989), total consumption may be a better measure of personal income rather than income itself (see also Deaton, 1992).

For the purpose of our study, the predicted or smooth income is obtained after conditioning consumption on all individual and household characteristics, e.g. head's age, education and sex, the number of children, and current income.[13] Results from two regressions based on data for 2003 and 2009 yield a positive relationship between total consumption and current income and reveal the significance of many individual characteristics in explaining consumption.[14] The results show that when total income increases by 10%, the total consumption of the household increases by 6.2% and 4.7% in 2003 and 2009, respectively. Other characteristics that seem to be relevant in explaining consumption are, among others, head age, number of children, number of adults, head education, many durable goods such as cars, second house etc.

6.2 Explaining the level of Loans

Having obtained an estimate of smooth income, this section focuses on what explains the level of household loans. The key problem arising in the estimation is that in regressing the level of the loans on characteristics for those who have loans does not explain the borrowing behaviour of the population as a whole. Those who have taken up loans in the year of the survey will tend to have higher loans than those who have not. Hence the results will tend to be biased (sample selection bias).

Table 11 presents the results (data from 2003 and 2009 are pooled) obtained from a standard Heckman (1979) model in order to solve the problem of sample selection. As expected, the results show a positive unit elasticity of total loans with respect to smooth income; hence, if smooth income increases by 10%, borrowing also increases by 10%. The idea here is to explore all the factors that may influence borrowing. As discussed in the introduction, households base their life-time expenditure on the expected

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[13] Table C1 (in the appendix) reports the OLS regression estimates for the 2003 and 2009.

[14] Consumption includes both durable and non-durables goods.

flow of income (or smooth income) over their lifetimes rather than just their current income. Thus, controlling for smooth income in a Heckman model, one would expect most other characteristics to be insignificant, something that is confirmed in the structural equation (loan expenditure equation) of Table 11.[15,16] Two other characteristics appear to be (weakly) statistically significant in addition to smooth income: the age of the head being between 50-59 and whether the household has children. With regard to the former this suggests that this group borrows above the level consistent with smooth income; although the same result may be also explained by the fact that this group may own other assets, such as real estate that can be use as collateral. The latter implies that families with children borrow less than that implied by their permanent income, something which seems odd and may require further analysis.

Smooth income in the selection equation also appears to be positive and significant but with lower magnitude compared to the structural equation. The age of household head is significant in the decision to borrow or not. However, the magnitudes are higher for households with head in younger age groups. The sex of household head appears to be significant in the borrowing decision, with males having a lower probability of borrowing than females. Durable goods such as second house and number of cars also have a positive and significant effect. Finally, some of the variables used for identification purposes appear to be significant, such as deposits, other benefits and the household's head being a professional.

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[15] Children into household and head age group 50-59 are just significant at 10%.

[16] Table C2 in the appendix presents the estimated results of a standard Heckman model when smooth income was calculated using total income instead of total consumption as a dependent variable, as described in previous section. The results show again a positive and significant elasticity of smooth income with respect to total loans in both equations. On the other hand, the magnitude of elasticity appears to be lower compared to the elasticity of Table 11. Furthermore, in the structural equation, we observe variables that also have a significant effect such as head age and number of cars. Head age appears to have a positive effect across all age groups. The highest magnitude appears in the youngest age group 20-29, and it declines in the following groups. Households owning durable goods such as cars, appear to have a positive and significant effect on dependent variable, probably because they were not bought by the same household and were acquired as a gift from parents.

TABLE 11
Estimation results of the sample selection model[a]: Ln(loan expenditure)

	Expenditure Loan		Selection Equation	
	Coef[b]	s.e	Coef[b]	s.e
Constant	-1.543	(1.002)	-2.824***	(0.786)
Years (2009)[c]				
Year 2003	0.177*	(0.098)	0.113	(0.084)
Smooth income	1.000***	(0.106)	0.209**	(0.087)
Head age group(>70) [c]				
20-29	0.271	(0.182)	0.635***	(0.137)
30-39	0.151	(0.160)	0.459***	(0.115)
40-49	0.110	(0.156)	0.394***	(0.113)
50-59	0.246*	(0.147)	0.333***	(0.107)
60-69	0.157	(0.101)	0.129*	(0.073)
Male head	0.071	(0.086)	-0.166*	(0.087)
Employee head	-0.140	(0.148)	0.071	(0.131)
Education level of head(elementary) [c]				
Gymnasium	0.152	(0.099)	-0.025	(0.081)
Lyceum	0.035	(0.067)	-0.021	(0.055)
College	0.051	(0.095)	0.093	(0.082)
University	-0.022	(0.050)	0.060	(0.047)
Employment sector (private)[c]				
public	0.029	(0.066)	0.024	(0.058)
Unemployed head	0.149	(0.157)	0.047	(0.142)
Pensioner head	0.015	(0.182)	0.182	(0.151)
Durable goods				
Second house	0.059	(0.088)	0.208***	(0.077)
Number of cars	0.028	(0.047)	0.266***	(0.034)
Yacht	0.096	(0.235)	-0.308	(0.189)
Other characteristics				
Children into household	-0.125*	(0.073)	-0.085	(0.063)
Number of adults	-0.017	(0.056)	0.004	(0.049)
Sqrmt of first dwelling	-0.001	(0.000)	-0.000	(0.000)
Household in urban area	-	-	0.025	(0.048)
Deposits	-	-	-0.626***	(0.043)
Source of income (other)[c]				
Income from non-salary	-	-	-0.055	(0.053)
Property income	-	-	0.111	(0.072)
Unemployment benefits	-	-	0.079	(0.089)
Other benefits	-	-	0.148***	(0.049)
Other head characteristics				
Manager	-	-	-0.073	(0.132)
Professional	-	-	-0.172***	(0.066)
Married	-	-	0.012	(0.090)
Divorced	-	-	-0.016	(0.103)

Notes: [a] The estimated standard error of the education expenditure equation is 1.052. The estimated correlation between the errors of the loan expenditure and selection equations is -0.47(s.e.=0.12) and the LR test for the independence of the two equations ($\rho=0$) gives a p-value equal to 0.69 (chi-squared statistic=0.15); [b]The symbols *, ** and *** denote statistical significance at 10%, 5% and 1%; [c] The variable in the brackets is excluded from the regression and is used as the benchmark for comparison.

7. Conclusions

The growing level of household borrowing has attracted enormous attention because of its significant macroeconomic and financial implications. According to the life-cycle theory of consumption, the choices made by consumers regarding their consumption patterns are determined not by current income but by their longer-term income expectations, labeled smooth or life-cycle income. Thus, credit markets can help households in achieving their consumption objectives by borrowing. This study attempts to examine the borrowing behaviour of households in Cyprus and consider how the various factors affect demand for borrowing. The analysis focuses on smooth income since this is thought to be the appropriate variable to explain the level of household loans in an economy. This, of course, holds true under the assumption that markets work efficiently, and that consumers and households do not face credit constraints.

The raw data show that consumption and income tend to move closely together, with only a small consumption hump for households with middle aged head, something not completely in tune with the life-cycle hypothesis. Another general observation is that while the debt level is rather high, and has increased as a ratio to total income in recent years, households also have significant deposits mainly concentrated among households with older head. Hence, net liabilities vary significantly across age groups. In addition, the highest gross debt-to-income ratios are presented in middle income households, while upper income groups appear to have relatively high gross-deposits-to-income ratios. This is important, since studying aggregate figures to derive conclusions regarding the creditworthiness of households (and financial stability in general) one needs to look in detail into the structure assets and liabilities. Furthermore, the descriptive analysis, reveal some borrowing and saving patterns among households with different characteristics such as sex, employment sector and education level.

In terms of empirical analysis, this study uses a methodology based on well-known fundamentals of economic theory to specify a simple econometric model for the empirical analysis of the borrowing-saving behaviour of households using micro data. The empirical analysis performed in this paper shows that, as expected from economic theory, the level of loans taken up by households in Cyprus at a given point in time is determined by their smooth, not current, income. Indeed, very few household variables other than smooth income are found to matter. This suggests that loans are demanded by households (and offered by banks) on the basis of variables that determine smooth income, such as age,

education, gender, occupation etc. One exception is borrowing by households with older head; but this may be explained by the availability of accumulated assets that can be used as collateral by households in this age group.

The fact that the results obtained from the approach followed in this paper show that the household demand for loans depends on smooth income, can be argued to be evidence that the borrowing behavior of households in Cyprus is rational, in the sense that it conforms to expectations as captured by this concept of income. The question arising, however, is whether household's expectations are realistic, given that they are formed during a long period of buoyant economic growth, only recently interrupted by recession. In general, no test of consumer rationality can be based on incomplete information on loans taken up by households in a specific year, ignoring the stocks of loans accumulated over previous years, as in the empirical analysis in the present paper.

In conclusion, this paper is a first step towards filling a gap in the literature concerning the rationality of savings and borrowing decisions of households. The theoretical model needs to be extended to capture the dynamics of these decisions; and the empirical results need to be confirmed by further empirical analysis based on information about the level of borrowing, savings, and investment incurred in the current year but also the stocks of these variables accumulated over time. This extension of the analysis will be possible when the «Household Finance and Consumption Survey» is available in Cyprus, hopefully in the near future. Notably, this survey is conducted in all countries of the euro area. This is useful insofar as one can extract comparable statistics for many countries for the estimation of the structural relationship between household consumption and wealth; and for investigating macroeconomic relationships of wider policy interest, such as the impact of changes in interest rates on the borrowing behaviour of different income groups.

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Appendix

A. Figures

FIGURE A1
Equivalized expenditure vs expenditure, by head age group (2003)

FIGURE A2
Equivalized expenditure vs expenditure, by head age group (2009)

FIGURE A3

*Average loan repayments by sex
(thousands euros)*

FIGURE A4

*Average loan repayments by
employment sector
(thousands euros)*

FIGURE A5

*Average loan repaynemts by education level
(thousands euros)*
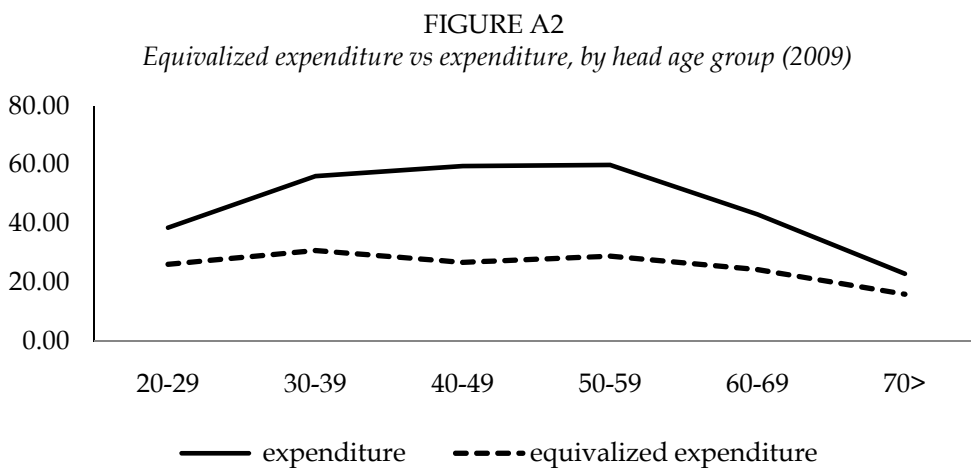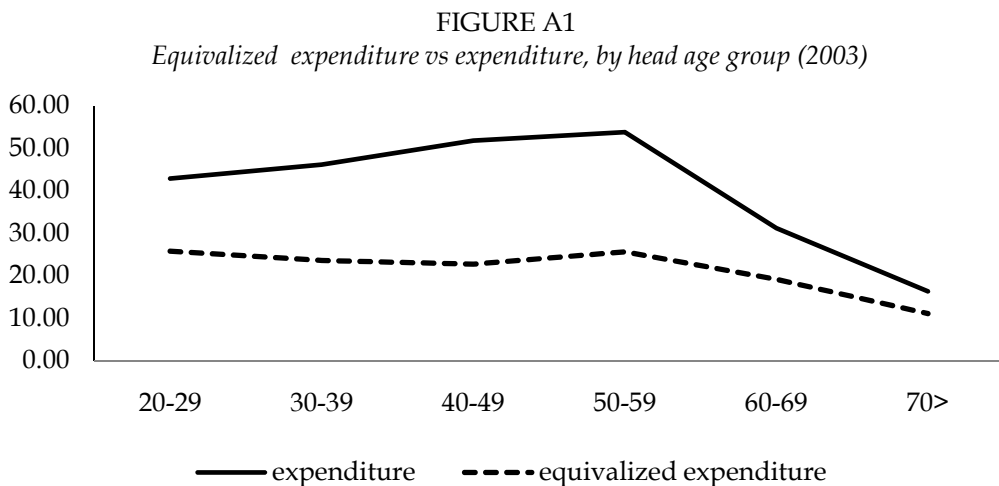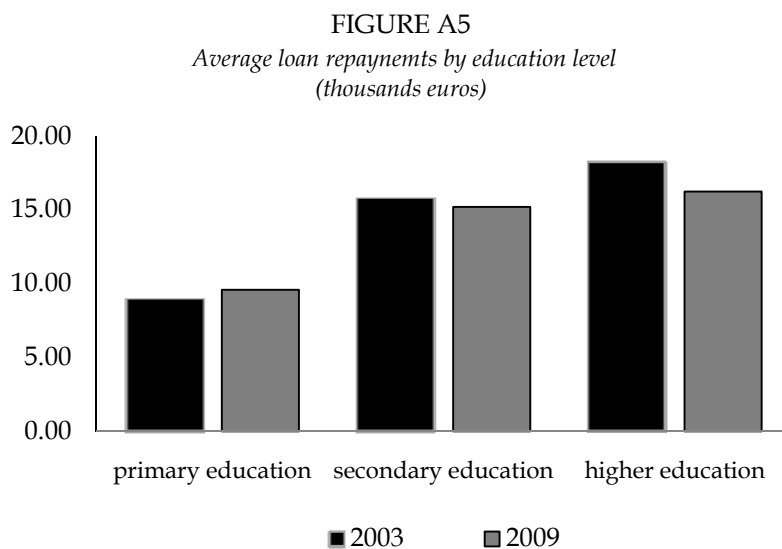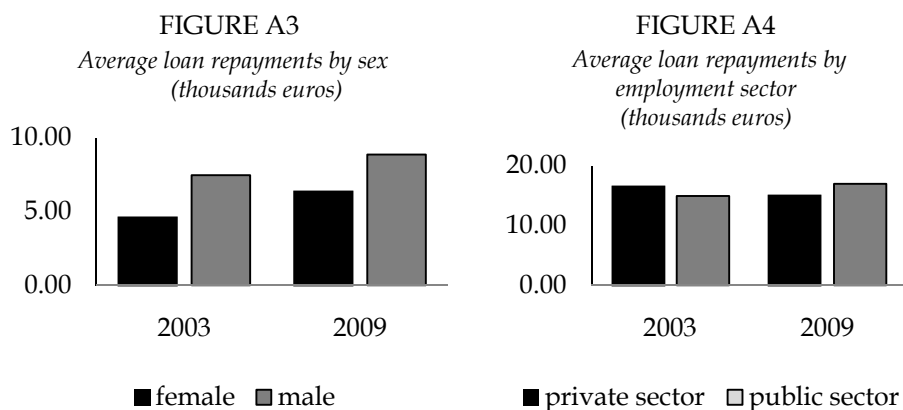
B. Tables

TABLE B1

Gross debt-to-income ratio for different type of loans, by income group percentiles (2003)

	0-25%	25-50%	50-75%	75-100%
Type of loan				
Housing	0.47	3.88	5.44	3.23
Transport	0.40	3.03	4.17	3.65
Other	1.27	1.26	2.23	1.31

TABLE B2

Gross debt-to-income ratio for different type of loans, by income group percentiles (2009)

	0-25%	25-50%	50-75%	75-100%
Type of loan				
Housing	1.36	8.33	3.92	3.51
Transport	1.41	2.82	4.34	4.78
Other	0.26	1.13	6.72	9.00

C. Heckman-Type Regression Model

A regression model is specified for the log of total loans (y_h)

$$y_h = \beta x_{1h} + u_{1h} \tag{1}$$

where x_{1h} is a vector of life-time income/smooth income and various household characteristics (e.g. age head, employment sector of head, number of children in households) that affect total loans obtained in the first stage outlined above. The dependent variable y_h is observed for a household h if the household has positive total loans.

In addition, we defined a variable d_h, which take the value 1 if $d_h > 0$ and the value 0 if $d_h = 0$. The variable d_h indicate whether a household has positive loans (d_h=1) or no loans (d_h =0). Hence, we specify a selection equation

$$d_h = \beta_2' x_{2h} + u_{2h} \tag{2}$$

such that y_h is observed if $d_h > 0$ and y_h is not observed if $d_h \leq 0$. Thus equation (2) constitutes a binary choice model. The vector of characteristics x_{2h} includes all characteristics in x_{1h} as well as some additional information affecting the choice between a household's decisions to borrow or not. In this study we use the information of whether households have deposits or not, sources of income and other head characteristics like marital status and work position. The error terms in (1) and (2) are jointly normally distributed with mean zero and variances Var (u_{1h}) = σ_1, Var (u_{2h}) = 1, and correlation, Corr (u_{2h}, u_{2h}) = ρ. Equation (1) and (2) form a standard selection model (Heckman 1976), which can be estimated using either maximum likelihood (see, e.g., Verbeek, 2002) or the two-step procedure proposed by Heckman (1979). Estimation results obtained by maximum likelihood are shown in Table 11 and C2 respectively.

TABLE C1

Estimation of smooth income

Ln(Consumption)	2003		2009	
	Coef[a].	s.e[b]	Coef[a].	s.e[b]
Head Characteristics				
Male	0.007	(0.035)	-0.008	(0.028)
Empolyee	-0.011	(0.043)	-0.015	(0.048)
Married	0.027	(0.048)	-0.055	(0.036)
Divorced	0.130***	(0.040)	0.054	(0.037)
Separated	0.103	(0.083)	0.063	(0.065)
Age	-0.052***	(0.019)	-0.004***	(0.001)
Age_sq	0.001***	(0.000)	-	-
Age_cb	-0.000***	(0.000)	-	-
Employment sector (public)				
Private	-0.003	(0.020)	-0.031	(0.021)
Unemployed	0.039	(0.067)	-0.056	(0.053)
Pensioner	0.040	(0.053)	-0.012	(0.057)
Public health insurance	-0.035**	(0.018)	-0.017	(0.019)
Private health insurance	0.051	(0.034)	0.044	(0.034)
Education (Elementary)				
Gymnasium	0.000	(0.029)	0.048	(0.029)
Lyceum	0.048**	(0.020)	0.026	(0.019)
College	0.057**	(0.029)	0.011	(0.034)
University	0.083***	(0.028)	0.036	(0.025)
Number of children	0.047**	(0.019)	0.032	(0.020)
Number of children_sq	-0.003	(0.004)	-0.002	(0.005)
Number of adults	0.172*	(0.101)	0.307***	(0.074)
Number of adults_sq	-0.026	(0.020)	-0.047***	(0.015)
Total household income	0.627***	(0.027)	0.472***	(0.026)
Household Characteristics				
Region (Paphos)				
Nicosia	-0.033	(0.029)	0.023	(0.027)
Famagusta	-0.016	(0.042)	0.021	(0.039)
Larnaka	-0.003	(0.031)	0.019	(0.029)
Limassol	0.008	(0.029)	0.079***	(0.027)
Household in urban area	0.016	(0.018)	0.021	(0.018)
Dwelling characteristics				
Home rented	0.035	(0.028)	-0.073***	(0.028)
Home ownership	-0.029*	(0.017)	-0.019	(0.018)
Type of dwelling (flat)				
Detached	0.039	(0.028)	0.001	(0.044)

Semidetached	0.035	(0.029)	0.031	(0.045)
Terrace	0.037	(0.037)	-0.032	(0.049)
Flat	0.067**	(0.030)	0.017	(0.045)
Sqrmt of the first dwelling	0.000***	(0.000)	0.001***	(0.000)
Durable goods				
Second house	0.061**	(0.026)	0.063**	(0.029)
Number of cars	0.101***	(0.011)	0.089***	(0.011)
Fridge	0.248**	(0.098)	0.181	(0.192)
Washing machine	0.111***	(0.037)	0.049	(0.045)
Air conditioning	0.045***	(0.017)	0.096***	(0.019)
Stereo	0.042**	(0.017)	0.011	(0.018)
Caravan	0.143**	(0.072)	0.028	(0.093)
Yacht	0.038	(0.061)	0.046	(0.062)
Dish washer	0.014	(0.017)	0.039**	(0.018)
Personal computer	0.032*	(0.018)	0.100***	(0.022)
Central heating	0.027	(0.017)	0.078***	(0.018)
Clothes dryer	0.029*	(0.017)	0.057***	(0.018)
Microwave	0.023	(0.015)	0.027*	(0.016)
Dvd	0.038*	(0.021)	0.034*	(0.019)
Constant	3.351***	(0.401)	4.514***	(0.322)
Observations	2280		2082	
R-squared	0.819		0.778	

Notes: [a]The symbols *, ** and *** denote statistical significance at 10%, 5% and 1%;
[b]The reported standard errors are robust to heteroscedasticity.

TABLE C2

Estimation results of the sample selection model[a]:

	Loan Coef[b]	Expenditure s.e	Selection Coef[b]	Equation s.e
Constant	-0.386	(1.670)	-5.903***	(1.342)
Years (2009)[c]				
Year 2003	-0.019	(0.135)	0.359***	(0.121)
Smooth income*	0.809***	(0.169)	0.542***	(0.147)
Head age group(>70)[c]				
20-29	0.770***	(0.189)	0.734***	(0.135)
30-39	0.568***	(0.161)	0.511***	(0.112)
40-49	0.450***	(0.157)	0.415***	(0.111)
50-59	0.537***	(0.148)	0.351***	(0.105)
60-69	0.305***	(0.102)	0.143**	(0.072)
Male head	0.043	(0.091)	-0.211**	(0.088)
Employee head	-0.129	(0.153)	0.108	(0.131)
Education level of head(elementary)[c]				
Gymnasium	0.168*	(0.101)	-0.038	(0.082)
Lyceum	0.052	(0.070)	-0.061	(0.057)
College	0.081	(0.102)	0.020	(0.086)
University	-0.026	(0.060)	-0.012	(0.053)
Employment sector (private)[c]				
Public	-0.002	(0.070)	-0.022	(0.060)
Unemployed head	0.205	(0.167)	0.137	(0.145)
Pensioner head	0.159	(0.195)	0.312**	(0.156)
Durable goods				
Second house	0.113	(0.092)	0.159**	(0.079)
Number of cars	0.131***	(0.048)	0.215***	(0.039)
Yacht	0.118	(0.241)	-0.345*	(0.190)
Other characteristics				
Children into household	-0.068	(0.077)	-0.137**	(0.065)
Number of adults	-0.012	(0.061)	-0.058	(0.053)
Sqrmt of first dwelling	-0.000	(0.001)	-0.001*	(0.000)
Household in urban area	-	-	-0.008	(0.049)
Deposits	-	-	-0.605***	(0.042)
Source of income (other)[c]	-	-		
Income from non-salary	-	-	-0.041	(0.053)
Property income	-	-	0.031	(0.076)
Unemployment benefits	-	-	0.093	(0.089)
Other benefits	-	-	0.155***	(0.048)
Other head characteristics	-	-		
Manager	-	-	-0.114	(0.132)
Professional	-	-	-0.188***	(0.066)
Married	-	-	0.007	(0.089)
Divorced	-	-	-0.005	(0.103)

Notes: [a] The estimated standard error of the education expenditure equation is 1.07. The estimated correlation between the errors of the loan expenditure and selection equations is 0.159(s.e.=0.12) and the LR test for the independence of the two equations ($\rho=0$) gives a p-value equal to 0.21 (chi-squared statistic=1.51); [b]The symbols *, ** and *** denote statistical significance at 10%, 5% and 1%; [c] The variable in the brackets is excluded from the regression and is used as the benchmark for comparison.