CHAPTER 15

FINANCIAL MOTIVATIONS FOR THE OLD AGE*

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1 INTRODUCTION

The following chapter, *The Capital for the Old Age*, looked at the access of elderly persons to stocks of various types of resources. This study aims to complement this, detailing the reasons for accumulation and depletion of financial resources during the life cycle, emphasising the old age.

All individuals have their own financial motivations to acquire or get rid of assets, credits or specific insurance policies, always aiming at improving their welfare. For example, real state can be purchased to live in, to rent or to be used a reserve value. In the same way that we classify assets as physical capital, human capital and social capital, or that we think about the traditional trilogy of return, risk and liquidity of assets as their defining characteristics, we initially propose a triad of types of effects that assets may have on the level of welfare.

First, individuals extract utility directly from the possession of certain types of assets, such as in the example of property used as a residence, whilst the greater the assets accumulated during the life cycle the higher the level of welfare that can be enjoyed. The second effect is that a high level of assets can increase the income generation capacity of individuals and their families. Although this effect is least relevant in the case of the return from human capital for elderly age groups, because

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at some point they leave the labour market, it is extremely important in terms of alternative real or financial assets accumulated.

The final effect is that the increase in the resources possessed improves the ability of individuals to deal with adverse income shocks. The role of consumption smoothing assumed by assets depends on the importance of these shocks and the extent to which the different segments of the financial sectors are developed, so that they can allow the impacts of these shocks on the level of welfare to be smoothed. In this case, public and private social security coverage and health insurance are of special importance during the old age.

Besides this introduction, this paper is divided into other four sections. In Section 2, we review the literature about the motivations behind the demand for long-term assets in family units. In Section 3, we use data from a survey carried out by the Brazilian Credit and Savings Association [Associação Brasileira de Crédito e Poupança (Abecip)], to evaluate the relevance of these motivations in the Brazilian context. In Section 4, we analyse, using microdata from a series of household surveys, the life cycle trajectories of some specific resources in regard to the theoretical review and the qualitative results previously discussed. These assets include small businesses and housing, most subject to credit market constraints, as well as social security benefits and health insurance which play a central role as the source of savings and insurance amongst elderly people. Finally, in the Section 5, the main results are summed up.

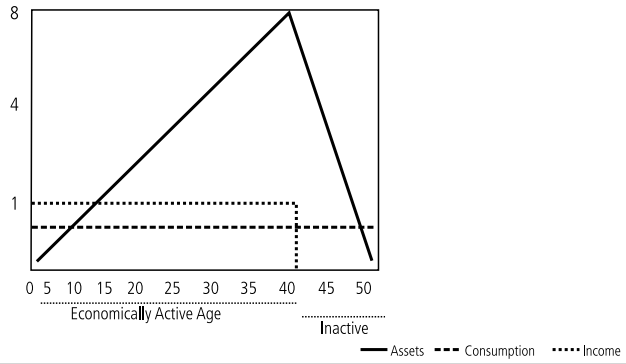
2 DEMAND FOR ASSETS: MOTIVATIONS

The objective of this section is to summarise the main reasons for the accumulation of financial assets in the various stages of individual's life cycle.

2.1 Life Cycle Model

Saving for old age comes from an individual desire to keep a stable pattern of consumption throughout the life cycle. As a result, individuals forego a part of consumption during economically active life to ensure the permanence of a standard of consumption in old age, when in general there is a fall in labour earnings. Savings, therefore, involve the accumulation of assets until retirement, after which the stock of assets begins to be used to complement retirement earnings. The simplest version of the life cycle model is that consumption is constant over the life cycle, there is no uncertainty, the interest rate is null, and the only change in income occurs when the consumer retires.

FIGURE 1
STRIPPED-DOWN VERSION OF THE LIFE CYCLE MODEL



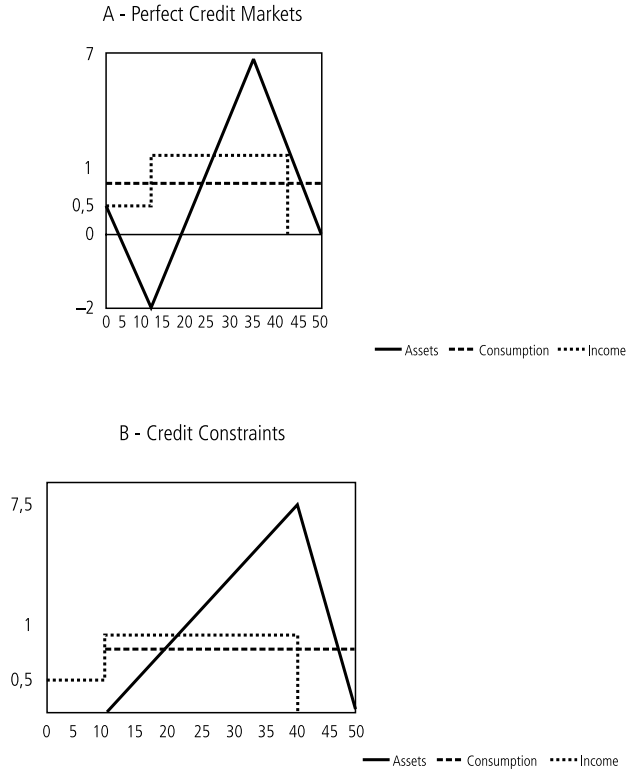
In Figure 1 shown the case which Modigliani (1986) calls the stripped down model of the life cycle. Income is constant for L years of working life (i.e., L = 40 years) and is equal to 1 unit and falls to 0 in R years of retirement (i.e., R =10 years). Consumption is constant at the level $L/(L + R)$ per period, or 80% of income during working life, in such a way that savings are equal to 20% of income per period, $R/(R + L)$, reaching the maximum of eight times income immediately prior to retirement.

2.1.1 A complementary perspective

The acceptance of the possibility of contracting debts during the initial period of the life cycle in the simple scheme presented by Modigliani in his Nobel Lecture provides us with an alternative analysis of the life cycle. The indebtment of younger groups represents an alternative mechanism for the consumption smoothing and welfare throughout the life cycle. What occurs is that during the initial stages of the life cycle, individuals are entering the labour market and their income is generally low. Since they expect to go through a period of professional ascending, they try to use future resources through credit to finance a consumption level above their current income levels.

Figure 2 includes these characteristics and the possibility of obtaining loans in two alternative ways in Modigliani scheme. In the first, young people are able to contract debts, in the second they are constrained in the credit market. The diagram divides the life cycle into three distinct stages: the first ten years of an individual's active life (J), when income is low (equal to 0.5 of a monetary unit), the following 30 years (L) (a period of professional maturity, prime-age, when individual's average income is one monetary unit) and the final ten years of the

FIGURE 2
LIFE CYCLE INCLUDING THE POSSIBILITY OF THE INDEBTMENT OF THE YOUNG



life cycle (*R*), in which the individual retires and finances consumption only with assets saved during the previous period.

Figure 2A illustrates the case when individuals manage to contract loans when young. In this case, the average consumption of an individual is 0.7 ((0.5 x *J* + 1 x *L*)/*J* + *L* + *R*). Thus in the initial phase, since the consumption of individuals is greater than their income, they will get loans, accumulate debts (negative assets). In the second phase of the cycle, the initial increase in income will initially be used to pay for previously contracted debts and only after a certain point will it be possible to accumulate net assets for retirement.

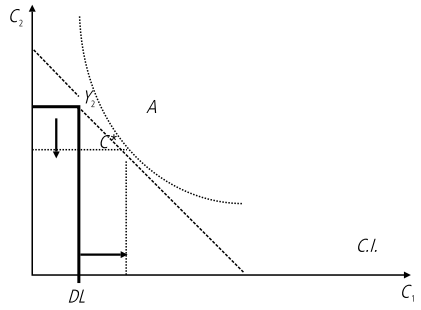
In the second case, Figure 2B, the young people do not manage to contract loans. In this case, liquidity constraints force individuals to consume their entire income (i.e., 0.5 of a monetary unit). The initial stage of the accumulation of assets will be null. It will only be possible to accumulate assets and smooth

consumption in the second phase. From this phase on, consumption will be equal to 0.75 ($L/L + R$).

2.2 Liquidity and Indivisibility Constraints

In more general terms than the simplified life cycle concept presented above, agents with liquidity constraints are those whose desire for consumption goes beyond their liquid assets availability. As shown in the scenario outlined in Figure 3, consumers prefer to be at point C^*, where they smooth consumption between periods 1 and 2. Nonetheless, since the available liquidity is inferior to the desired consumption level, the individual is stuck in a corner solution represented by point A. In this case, the individual consumes all his income.

FIGURE 3
LIQUIDITY CONSTRAINTS AND TEMPORAL CHOICE



Where:

C_1 and C_2 represent consumption in periods 1 and 2, respectively;

DL are the available liquidity in period 1, i.e., assets inherited from the past plus current income ($A_0 + Y_1$);

*Y*2 is income from period 2; and

CI is the agent indifference curve.

Normally it is expected that individuals with liquidity constraints not to save, since savings are seen as excess income in relation to consumption. Nonetheless, some of the saving motives can be reinforced by the existence of liquidity constraints. Individuals with liquidity constraints are induced to accumulate financial assets as a "buffer-stock" against uncertainties.

In the usual empirical tests, liquidity constraints are evaluated on the basis of the amount of assets that individuals have. According to Runkle (1991), people who have few liquid assets have difficulties in obtaining loans and therefore encounter liquidity constraints. Nonetheless, the inability to obtain loans does not imply an inability to save; there can be good reasons for consumers with liquidity constraints to accumulate even more financial assets.

For example, financial accumulation for the acquisition of indivisible goods can result in the lack of access to credit when monthly income flows taken individually are not sufficient to buy indivisible goods with a high unit value, such as property[1] or physical assets linked to small business production. This situation is caused by the existence of imperfections in the credit market. As a result, liquidity constraints can result in higher, and not lower accumulation of assets.

Saving to acquire goods is, therefore, the result of the interaction of two factors: the indivisibility of goods and imperfections in the credit market. Individuals in an autarchic situation have to accumulate resources by themselves at certain times until they obtain the indivisible good. Similarly, people wanting to start a new business are frequently frustrated by lack of access to the capital market, and are forced to accumulate assets in advance.[2]

2.3 Precautionary Motives

The demand for assets due to precautionary reasons arises from uncertainties about the future that can affect welfare levels and financial behaviour. Since savings provide resources that will be available in the future, when these uncertainties are resolved, the decision to save is also related to the nature and size of these uncertainties.

As well as the level of uncertainty, the specification of the utility function is a key to establish the need to save for precautionary reasons. The convexity of the marginal utility function is a necessary condition to create a precautionary reason to save. The idea is that in bad times, when the level of consumption is low, the consequences are much worse than in good times when the level of consumption is high. Therefore, the marginal disutility of losses in consumption close to subsistence levels is higher than the marginal utility of earnings in times of relative abundance. As a result, individuals give up higher levels of consumption, when possible, in order to prepare for possible needs. The more uncertain future income is, the greater savings are and the lower present consumption is.

1. Italy and Japan are examples cited in the literature of countries with high rates of savings due to credit rationing.

2. The existence of consortiums allows saving and the period for the acquisition of goods in the absence of credit to be reduced by half.

One case that can be explicitly solved is one with a utility function with constant absolute risk aversions, known in the literature as CRRA.

Suppose that the consumer maximizes:

$$\max Et[\Sigma(-1/\alpha)\exp(-\alpha Ct)/0]$$

subject to:

$$At+1=(At+Yt-Ct)$$

and:

The consumer has constant absolute risk aversion, with the coefficient a and lives for T periods. The subjective discounted rate is equal to the interest rate without risk, and both are equal to 0. Income from work follows a random path with normally distributed innovations.

In the first order condition of the problem, it can be seen that optimal consumption satisfies the following Euler equation.

$$Ct = Yt + (1/(1+\alpha))Et[Ct+1] - N(0,\sigma)(\alpha/(2+\alpha))(\alpha-1)\sigma/4$$

(1)

Savings will be equal to:

(2)

The equation (1) shows the impact of income uncertainty on the slope of the consumption path (Euler's Equation). Greater uncertainty in income and greater prudence lead to a steeper slope in the consumption trajectory over time. Equation (2) shows the flow of savings as a function of wealth, income and uncertainty. In the case of certainty equivalence the solution is given just by the first term. Prudence is reflected in the second term: the greater the uncertainty, the higher the level of savings for given levels of income and wealth.[3]

This motive is also strengthened by the existence of credit constraints, as shown by Deaton (1991 and 1994). The possibility of obtaining loans in bad times is an alternative that transmits security. However, if this alternative cannot

3. It should be noted that the argument is a derivative of the impact of risk aversion that affects the composition of stocks of wealth. Prudence affects the decision to consume, which is related to the marginal utility curve, in other words, to the third derivative of the utility function.

be used, provisions for savings have to be made for these possibilities. Without access to credit (or insurance) contracts, consumers have to provide resources for insurance purposes through the accumulation of additional assets.

2.4 Inheritance

Much of the current debate about savings behaviour in developed countries centers around the relative importance of life cycle motives (i.e., hump saving to finance consumption during old age) versus inheritance (i.e., saving to finance the consumption of descendents). These motivations are particularly important in understanding the demand for assets among the elderly population.

Individuals leave inheritance for at least three reasons:

a) Altruism. There is a legitimate concern with the welfare of next generations, thus savings are made to smooth the level of consumption between generations.

b) Control. The donor saves to leave goods to compensate his heirs for services provided by them during the life of the potential donor.

c) Accident. Since of individuals do not know when they will die, they are unable to prepare an exact plan of the resources they will need until the end of their lives. They need to keep a certain amount that will allow them to live more than they have really lived, and leaving a certain amount when they die.

A polar vision of "altruistic" families was discussed in Barro (1974). In this vision, families derive utility not just from present consumption levels, but also from the future consumption of their children. This means that they extract welfare from the consumption of their descendents. Kotlikoff and Summers (1981) note that a substantial proportion of American savings is related to inheritance. Other evidence that points to the importance of intergenerational transfers are presented by Mirer (1979).

Barro assumes that parents leave inheritance for their children because they are truly concerned about them. Bernheim, Shleifer and Summers (1985) discusses the second reason mentioned above for individuals to leave inheritances, and suggests that parents use inheritance to control their children. Parents want their children attention and use the threat of cutting off inheritance as a way of getting the desired attention.

To test this strategic motivation for inheritance, data related to the frequency parents are visited is examined. This data shows that the richer the parents, the more diligent the visits were. Moreover, only wealth that can be left as inheritance induces

a greater number of visits. Wealth that cannot be left as inheritance, such as pensions that will stop upon the death of the pensioner, does not encourage sons and daughters to visit their parents. This evidence suggests that there can be other reasons for intra-generational transfers of wealth apart from altruism.

An important source of uncertainty in consumption is related to the moment of death and individuals' health expenses. The lower the expectations of life, the lower the post-retirement consumption. Therefore, saving for retirement and for inheritance, whether for altruistic or for strategic reasons, also depend on a degree of uncertainty related to death and morbidity.

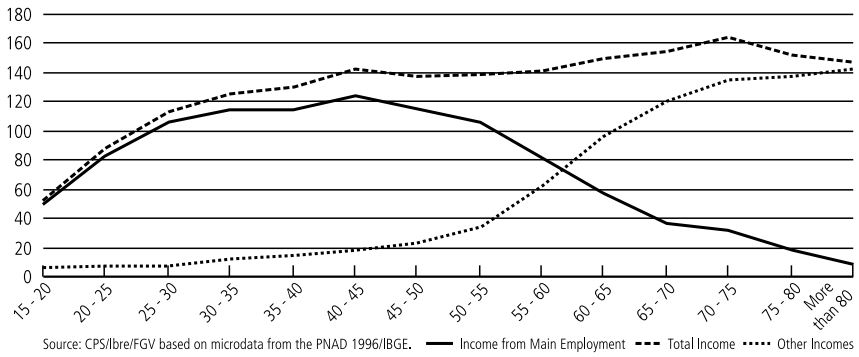
3 EMPIRICAL ANALYSIS

3.1 Life Cycle and Income Flows

As seen above, the Modigliani life cycle is often presented as the main motivation for the long-term demand of financial assets. The idea is that individuals save during their lives in order to smooth out their consumption and guarantee their welfare during the final stages of the life cycle when income from work tends to diminish.

We present here a series of charts (Figure 4A to 4F) based on the 1996 National Household Sample Survey [Pesquisa Nacional por Amostra de Domicílios (PNAD)] with the trajectories of individual incomes divided by groups with different education levels that can be seen as a proxy for individuals' permanent income levels. First, the increase in other income sources alternative to labour can be interpreted as evidence of a prior accumulation of financial resources

FIGURE 4A
LESS THAN 1 COMPLETED YEAR OF SCHOOLING



Source: CPS/Ibre/FGV based on microdata from the PNAD 1996/IBGE.

FIGURE 4B
BETWEEN 1 AND 4 COMPLETED YEARS OF SCHOOLING

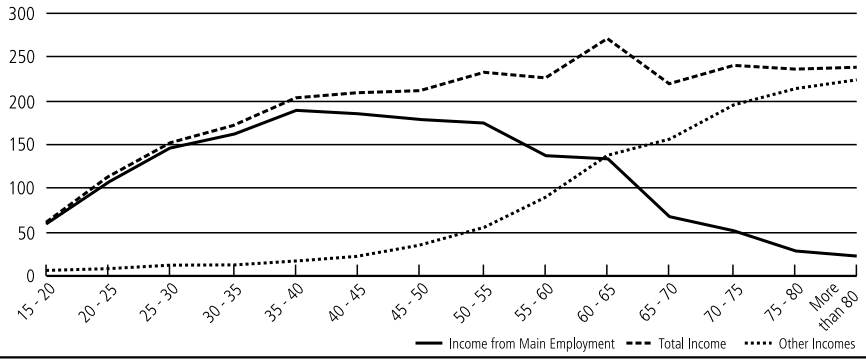
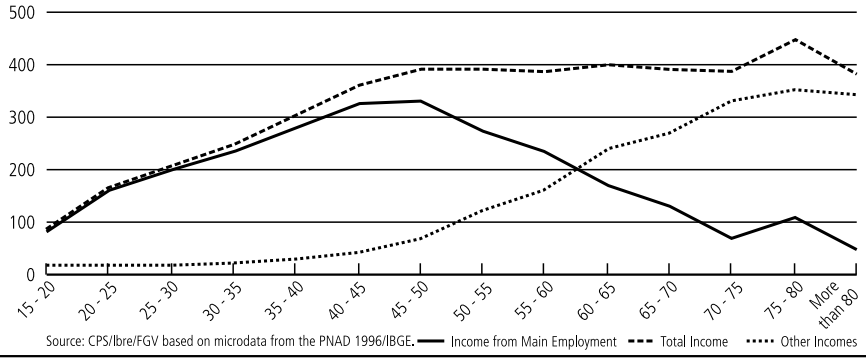


FIGURE 4C
BETWEEN 4 AND 8 COMPLETED YEARS OF SCHOOLING



Source: CPS/Ibre/FGV based on microdata from the PNAD 1996/IBGE.

FIGURE 4D
BETWEEN 8 AND 12 COMPLETED YEARS OF SCHOOLING

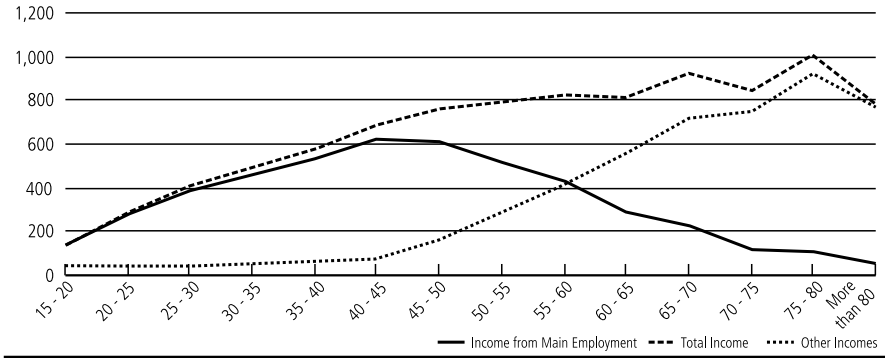


FIGURE 4E
BETWEEN 12 AND 15 COMPLETED YEARS OF SCHOOLING

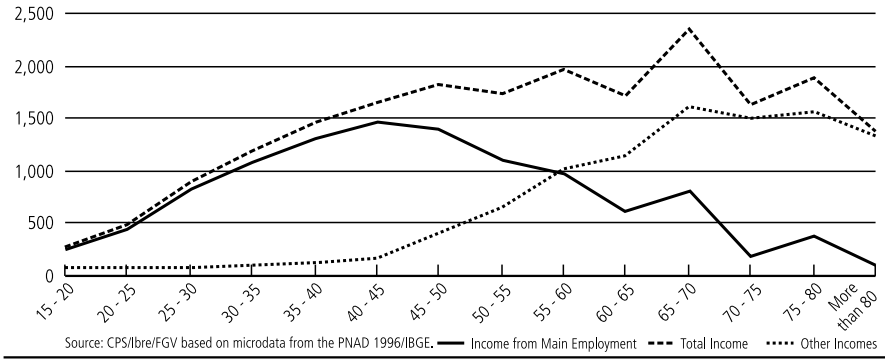
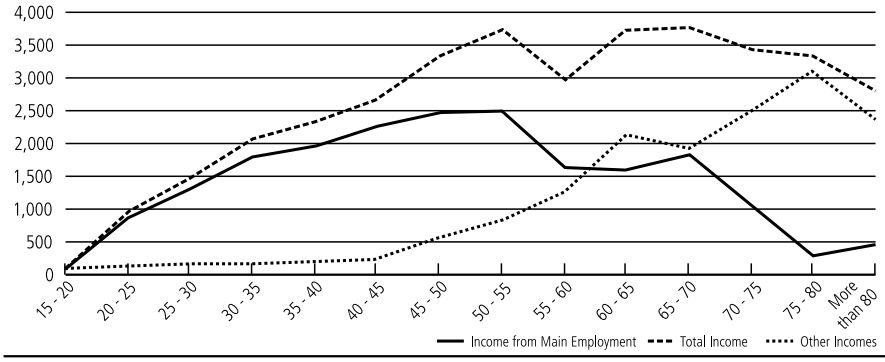


FIGURE 4F
MORE THAN 16 COMPLETED YEARS OF SCHOOLING

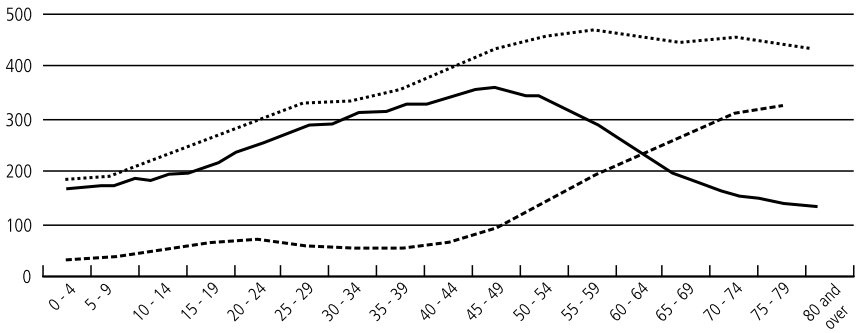


during the life cycle with the object of smoothing consumption and maintaining a constant level of welfare in the final stages of the life cycle, when labour earnings are reduced.

We now move to the per capita concept from different income sources classified by the age of individuals (i.e., not the age of household heads) using the data of the 2000 Census.

Now comes a series of charts referring to absolute and relative life cycle profiles of family per capita income flows from different sources, such as main employment, other employment, rent, retirement and social security benefits, private transfers and other incomes. Income from main employment (Figures 6A and 7A) has a bell shaped curve, reaching the absolute peak of R$ 327 between 45-49 years of

FIGURE 5
PER CAPITA INCOME TRAJECTORY DURING THE LIFE CYCLE



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

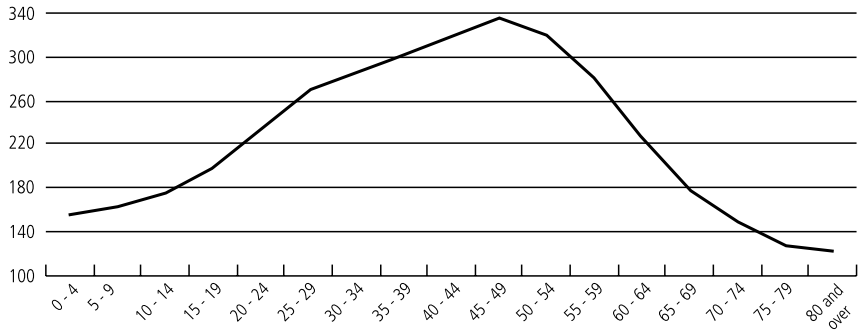
age and the relative peak is achieved ten years earlier, corresponding to 86% of total income. From then on it falls monotonically to around 30% for those over 80 corresponding to an absolute value of R$ 125.

Income from other employment (Figures 6B and 7B) is at a much lower level than income from main employment. Nonetheless, its path has a similar share along the second phase of the life cycle, falling from a peak of R$ 13 for the 45 to 49 age group, 3% of total income, to R$ 3, 8%, for the over 80 age group. The difference can be found in the first half of the life cycle when secondary labour earnings grow at lower absolute and secondary rates indicating lower occupational diversification, which implies greater financial risk.

Each group of non labour incomes increases during the life cycle, as is the case of income from rent. Rent reaches a value of R$ 34 among elderly people and can be perceived as a proxy of the stock of real estate not used as place of residence. The path of other incomes including public transfers, as well as those from financial investments, indicates the accumulation of capital throughout the life cycle, with the peak being reached in the 75 to 80 age group with a value of R$ 20,45. However, private transfers follow a similar pattern for a quite different motive, younger members of the family complement the income of the elderly members reaching a peak of R$ 7,3 for those 80 or over. This result shows the elderly to be the net recipients of private transfers.

In the composition of incomes, retirement and social security benefits is the most important form of income for elderly people. One should note that even in the elderly group, income from retirement continues to increase with age.

FIGURE 6A
INCOME FROM MAIN EMPLOYMENT BY AGE



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 6B
INCOME FROM OTHER EMPLOYMENT BY AGE

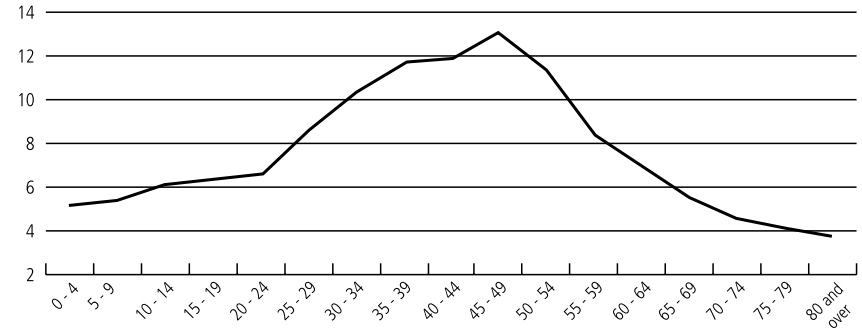
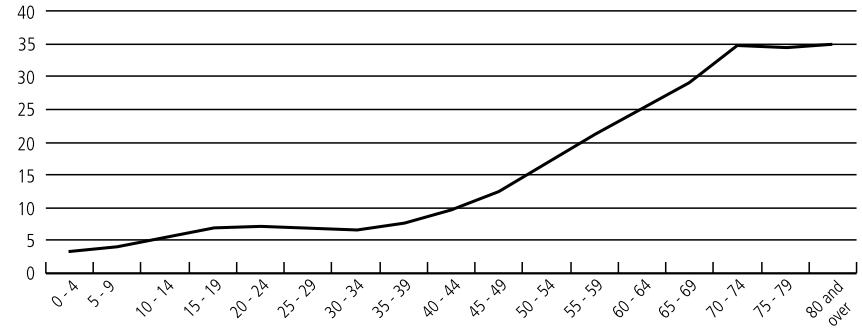


FIGURE 6C
INCOME FROM RENT BY AGE



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 6D
INCOME FROM RETIREMENTS AND SOCIAL SECURITY BENEFITS

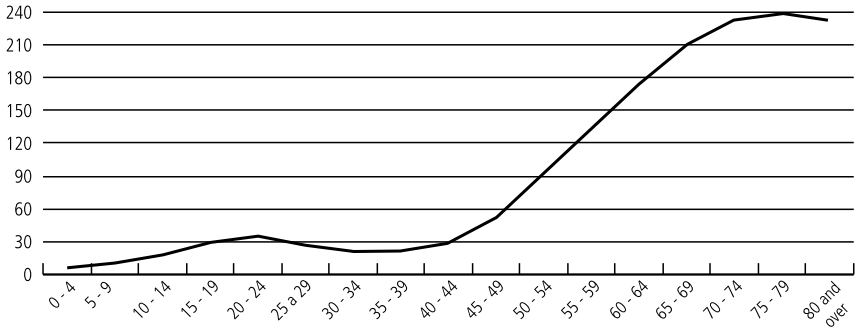
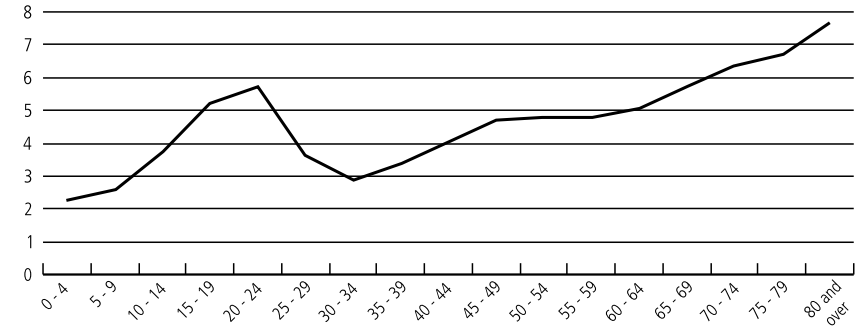
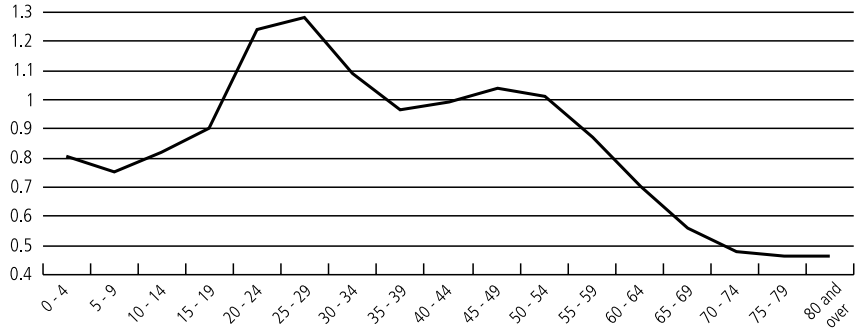


FIGURE 6E
INCOME FROM PRIVATE TRANSFERS BY AGE



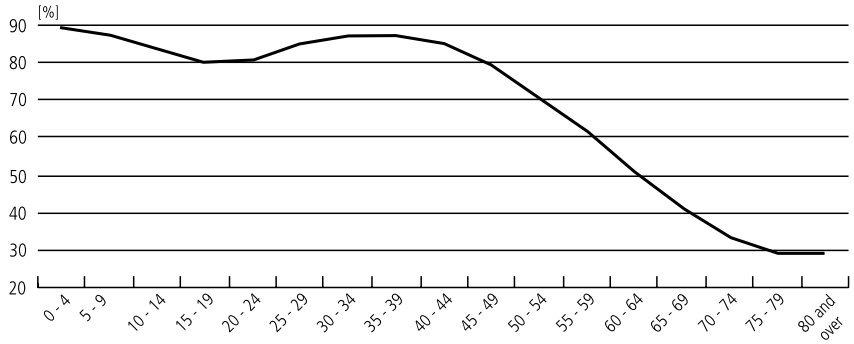
Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 6F
OTHER INCOMES BY AGE (INCLUDING PUBLIC TRANSFERS BY AGE)



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 7A
INCOME FROM MAIN EMPLOYMENT BY AGE



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 7B
INCOME FROM OTHER EMPLOYMENT BY AGE

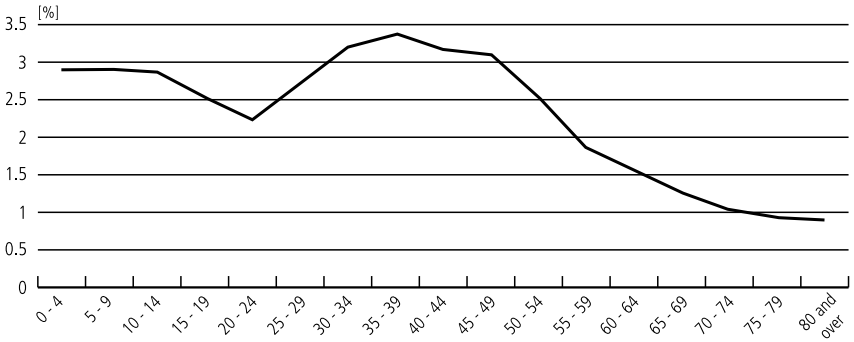
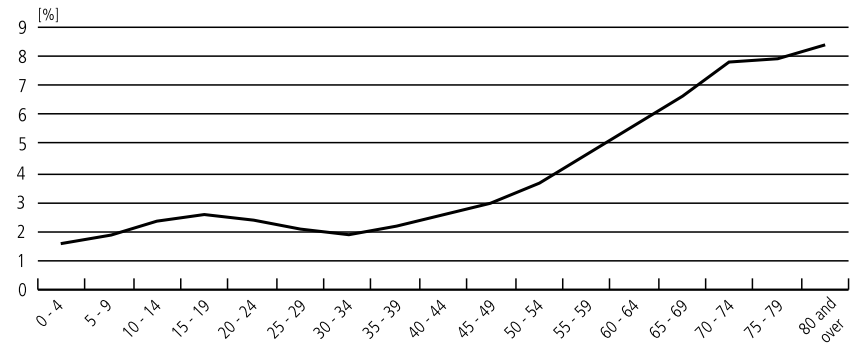


FIGURE 7C
INCOME FROM RENT BY AGE



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 7D
INCOME FROM RETIREMENTS AND SOCIAL SECURITY BENEFITS BY AGE

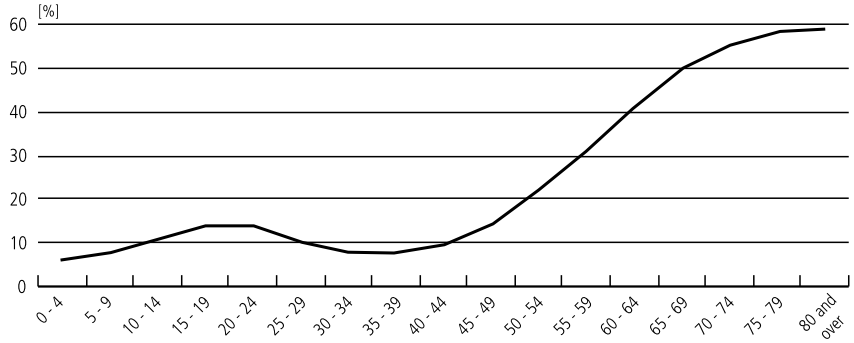
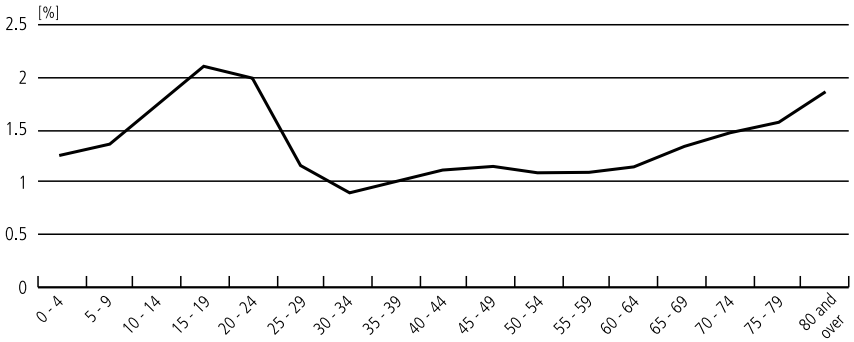
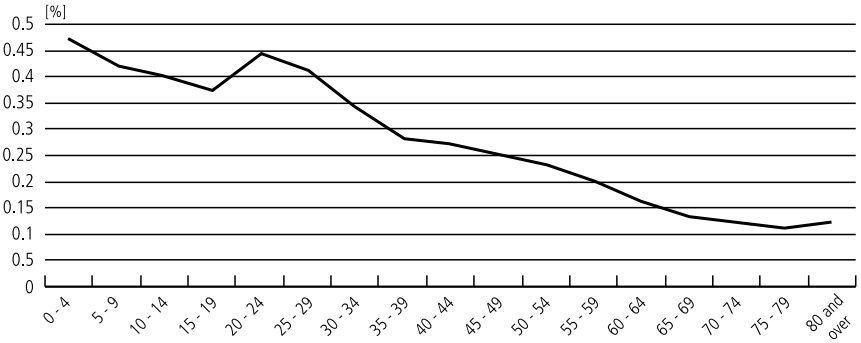


FIGURE 7E
INCOME FROM PRIVATE TRANSFERS BY AGE



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 7F
OTHER INCOMES (INCLUDING PUBLIC TRANSFERS BY AGE)



3.2 Long-Term Financial Behaviour

This section aims to discuss the financial behaviour of individuals, giving special attention to those of advanced ages. The data referring to the analysis is given in the statistical annex.

3.2.1 Financial profile

We will start by tracing the profile of savers by age groups, using the Survey on Financial Behaviour carried out by the Abecip. Abecip's research was carried out until 1987 in eight Brazilian metropolitan regions (Belém, Fortaleza, Recife, Salvador, Belo Horizonte, Rio de Janeiro, São Paulo and Porto Alegre) and provides a general picture of the financial behaviour of individuals. In order to investigate financial behaviour throughout the life cycle, individuals are divided into three age groups: 18 to 29, a period in which they are entering in the labour market and begin to acquire goods and accumulate assets; 30 to 49 years, the most prominent professional phase and, therefore, involving the intensification of the asset accumulation process; and 50 and over,[4] when the process of retirement begins.

Abecip research on consumer finances shows that 53% of adults possessed some sort of financial asset. This proportion increases among the older age groups, from 48% among the youngest group to 57% among the oldest. The research also shows that the most popular form of financial asset in Brazil is the savings account: 82% of individuals who have some financial assets have savings accounts. Those in the over 50 age group use savings accounts most often (87%). The high proportion of investors with savings accounts in the population means that when the spectrum of financial assets is restricted to this asset, little is lost.

In 1987, there were around 70 million active savings accounts in Brazil, though savers could have more than one account. Abecip data shows that at the same time there was an average of 1.4 savings accounts for each adult saver. The quantity of savings accounts per person increases with age, the older groups have the highest quantity, approximately 1.6. Among the youngest group, this figure is 1.3. The average balance in savings accounts is also higher for the over 50 age groups than for the youngest group (20 minimum salaries compared to 11).

The first explanation for the popularity of savings accounts can be found in the low level of income needed to open these types of accounts. These low levels are due to the operational simplicity of the monthly capitalisation period. This

4. Abecip data was organised according to these three age categories, therefore elderly people were included in the over 50 age group.

philosophy, adopted when savings accounts were introduced for the first time, results in the absence of entrance barriers in official institutions, such as Caixa Econômica Federal. In 1987, 36% of those with savings accounts held accounts in this institution.

An indication of the easy access to savings accounts is shown in the explanations given by respondents who "did not have a savings account", where the answer "very high opening limit" has a minimal proportion of respondents among all age groups. On the other hand, the preference for savings account among the elderly is shown by the fact that only 2% of individuals aged 50 or over who "did not have a savings account" explain this by stating that they prefer another type of asset, compared to approximately 38% of savers between 18 and 35.

Two reasons can be offered to explain the popularity of savings accounts among the oldest groups: first, these individuals have not actively participated in innovations occupied in the financial market, such as the introduction of stock market funds, open market operations, etc. Second, they tend to be more conservative and the savings account is considered to be one of the safest financial investments. As a result, assets with greater risks are more important for the intermediate age group. In this group, approximately 5% invest in shares and 2% in the *open market*, while among the oldest groups, these numbers are 2% and 1%, respectively.

Among the characteristics seen as important by depositors, investment risks, contained by the item "security", appear in first place with 42%. Profitability is next with 29%. Liquidity is third, but much below, with 3%. Facility to invest is also the same, 3%. Among the triad of profitability, risk and liquidity, only profitability differs between the age groups, being given a greater weight by the youngest group, 31% compared to 22% for the oldest, reflecting the higher margin for the substitution between assets preferred by the former.

3.2.2 Financial motivations

Abecip's qualitative questions about individuals' aims and motivations when deciding whether or not to invest in savings accounts allows us to investigate the importance of the theoretical approaches discussed above on the financial behaviour of individuals throughout the life cycle.

According to the survey, precautionary motives are the most important type of motive among Brazilian savers. The main objective of most savers when they

open a savings account is to use the money saved for emergencies (44%).[5] This reason is stronger for savers in the over 50 age group, (51%). The majority of elderly people say that they save to protect themselves from the uncertainties of income, in accordance with the precautionary savings model seen in the first part of the article.

The second and most important reason is to save funds for the future, which, as could be expected, is slightly higher among the youngest age group (30%) than among the oldest (28%). This result is not inconsistent with Modigliani's life cycle theory, but we will look at this question in greater detail below.

Other evidence for the life cycle theory is the intention to invest or withdraw savings in the future. The intention to invest in savings accounts in the future is 63% among the oldest age groups, falling to 78% among those aged between 18 and 29. The youngest age group deposits money most frequently: 38% had last deposited money in their savings account less than a month previously, while 38% of the oldest age group had last deposited money more than a year previously. The average date of the last deposit in a savings account was five months for the youngest group and eight months for the oldest. The main reason for the oldest group for not depositing money in savings accounts was the lack of extra money (93%). The choice of other investments was quite relevant among the youngest group (21% against 2% among the oldest) who did not invest in savings accounts.

Also consistent with the life cycle perspective, is the intention of withdrawing money from savings, it has a trajectory that grows with age (7% of the youngest group compared with 17% of the over 50 group). The oldest group are also those who withdraw money from savings most frequently, 19% had withdrawn money less than a month previously. Among the youngest, only 8% had done so. On the other hand, 24% of the youngest group had never withdrawn money from their savings accounts, while 18% among the oldest group had never done so. These results reveal the concern of the youngest group to accumulate assets to ensure stable living standards in the future, while the oldest groups used their accumulated savings to a greater extent to compensate losses of income.

In fact, the main reason for withdrawing money from savings accounts in the future for those over 50 is to complete their budget (74%). In the case of the savers aged between 18 and 29, this proportion falls to 24%. Among the same

5. Coincidently, Carrol and Sawfwick (1994) estimates that precautionary savings account for 40% of the accumulation of American stocks of wealth. Tobin (1967) calls attention to the ratio between the aggregate stock of wealth and the Gross Domestic Product (GDP) is around 4, the same shown by the simplified version of the life cycle presented in the first part of this article which is similar to that observed in the US. Brazilian data presented in Morandi (1997) is reasonably close to the results cited by Tobin (1967).

group, one of the main reasons for withdrawing money from savings in the future is to invest it in other investments (10% among the 18 to 29 group and 24% among the 30 to 49 group).

According to Abecip, Brazilians do not have the habit of saving to leave inheritance for their families. The proportion of people who save for a better future for their families is insignificant (0.39%). In this case, any inheritance left to their descendents can be seen as accidental.

Liquidity constraints, as we have seen, encourage the prior accumulation of resources by individuals to acquire indivisible assets, which can be seen in the high proportion of individuals who save to acquire high value physical assets, such as property, construction, etc., and also to acquire intangible items, such as wedding, parties, and in some cases travel. Another example of an indivisible good is the opening of an individual's own business. In general, people need to save for a long period to be able to set up their own business. According to the Abecip survey, a large number of individuals save to buy goods and property, especially among the youngest group. This corresponds to 15% of individuals under 50, compared to 9% of individuals over 50. A significant part of individuals aged between 18 and 29 also save to travel (4%). On the other hand, the proportion of people who save for construction, weddings and for setting up their own businesses is small (less than 0.5%).

4 MOTIVES, ASSETS AND THE LIFE CYCLE

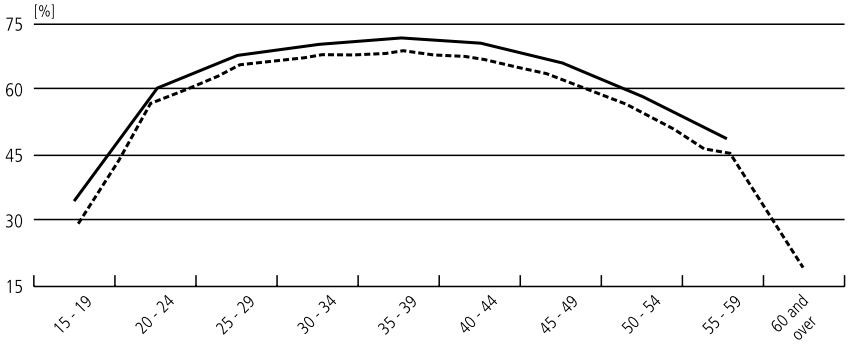
4.1 Overview

Drawing on the theoretical discussion and the qualitative results discussed above, we will emphasise in this section some of the most significant resources accumulated during the life cycle, such as: *a*) private pensions and public social security contributions that smooth fluctuations in labor earnings as suggested by the life cycle theory and the evidence presented above; *b*) small business and housing assets more subject to credit market constraints; and *c*) health insurance which plays a precautionary role in relation to morbidity risks for elderly people.

4.2 Life Cycle and Social Insurance Contributions

The fall in employment income during the life cycle reflects the reduction of occupation rates during the final phases of the life cycle, as a result of which it is necessary to look for other sources of income in order to sustain the same level of welfare. Figure 8 shows occupation rates per age group. As shown in the charts

FIGURE 8
OCCUPATION RATE



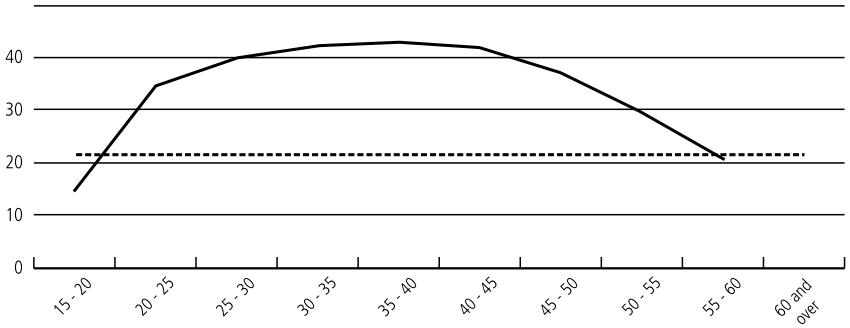
Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

related to employment income, the occupation rate has an inverted U shape, reaching the peak during the 35 to 45 age group.

A fundamental question in the evaluation of the motivations initially given by Modigliani in the life cycle theory is related to social security contributions, both public and private. Figures 9A and 9B show the contribution rates for social insurance and for private pension funds among the occupied population.

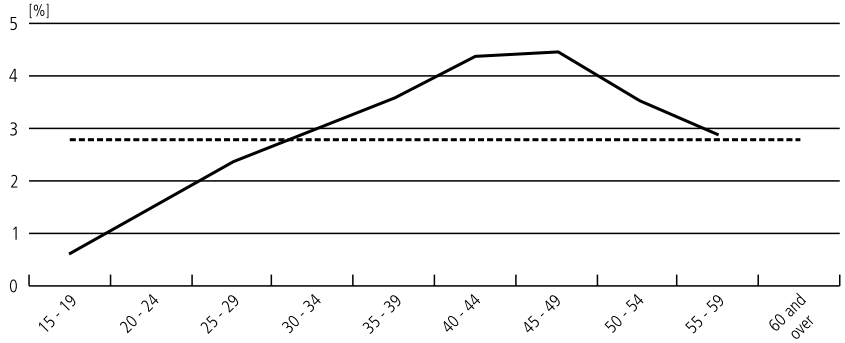
The private contribution rate is on average almost ten times lower than the social security rate. The percentages are 2.68% and 20.31% respectively. Looking across age groups, it can be seen that the groups with the highest contribution rates are distinct depending on the type of insurance. Contributions to public social insurance are more uniformly distributed in the 25 to 50 age groups, with a peak in

FIGURE 9A
RATE FOR SOCIAL SECURITY CONTRIBUTIONS AMONG THE OCCUPIED POPULATION



Source: CPS/Ibre/FGV based on microdata from the PNAD 2002/IBGE.

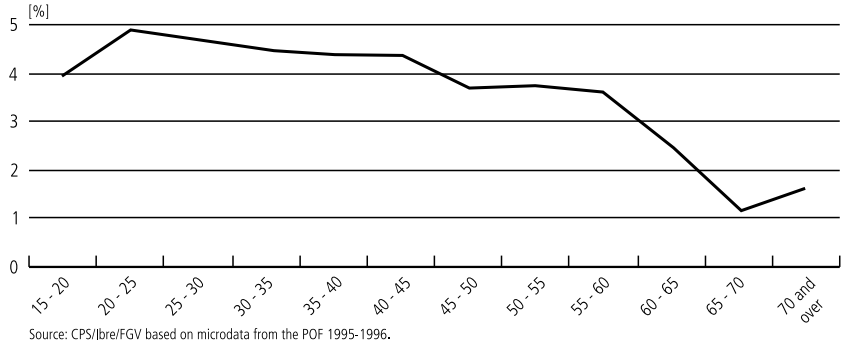
FIGURE 9B
RATE FOR PRIVATE PENSION FUNDS AMONG THE OCCUPIED POPULATION



the 35-to-40 group (41.57%). The peak of private insurance contributions is in the 45-to-49 age group (4.36%).

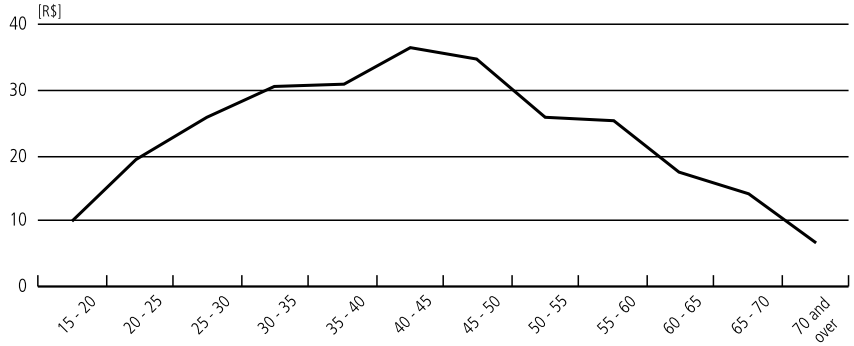
The Brazilian Institute of Geography and Statistic [Instituto Brasileiro de Geografia e Estatística (IBGE)] 1996 Family Budget Survey [Pesquisa de Orçamentos Familiares (POF)] provides information about the monetary values spent on insurance contributions among the occupied population working in the private sector in Brazilian metropolitan regions. It can be seen that the volume of contributions increases in accordance with age until the 40-to-45 age group. Then, the ratio between contribution and income falls during the rest of the life cycle, due to the greater growth of average income compared to the value of the average contribution until 50 and because of an expected fall in the volume of contributions of the elderly as they reach the age of retirement.

FIGURE 10A
RATIO BETWEEN CONTRIBUTION AND INCOME—OCCUPIED POPULATION IN THE PRIVATE SECTOR



Source: CPS/Ibre/FGV based on microdata from the POF 1995-1996.

FIGURE 10B
VOLUME OF CONTRIBUTIONS—OCCUPIED POPULATION IN THE PRIVATE SECTOR



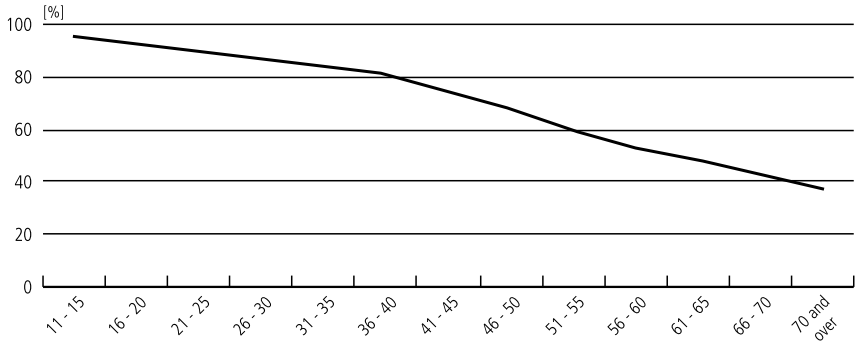
4.3 Precautionary Motives and Health Insurance

According to the Abecip research, the most popular financial asset in Brazil is the savings account and the main reason given for opening savings accounts is the precautionary motive: 44% of savers explicitly open them as a way of dealing with possible emergencies, including 51% of the oldest group. Precautionary demand aims to improve the ability to deal with adverse shocks. The role of smoothing consumption through assets occurs due to the importance of shocks and the emergence of various parts of the financial market that allow the smoothing of the impact of shocks on the level of welfare. Therefore, the greater the presence of shocks and the worse the types of insurance available, the greater will be the need for this type of range of financial products.

Factors related to the life cycle are related morbidity risk dub to the natural ageing process. Some types of health needs can be seen in the series of Figures 11A to 11F. The self-evaluation of health (good and very good) assumes decreasing proportions as the individual ages. On the other hand, measures of morbidity displays increasing behaviour as a function of increased age.

The possession of health insurance also shows increasing monotonic behaviour, because of the increased need of individuals of advanced ages to use health services. In relation to the difference between health insurance services, behaviour is homogeneous among different age groups. In relation to the cost of health insurance, it can be seen that the proportion of individuals who spend less than R$ 50 on their health insurance decreases with age. Here, it is clear that the value of monthly payments is proportional to age, since the probability of death or illness increases with age.

FIGURE 11A
SELF-EVALUATION OF HEALTH (GOOD AND VERY GOOD)



Source: CPS/Ibre/FGV based on microdata from the PNAD/IBGE 1998 Suplement.

FIGURE 11B
MEASURES OF MORBIDITY

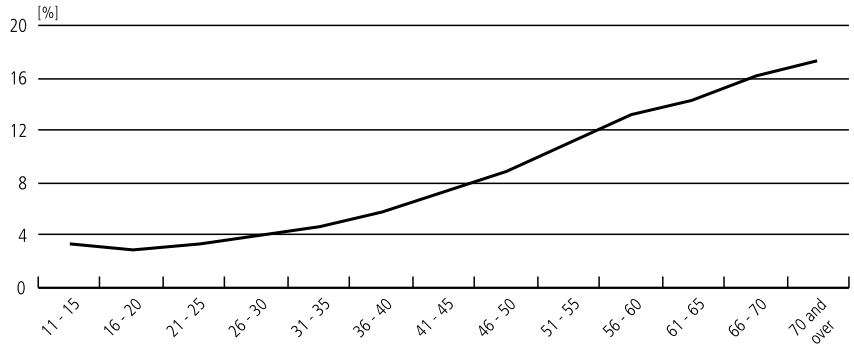
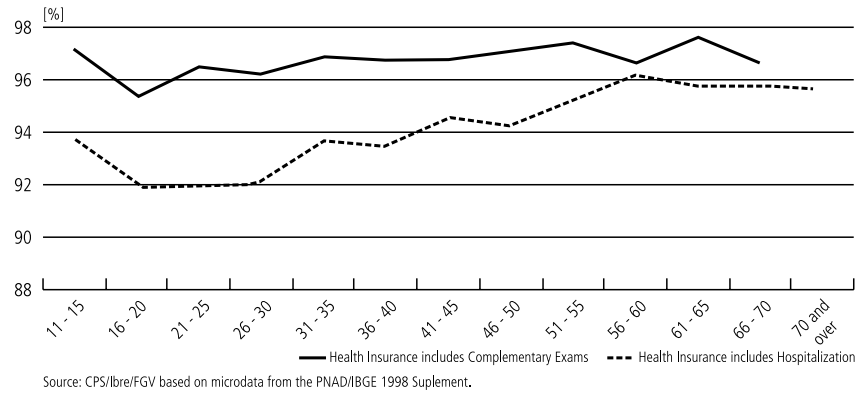


FIGURE 11C
DIFFERENCES BETWEEN HEALTH INSURANCE SERVICES



Source: CPS/Ibre/FGV based on microdata from the PNAD/IBGE 1998 Suplement.

FIGURE 11D
POSSESSION OF HEALTH INSURANCE

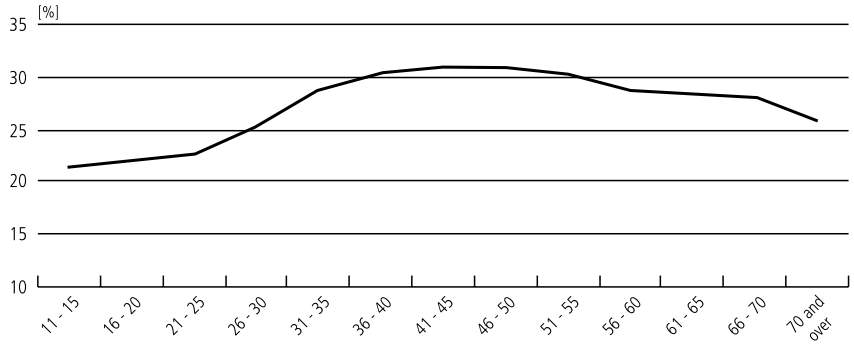
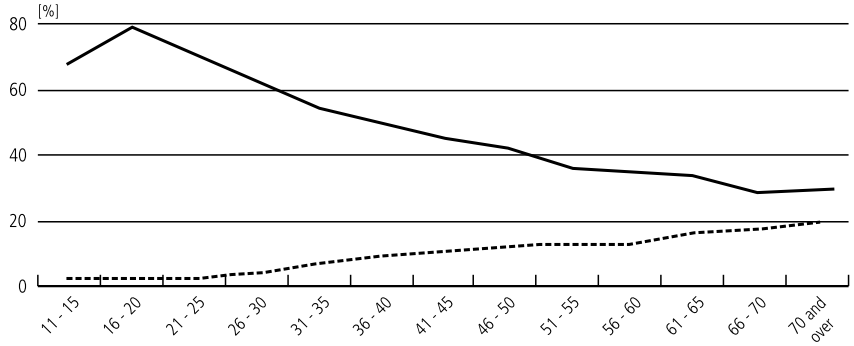


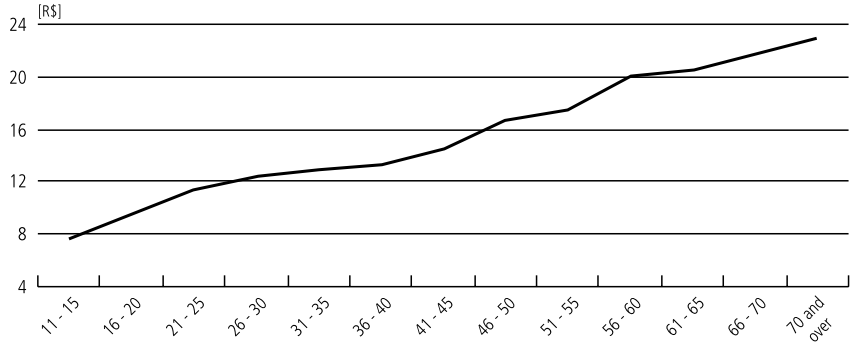
FIGURE 11E
VALUE OF MONTHLY PAYMENTS OF HEALTH INSURANCE



Source: CPS/Ibre/FGV based on microdata from the PNAD/IBGE 1998 Suplement.

Less than R$ 50 — More than R$ 200

FIGURE 11F
NEEDED HEALTH SERVICES IN THE LAST TWO WEEKS

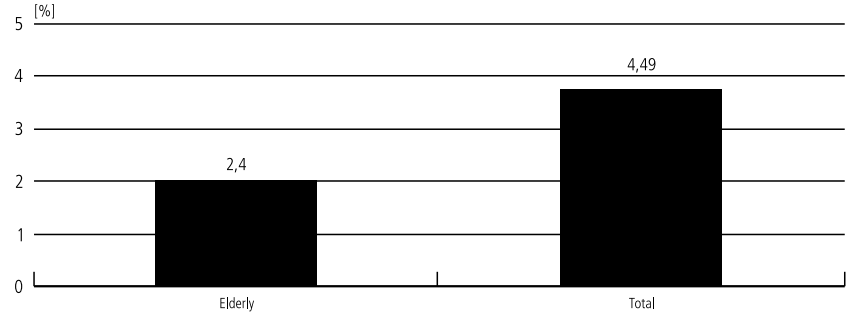


4.4 Credit Restrictions: Real State and Entrepreneurship

4.4.1 The use of credit

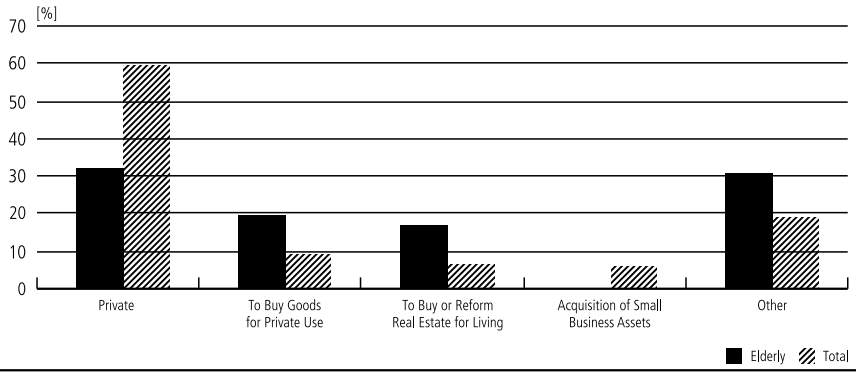
Questions included in the Living Standards Measurement Survey [Pesquisa de Padrões de Vida (PPV)] about credit and loans can provide us with information about an alternative vision of the Modigliani life cycle. As Figures 12A and 12B show, the proportion of individuals who contract loans is inversely related to age. The youngest are those who most obtain them, 6.3% of the 15-to-25 age group. This figure declines in the different age groups, falling to 2.4% among individuals in the over 65 group. In general, individuals take out loans using private means (76% from other individuals or loan sharks). Among the youngest (less than 35) and the oldest (over 65), in other words the polar age groups, this proportion is higher, being approximately 90% and 85%, respectively.

FIGURE 12A
USE OF CREDIT AND LOANS OVER THE LAST 30 DAYS



Source: CPS/Ibre/FGV based on microdata from the PPV 1996-1997.

FIGURE 12B
MOTIVATION FOR OBTAINING LOANS



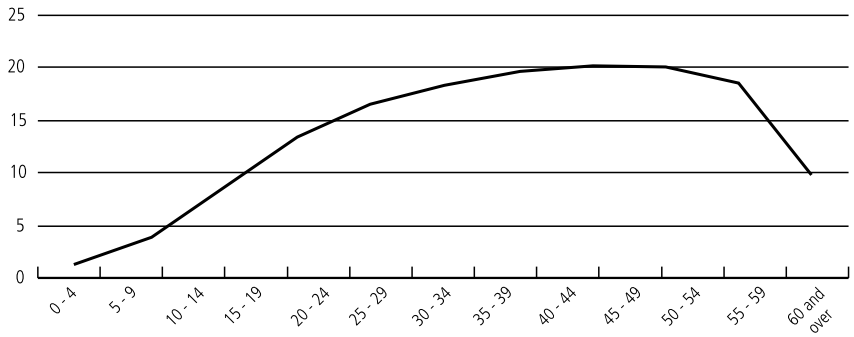
The motivation for the acquisition of physical property assets, goods for private use, and goods associated with business activities are the most important reasons given for obtaining loans. Buying or renovating the family house is especially important among the oldest groups, accounting for 17% of loans taken out by elderly people compared to 6.3% for the total population. Similarly, the purchase of goods for private use is responsible for 20% of demand for credit among the elderly, while for the population in general this figure is 9.2%. Finally, the acquisition of small business assets is absent from the sample of elderly people, while for the population in general it accounts for 5.6%. This reflects the lower occupation rate of the elderly population and the lower tendency to make new investments in productive physical capital in the final phase of the life cycle.

4.4.2 Occupational choices

Turning the life cycle analysis to occupational strategies, more specifically small business strategies, it can be seen that access to self-employment and employer positions follows an inverted U shaped trajectory throughout the life cycle, with high growth rates in the first age groups, increasing during the life cycle, peaking in the middle aged groups (50 to 55 and 40 to 45, respectively) and declining afterwards.

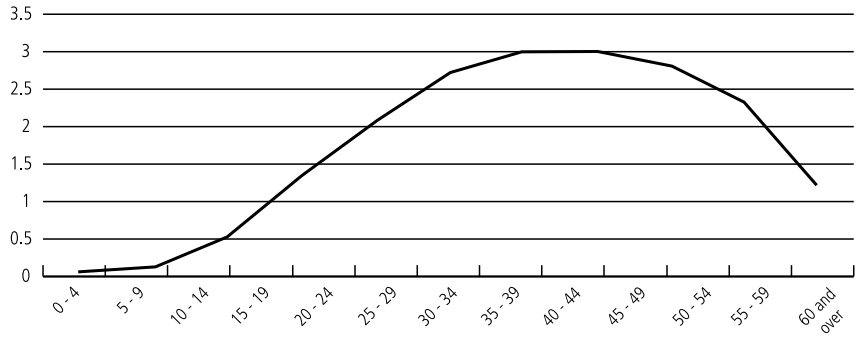
There is a greater probability for individuals to gain the status of a small entrepreneurs during middle age. It is important to note that the declining period in the occupation rate for self-employment and employers in the later phases of the life cycle is more pronounced that the ascending phase during youth. These differences can be basically explained by the reduction in the occupation rate in relation to population of an economically active age, which intensifies after 40. As

FIGURE 13A
ACCESS TO SELF-EMPLOYMENT POSITION



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 13B
ACCESS TO EMPLOYER POSITION



has already been noted, the peak of the occupation rate is reached in the 40-to-44 age group (65%) and falls afterwards, dropping to a value of 21% among the Brazilian elderly.

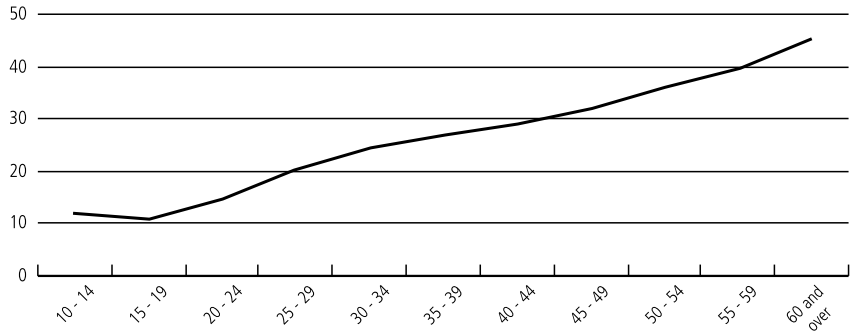
In Figures 14A and 14B, it can be seen that the rate of access to self-employment and employer positions is dependent on the individual being occupied. It should also be noted that the rate of access to both self-employment and employer positions increases with age. However, the increase in self-employment among the economically occupied is more pronounced in the older groups. Between the 40 year old and the 60 year old age groups, this rises from 28% to 45%. The evolution of the proportion of employers among the economically occupied does not increase so markedly, rather it increases at lower rates, reaching its maximum point among the elderly age group, 5,5%.[6]

This analysis reveals that there really is delayed access to the position of small entrepreneurs among those who are occupied. Nonetheless, the relative importance of the asset accumulation process and credit constraints versus difficulties in finding positions in the labour market for older people cannot be directly inferred from the data presented here.

The data related to sources of financing for the opening of businesses with five of less employees obtained from the 1997 Informal Urban Survey [Pesquisa Informal Urbana (Ecinf/IBGE)] show that finance from new businesses (*seed money*) rarely comes from the financial system (Figure 15A). The reduced role of inheritance in Brazil is an important difference in relation to developed countries, perhaps because of the relative importance of public transfers through retirement benefits that are not

6. For a more detailed analysis see Wajnman, Oliveira and Oliveira in this book.

FIGURE 14A
ACCESS TO SELF-EMPLOYMENT POSITION AMONG OCCUPIED POPULATION



Source: CPS/Ibre/FGV based on microdata from the 2000 Census.

FIGURE 14B
ACCESS TO EMPLOYER POSITION AMONG OCCUPIED POPULATION

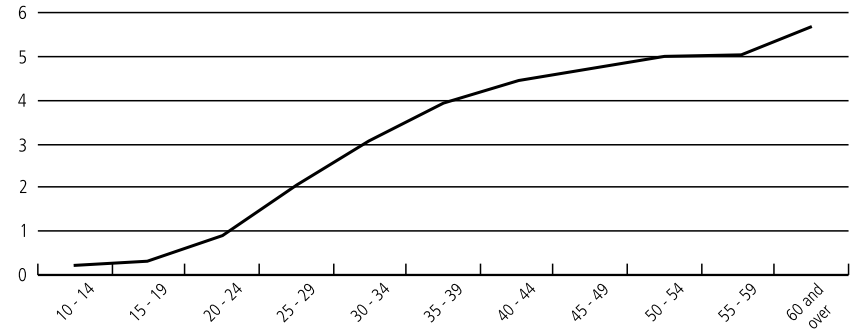
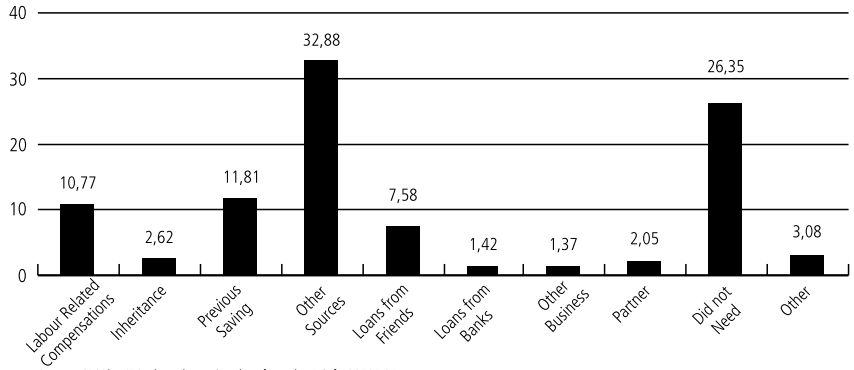


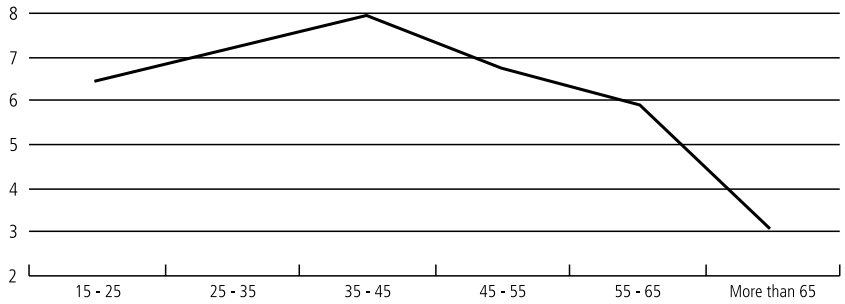
FIGURE 15A
SOURCES OF FINANCING FOR THE OPENING OF BUSINESSES



Source: CPS/Ibre/FGV based on microdata from the Ecinf 1997/IBGE.

passed through generations. In general terms, new businesses that do not receive an injection of capital due to their precariousness use previous savings, an indicator of the conjunction of indivisibilities and credit constraints. Curiously, the main external source of resources are labour related compensations. The analysis of financial flows per age group reveals that among settled urban entrepreneurs the percentage of those who obtained loans in the previous three months is lower among elderly people (2.9%) than the population in general, confirming the evidence from the PPV (see Figure 15B).

FIGURE 15B
PERCENTAGE OF THOSE WHO OBTAINED LOANS IN THE PREVIOUS THREE MONTHS



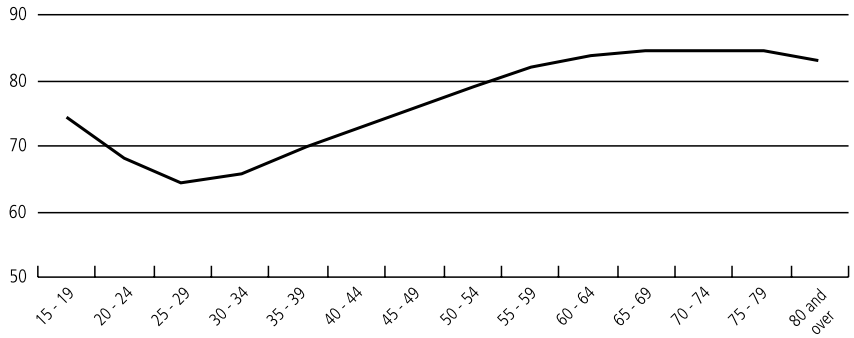
4.4.3 Real state

As we have seen, people who want to acquire their own home can encounter two types of constraints: the indivisibility of goods and credit rationing. Individuals who encounter liquidity constraints need to accumulate resources in advance, since there are no perfect credit markets. The young, who have more need for credit, have rates of access to their fully paid for homes lower than those of elderly people. This rate grows in accordance with age due to older age groups' greater access to the credit market and the need to accumulate to acquire high value goods due to credit constraints for young people.

Figures 17A and 17 B can be used to compare the value of households among those who own and those do not own their land for the population as a whole and for the elderly population. The charts are quite similar, with the values of households be higher in owned land, irrespective of age.

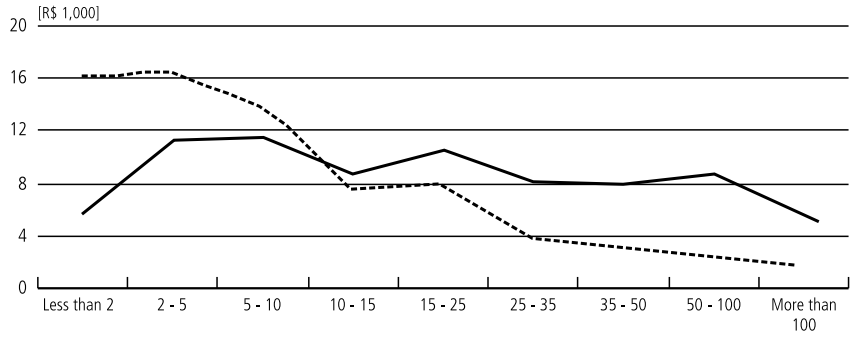
Figures 18A and 18B show that elderly people have more access to their own land, whether it has been fully paid for or they are still paying for it. This better definition of land holding rights allows greater access to credit for elderly people

FIGURE 16
RATE OF ACCESS TO FULLY PAID FOR HOMES



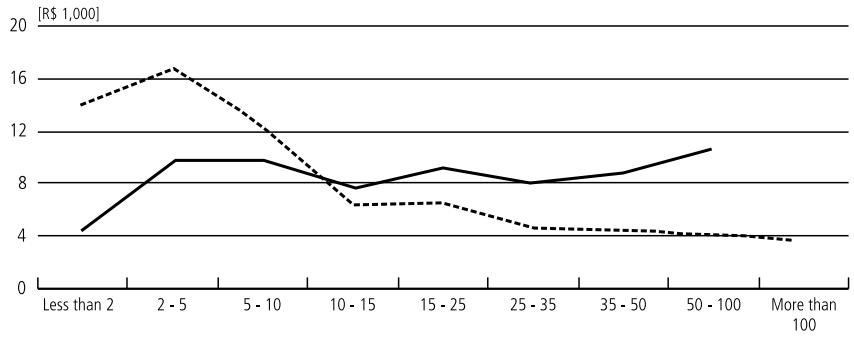
Source: CPS/Ibre/FGV based on microdata from the PNAD/IBGE 2002.

FIGURE 17A
VALUE OF HOUSEHOLDS FOR THE POPULATION AS A WHOLE



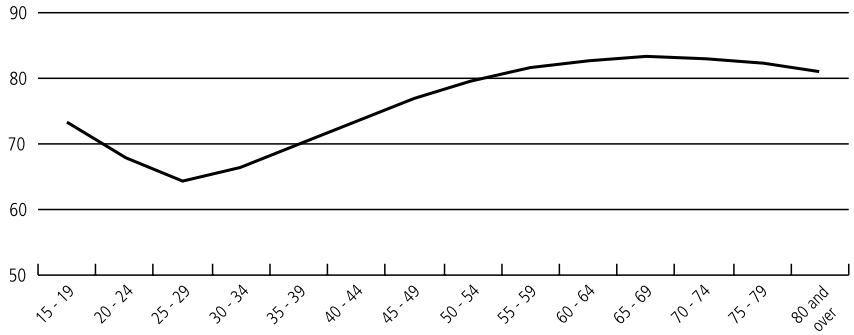
Source: CPS/Ibre/FGV based on microdata from the PNAD/IBGE 2002. — Owned Land - - - Not Owned Land

FIGURE 17B
VALUE OF HOUSEHOLDS FOR THE ELDERLY POPULATION



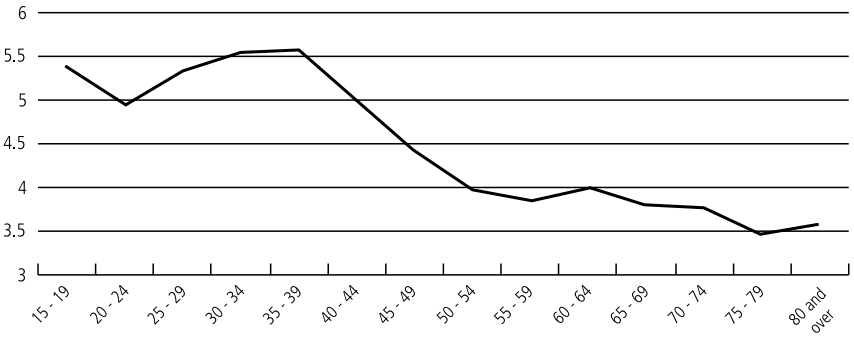
Source: CPS/Ibre/FGV based on microdata from the PNAD/IBGE 2002. — Owned Land - - - Not Owned Land

FIGURE 18A
ACCESS TO OWN LAND



Source: CPS/Ibre/FGV based on microdata from the PNAD/IBGE 2002.

FIGURE 18B
NOT ACCESS TO OWN LAND



and raises the value of their properties. In other words, using the terminology of Hernando de Soto, the capital of elderly people is more alive (and more valuable) than that of others.[7]

5 CONCLUSION

This work investigated the process of the accumulation and depletion of financial resources throughout the life cycle, giving a special emphasis to the demand for assets, credit and insurance in old age. Since the Brazilian literature on this theme is incipient, we tried to check whether the main stylized facts found in the literature

7. Hernando de Soto in his book *The Mystery of Capital* argues that the problem of the poor is not the low quantity, but the low quality of capital. The high informality of property results in a reduction of the market value of the assets of the poor, a type of dead capital in the conception of Soto.

are observed in various sources of microdata available in the country. The study gave a brief theoretical overview of the reasons behind the demand for long-term assets by individuals and an empirical evaluation of the qualitative nature of these motivations.

The life cycle theory is frequently presented as the main motivation for long-term demand for financial assets by individuals. According to this theory, the fall in income in old age causes the prior accumulation of financial assets by individuals, in order to maintain a stable standard of consumption throughout the life cycle. We have observed occupation and earnings trajectories that create bell-shaped earnings profile. The rates of social insurance contributions, both public and private, follows movements consistent with Modigliani hump savings hypothesis, as do the values of average contributions.

The most popular financial assets in Brazil are savings account deposits. They are most used by older people, who also have the highest number of accounts and that save the largest amounts. The second most important reason given by savings account holders is to save funds for the future. As expected from the viewpoint of the life cycle theory, this motivation is highest among the young. This result, as well as the lower level of deposits and higher amount of withdrawals by elderly people, is also consistent with Modigliani's theory.

More generally speaking, the relative evidence of labor earnings flows compared with alternative incomes shows the existence of strong smoothing behaviour of total incomes in more advanced ages for all educational levels as predicted by the life cycle hypothesis. On the other hand, to the contrary of the striped-down version of the life cycle, we observed during young ages positively inclined income trajectories from all sources—as well as for consumption—,which questions the ability of young people to smooth out consumption across their life span.

The inclusion of the possibility of indebtment in the initial period of active life gives us a complementary perspective to that proposed by Modigliani. In this initial period, the desire for consumption is generally higher than income, whether because of the lack of experience of those who are employed, high levels of unemployment, or the need for time and financial resources to invest in human capital, resulting in a demand for loans. If individuals do not encounter credit market constraints, they will finance consumption based on credit, alternatively, they will force into a "corner solution" consuming all their income during a period of professional ascension. Similarly, we provided evidence that the demand for credit, whether from individuals or companies, formal or informal, is stronger at young age.

According to the literature about family financial behaviour, the process of smoothing consumption during the life cycle is affected by three main factors: *a*) credit constraints; *b*) inheritance; and *c*) uncertainty.

First, credit constraints are understood as a lower limit to the volume of assets, therefore, by definition they raise the stock of savings. The desire to acquire indivisible goods with high unit values—such as real state—reinforces even further the affects of liquidity restrictions on the demand for savings. In fact, a part of those who have savings accounts deposits, especially the young, state that the reason for this is to acquire indivisible goods.

The evidence presented here is consistent with this hypothesis for two particular types of indivisible goods: real state and productive assets. Access to small business occupations takes place at advanced stages of the life cycle, while access to initial financing (*seed money)* rarely comes from the financial system. The main source of finance is previous savings that reflects the combination of indivisibilites and credit restrictions. In terms of property capital, in addition to delayed access to home ownership and income from rent, we noted that elderly people have better defined property rights, giving leverage to access to credit and value to their properties.

Second, in the case of inheritance, the individual saves to finance the consumption of descendents. Nevertheless, in opposition with the evidence reported for developed countries, the rare use of inheritance to finance new business, points to its low importance in Brazil. In addition, Brazilian—elderly people in particular—do not have the habit of investing in savings accounts to guarantee the future of their descendents. In this case, observed inheritances could be considered accidental.

Third, the precautionary motive derived from a situation of uncertainty in relation to the future encourages demand for various financial instruments. The demand for social insurance, both public and private, analysed previously, serves to absorb adverse shocks. Health insurance is another fundamental instrument in old age due to the increase in morbidity risks. The increasing investment of resources in health insurance during the life cycle observed is less connected to access to health insurance, but rather to the greater value—and more intensive use—of these plans. Finally, the main reason given to invest in savings accounts is precautionary: almost half of elderly savers save explicitly to deal with possible emergencies.

ANNEX 1

DATABASE DESCRIPTION

Demographic Census

The 2000 Demographic Census Sample is a household survey that seeks to interview 10% of the Brazilian population throughout the country. The Census classifies people and occupations of all household members. The Census provides detailed information about various income sources, on the access to housing, public services and durable goods among other assets.

PNAD

PNAD is a household survey carried out in the 3/4 of each year, covering 100,000 dwellings. This survey provides detailed personal and occupational characteristics from all household members, on access to housing, public services, durable goods, etc. In 2002, PNAD introduced new variables in the questionnaire, such as classes of property according to value and area.

Financial Behaviour Survey of Abecip

This survey was carried out by Abecip in 1978, 1980, 1983, 1985 and 1987. We used the secondary data from the 1987 survey, according to which 3,600 households in the eight biggest Brazilian metropolitan regions were interviewed. The Abecip survey provided information on the possession of financial assets and portfolios composition, but the main focus was on savings accounts. The survey obtained data about the amount of money saved, the number of accounts held, motivations, how long accounts had been held for, and estimate of future deposits and withdrawals, reasons for not opening a savings account, reasons for not making deposits in savings accounts, reasons and taken and timing to close accounts, perceptions of changes in various laws related to savings accounts, the characteristics perceived of sums deposited in savings (return, liquidity and risk), etc.

PPV

A basic source for primary data used was the access to different types of assets examined by PPV. The main advantages of the PPV are that it connects the use of these assets and a vast array of dimensions of households.

The PPV actually corresponds to the Brazilian version of the Living Standard Measurement Survey (LSMS) and was carried out in Brazil only once—in 1995-96 in a joint project between the World Bank and IBGE. A sample of 5,000

households was taken in the Northeastern and Southeastern regions. Like PNAD, this survey also contains detailed information about the personal and occupational characteristics of individuals, possession of durable goods and housing conditions. The PPV questionnaire has special sections about consumption (at a desegregated level), individual financial behaviour, the evaluation of access to public services, (health, infrastructure, education).

POF

The main objective of this survey is to obtain the consumption structure of the population in order to create weightings to calculate Inflation Indices [Índice de Preços ao Consumidor Amplo (IPCA), Índice Geral de Preços (IGP), etc.]. It allows a more detailed analysis of the living standards of the population, especially information about the value of insurance contributions and their participation in income.

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