



CENTRO STUDI IN ECONOMIA E FINANZA

---

CENTRE FOR STUDIES IN ECONOMICS AND FINANCE

**WORKING PAPER no. 1**

*The Determinants of Saving:  
Lessons from Italy*

*Tullio Jappelli and Marco Pagano*

**MARCH 1998**



DIPARTIMENTO DI SCIENZE ECONOMICHE - UNIVERSITÀ DEGLI STUDI DI SALERNO

Via Ponte Don Melillo - 84084 FISCIANO (SA)

Tel. 089-96 3167/3168 - Fax 089-96 3169 – e-mail: [csef@xcom.it](mailto:csef@xcom.it)

## **WORKING PAPER no. 1**

### ***The Determinants of Saving: Lessons from Italy***

**Tullio Jappelli\* and Marco Pagano\***

**March 1998**

Paper prepared for the Conference on “Determinants of Domestic Savings in Latin America”, organized by the Inter-American Development Bank, Santafè de Bogotá, 15-17 June 1996. We thank Mauricio Cardenas, Mike Gavin, Ricardo Hausmann and Ernesto Talvi for comments.

\* Department of Economics, Università di Salerno (Italy) and CEPR.

## TABLE OF CONTENTS

### *Introduction*

1. *The long-run historical record*
2. *International perspective: the role of growth and fiscal policy*
3. *Other reasons for the decline in saving*
  - 3.1 Credit and insurance markets
  - 3.2 Social security
  - 3.3 Demographic factors
4. *Do micro data help us to understand the decline in saving?*
  - 4.1 Decomposing the SHIW saving rates
  - 4.2 Sensitivity of the results
  - 4.3 Assessing the microeconomic evidence
5. *Conclusions: can we reconcile the macro and the micro evidence?*

## *Introduction*

Understanding the determinants of the aggregate saving rate is a crucial prerequisite in designing a number of policy interventions, from the design of the tax and social security system to the layout of financial markets regulation. It is therefore not surprising that the analysis of saving behavior has become one of the central issues in empirical macroeconomics (see Browning and Lusardi, 1996, and Deaton, 1992 for recent surveys). In this paper we contribute to this large and growing body of empirical research by focusing on the Italian experience. In fact, the behavior of the Italian saving rate deserves special attention, for at least two reasons.

First, in this century Italy turned from an underdeveloped, mainly agricultural economy into one of the main industrial nations in the world, and during this transition it experienced wide fluctuations in its saving rate. These fluctuations provide an interesting environment to understand if saving has been the driving force of capital accumulation or rather has passively responded to exogenous changes in the economic growth rate – one of the key unsolved issues in the literature (Deaton, 1995).

Second, in most of the postwar period, Italy featured an abnormally high saving rate compared to that of most other industrialized countries. But in recent years this is no longer true. Under any definition of saving, in the last decade the Italian saving rate has fallen below the average of the developed countries. Why was the Italian saving ratio comparatively high and why has the decline been so dramatic? We consider various potential answers to both of these questions.

In our inquiry we look at the evidence from three different standpoints, drawing on new data sets as well as on results already available in the literature. Initially, we analyze the long-run record, by drawing upon more than one century of time series data. We then put the Italian saving experience in international perspective and compare it with the evidence for the main developed countries. Finally, we check if the theories consistent with the macroeconomic evidence are also borne out by the microeconomic data available for the 1980s and early 1990s.

Our main results can be summarized as follows. The long-run historical record and the international data point to a very strong contemporaneous correlation between national saving and growth. The data also reveal that in the Italian historical experience growth tends to lead saving, rather than the opposite. This finding is consistent with the predictions of several models,

including Modigliani's (1986) life-cycle model and endogenous growth models.

We also uncover two stylized facts that characterize the dynamics of the Italian saving rate in the post-war period. In the 1960s and 1970s the Italian national saving rate was comparatively high even conditioning on growth and government saving. In the 1990s, instead, the Italian saving rate was back in line with the international average. The macroeconomic evidence is consistent with several potential explanations for these dynamics: the fluctuations in productivity growth, the pervasive borrowing constraints and imperfections of insurance markets (followed by some liberalization in the late 1980s), the transition to an unfunded and increasingly generous social security system in the late 1960s and 1970s, the spectacular drop in fertility, the increasing tax pressure associated with the build-up of public debt, and the changing tastes of Italian households.

Some of these explanations of the changes in aggregate saving behavior have testable implications at the microeconomic level. For example, the growth-saving nexus suggested by the life-cycle model arises from the fact that productivity differs across generations, the young being more productive than the old. In a growing economy, net saving is positive because the young are richer than their parents, and therefore increases with the income differential between successive generations. One testable implication of the theory is that a change in productivity growth should not affect the individual propensities to save of different generations, but rather the relative income shares of the young and the old.

When this prediction is tested with data drawn from the 1984-93 Survey of Household Income and Wealth, it receives very little support: microeconomic data suggest that almost all the reduction of household saving in the last decade is due to a fall in the saving rate for all the age groups, not to a change in their relative income shares and in their relative size. One possible explanation for this finding is that the declining saving rates of the last decade are not due to a decline in growth, as suggested by the time-series evidence, but rather to other shocks, such as asset price changes or preference shifts. Alternatively, one must abandon the life-cycle framework, and turn to models in which productivity growth is positively correlated with individual saving rates, and not only with the aggregate saving rate.

## 1. *The long-run historical record*

Economic theory suggests that productivity and population growth are the main candidates to explain variation in saving rates, both across countries and over time. This prediction is validated by much empirical work showing that a positive correlation between saving and growth is one of the most robust stylized facts in macroeconomics (Levine and Renelt, 1992; Carroll and Weil, 1995). Although most of the empirical studies on saving have used post-war data, this correlation is not peculiar to that period.

The correlation is apparent from Figure 1, which shows the time series of the national saving rate and the growth rate of real GDP in Italy in the 1862-1990 period.<sup>1</sup> This figure shows that Italy has not always been a high-saving country, contrary to what is commonly held. The swings of saving and growth are very remarkable, reflecting the length of the period of observations, the presence of two major wars and the succession of different regimes and political institutions. The period that runs from 1862 until the turn of the century is essentially characterized by economic stagnation. The years between 1897 and 1907 represented, in all respects, the period of most rapid growth that the Italian economy had experienced; in fact also the national saving rate rises to an average of 10.2 percent in the first decade of the century. After WW2, the net national saving rate increased tremendously during the “economic miracle” of the 1950s and 1960s, and then declined steeply in the 1970s and 1980s, reverting in 1990 to the same level of the early 1950s.

The next figures offer greater detail about the secular behavior of the Italian saving rate. Figure 2 shows the time series pattern of net national saving and of its breakdown into government saving and net private saving from 1862 to 1950, that is, from the unification of Italy to the inception of the “economic miracle”. In the two world wars, net national saving dipped dramatically owing to the enormous dissaving by the government sector,

<sup>1</sup> In the figures and regressions of this section, the growth rate is computed as the rate of change of net national income, government saving is defined as the public sector budget surplus net of investment outlays, and private saving is defined as national saving minus government saving. Data sources are as follows. For the 1861-1951 interval, net national saving and net national income are drawn from *Statistiche storiche italiane*, Istituto Italiano di Statistica (ISTAT), 1985, Table 115, pp. 217-8; government saving is drawn from Modigliani and Jappelli (1987). For the 1952-1990 interval, net national saving, net national income and government saving are drawn from Pagliano and Rossi (1992), Tables 15 and 17.

reflecting the financing needs associated with the wars, while private saving held its level or even increased, largely due to the “forced saving schemes” imposed by the government.

The picture, however, changes considerably if private and government saving are adjusted for inflation, as done in Figure 3. The inflation adjustment consists in deducting the reduction in the real value of government nominal debt due to inflation from the private sector income, and adding it to the revenues of the government. Since this adjustment captures inflation-induced transfers from the private to the public sector, it only applies to the saving rates of the private and public sector, but not to the national saving rate, which is unaffected by inflation. Due to the relatively low rates of inflation up to WW1, the adjusted figures do not differ much from the unadjusted ones. In the two war periods, instead, inflation induces massive redistribution of resources from the private to the government sector: adjusted government saving falls much less than the unadjusted figures, and correspondingly the adjusted private saving rate falls dramatically.

Figures 4 and 5 present the same breakdown of national saving for the 1950-1990 period. Since the unadjusted private saving rate falls far less than the national saving rate (Figure 4), one may be led to conclude that the steep decline of the saving rate in the last 20 years arises mainly from the behavior of the government sector. But this is misleading once the saving rates are adjusted for inflation (Figure 5): the inflation-adjusted private saving rate declines much more steeply in the 1970s and 1980s than the unadjusted rate. Symmetrically, the decline in the government saving rate is far smaller after it is adjusted for inflation, especially in the 1970s. Again, this is because the high inflation rates of the 1970s and early 1980s effected a large transfer of wealth from the private to the public sector. The capital loss born by the private sector was especially large because at the beginning of the 1970s Italian households held a large amount of their financial wealth in the form of long-term nominal public debt, whose price collapsed under the impact of the sharp rise in inflation and nominal interest rates.

What is behind the large changes in saving? The most natural answer is again to look at the relationship with growth. As shown in Figure 1, the national saving rate has been high at times of high growth, *i.e.* at the beginning of the century and in the 1950s and 1960s, and has declined during the productivity slowdown of the 1970s and 1980s. But of course the existence of a contemporaneous correlation cannot be taken as an argument

for the fact that exogenous changes in growth have driven aggregate saving behavior: the causal relationship may well go in the opposite direction.<sup>2</sup>

A piece of evidence on this point can be obtained by considering the Granger-causality between growth and saving. We do this by estimating a two-lag vector autoregression of the growth rate  $g_t$  and the saving rate  $s_t$  over the 1862-1990 period. In order to concentrate on the low frequency relationships in the data, we take 5-year averages as our observations. Since the 5-year intervals corresponding to WW1 and WW2 are excluded from the sample and two lags of the regressors are included, the sample includes 22 observations. The estimates are reported below (t-statistics in parenthesis):

$$s_t = 0.02 + 0.71s_{t-1} - 0.18s_{t-2} + 0.26g_{t-1} + 0.57g_{t-2} \quad \bar{R}^2 = 0.82 \quad (1)$$

(1.49) (3.27) (-0.95) (1.34) (2.85)

$$g_t = 0.23 - 0.09s_{t-1} + 0.01s_{t-2} + 0.22g_{t-1} + 0.32g_{t-2} \quad \bar{R}^2 = 0.15 \quad (2)$$

(1.54) (-0.31) (0.05) (0.87) (1.23)

The  $F$  test that the coefficients of the two lags of the growth rate in equation (1) are zero rejects the null hypothesis (at the 1.7 percent significance level), *i.e.* past growth does not help in predicting saving. The symmetric test on the two lags of the saving rate in equation (2) instead does not reject the null hypothesis that past saving does not predict growth (the null can be rejected only at a 90 percent significance level). While Granger causality tests provide no conclusive evidence for the existence of causal relationships, it is still informative that the rise and decline of the growth rate in the postwar period have preceded the corresponding changes in saving rate, rather than followed it.

<sup>2</sup> A causal relationship from saving to growth is predicted by most growth models. In endogenous growth models, for instance, a preference shift which leads to a higher saving rate also increases the steady-state growth rate of the economy. In a neoclassical growth model, the same preference shift increases growth along the transition path to the new steady-state.

## *2. International perspective: the role of growth and fiscal policy*

Do fluctuations of the Italian saving rate reflect a time pattern common to most developed countries, or are they idiosyncratic to the Italian economy? To answer this question, in this section we set the Italian experience against the backdrop of the international evidence.

In the 1960s and the 1970s, the Italian saving rate was truly exceptionally high by international standards. According to all measures of saving (net, gross, national, private) in the G10 only Japan exhibited a higher saving rate. As shown in Table 1, in those two decades Italy's gross national saving rate exceeded the average rate of the G10 by 3.2 and 1.9 percentage points respectively. For private saving, the difference was even larger: 8 percentage points in the 1960s and 8.7 points in the 1970s. But in the 1980s the saving gap between Italy and the other developed economies started to narrow: it fell to 1 percentage point for national saving and 6 percentage points for private saving. And in the early 1990s the situation reversed, at least as far as the national saving rate is concerned: Italy's national saving is currently below the G10 average, and its private saving rate is below that of Japan, Germany, Belgium and the Netherlands.

So the Italian saving rate started from a higher level in the immediate postwar years but declined more rapidly than in other developed countries: in the last 35 years, its gross national saving declined by 9.9 percentage points versus 4.3 in the G10. Only half of this decline can be attributed to the reduction of government saving, which went from -0.8 percent to -6.3 percent of GDP. This represents a striking difference relative to the other G10 countries. On average, this group experienced no change in its gross private saving rate between the 1960s and the early 1990s: the 4.3 fall in its national saving rate reflects precisely its fall in government saving.

Net national saving is the appropriate indicator of the resources available for capital accumulation, because it subtracts capital consumption (depreciation) from gross national saving. In Table 2 we report net national saving and its breakdown into private and government saving. Both components of the national saving rate are inflation-adjusted. Due to the increased share of depreciation in GDP, the decline in net national saving is almost twice as large as the gross saving figures. But the comparison between Italy and the other countries is unchanged compared to Table 1. Italy still appears to be a high-saver in the early postwar period, and turn

into a below-average saver in the early 1990s. And the decline of its national saving rate now appears to reflect almost entirely the fall in its private saving rate (11.1 out of 11.6 percentage points), in contrast with the G10 average (where it explains 3.1 out of 7 percentage points).

Based on the evidence analyzed in section 1, the growth performance of the Italian economy is a natural candidate to explain this different performance of Italy's saving rate. In Figure 6 we plot time averages of each country's net national saving against the corresponding averages of the real GDP growth rate. There are 4 observations for each G10 country, corresponding to the 1960-69, 1970-79, 1980-89 and 1990-94 intervals (40 observations).

The scatter confirms that growth and saving are positively correlated. The correlation is also captured by the fitted values of the simple regression of saving on growth (the estimated coefficient of growth in this regression is 2.09, with a T-statistic of 5.81). The four observations for Italy (ita60, ita70, ita80 and ita90) are omitted from the regression. The purpose is to investigate if and when the Italian saving rate has been comparatively "high" or "low", conditioning on the relation between growth and saving prevailing in the rest of the sample and on the observed growth rate in Italy. The observations corresponding to the first two subperiods are above the fitted regression line. So the Italian saving rate was abnormally high, even after taking into account that growth was comparatively high in those subperiods. The observations corresponding to the 1980s and 1990s, instead, are almost on the regression line, indicating that the lower level of the Italian saving rate in the last 20 years is in line with its lower growth rate: the growth slowdown thus emerges as a likely candidate explanation for the decline in the national saving rate.

However, the univariate correlation with growth captured by Figure 6 may be misleading, since other factors may have contributed both to the comparatively high initial level of Italian national saving and to its subsequent decline. Government deficits may be responsible for a reduction in national saving; furthermore, the initial level of *per capita* income can contribute to explain cross-country differences in private saving rates, if preferences are non-homothetic. To control for these two factors, we have estimated a regression of the national saving rate on the growth rate of real GDP, the inflation-adjusted government saving and the logarithm of initial *per capita* real GDP, using the same panel of G10 data (excluding the observations for Italy) used in Figure 6. Table 3 reports the regressions results obtained with OLS and robust estimation methods, with

and without the inclusion of time dummies among the regressors. In all the regressions, the coefficient of government saving is positive, large and highly significant: the coefficient of 0.7 in Table 3 implies that the 4.1 percentage points decline in the G10 government saving between the 1960s and the 1990s explains 2.8 out of the 7.5 percentage points decline in net national saving (see Table 2). This represents a rejection of the Ricardian equivalence proposition, according to which an increase in government saving induces an equal reduction in private saving, leaving national saving unaffected.<sup>3</sup> The coefficient of initial *per capita* GDP is positive, lending some support to the view that in rich countries households save more; however, this coefficient is not precisely estimated, in particular when time dummies are included in the estimation.

The differences between the actual values and those predicted by these regressions are reported in the bottom part of Table 3. Even though the regressions control for growth, government saving and initial *per capita* income, they underpredict the Italian national saving rate in all periods (contrary to Figure 6, where sizable forecast errors occurred only in the earlier decades). The underprediction is larger in the 1960s and 1970s (8-9 percentage points) than in the 1980s and 1990s (about 5-6 percentage points). As a result, the regressions explain a good fraction of the decline of the Italian national saving rate – 8.2 out of 11.6 percentage points in the specification of row 1. Summing up, the international time-series evidence shows that growth and fiscal policy are important determinants of the decline in the Italian saving rate, but do not explain its level and cannot account fully for its decline.

### *3. Other reasons for the decline in saving*

Since differences in growth and in fiscal policy cannot explain the evidence fully, what other factors may explain the high Italian saving rate of the 1960s and 1970s and its sharp decline in the 1980s and 1990s? The factors that in the Italian experience deserve the closest scrutiny are (i) the

<sup>3</sup> This proposition applies to an increase in government saving achieved by increasing taxes, reducing debt and holding public consumption constant. If instead the increase in government saving is achieved by cutting public consumption, the fall of private saving will offset it completely only if the drop in government consumption is perceived to be permanent (otherwise, national saving will increase).

level of development of its credit and insurance markets; (ii) the changes in the social security system, and (iii) the sharp demographic change of Italian society in the last two decades.

### *3.1 Credit and insurance markets*

Italian households have traditionally met with highly imperfect markets for consumer credit, housing loans and insurance, although in the late 1980s these markets have become more accessible owing to a partial liberalization.

When the market for consumer credit and housing loans are imperfect, young households are prevented from borrowing the desired amount to finance current consumption, and must save to accumulate the funds needed to purchase consumer durables or homes. Similarly, insurance market imperfections induce households to accumulate wealth for precautionary reasons. In both cases, the saving rates of young households are higher than they would be otherwise. Jappelli and Pagano (1994) show that, for any given level of the growth rate, the presence of borrowing constraints produces a higher aggregate saving rate and it increase the sensitivity of the aggregate saving rate to changes in the growth rate. An identical change in growth - for instance, from zero to positive growth - generates a greater change in saving in an economy with liquidity constraints than in an economy with perfect capital markets.

This argument indicates that the interaction between saving, growth and liquidity constraints can explain not only why Italy's saving rate was high in the 1960s and 1970s, but also why the slowdown in economic growth reduced it more sharply in the 1980s and 1990s. The theory predicts that if indeed Italy featured less developed markets for household credit and insurance than other developed economies, the same reduction in growth performance would have caused a larger reduction of the aggregate saving rate in Italy than elsewhere. The partial liberalization of the consumer credit, housing loan and insurance markets started in the late 1980s may have added further impetus to this process.

The fact that in Italy the markets for household debt and insurance are “more imperfect” than in most other developed economies has been extensively documented by Jappelli and Pagano (1989, 1994) and Guiso,

Jappelli and Terlizzese (1994). Some of the most striking findings of these studies are reported in Table 4 and summarized in this section.

Column 1 reports the share of consumer credit in total consumption expenditure in 1988: in Italy this figure was the lowest among the developed economies (4 percent). This did not reflect a comparatively low propensity to buy consumer durables by Italian households, as shown in column 2. Further evidence in this direction is provided by the simulations in Jappelli and Pagano (1989), which show that the earnings profiles and the age structure of the population do not have a pattern that should induce Italian households to borrow less than their OECD counterparts. The explanation for the small size of the consumer credit market is more likely to lie with the terms at which consumer credit is supplied by banks and finance companies. In 1989 the spread between the interest rate charged by consumer credit companies and the after-tax rate on one-year T-bills was 13.2 percentage points, to be compared with a spread of 6.5 points in the US in 1986 and of 3.5 points in the UK in 1987.

In the market for housing mortgage loans the difference between the indebtedness of Italian households and that of their foreign counterparts is even more striking, as shown in column 3. In 1982 the ratio between outstanding mortgage loans and private consumption expenditure was a mere 6 percent in Italy, to be compared with figures ranging from 25 and 61 percent for the other countries in the table, and in particular with an average value of 44 percent for the G10 countries. Microeconomic data show that in 1991 only 10.2 percent of the households interviewed have mortgage debt, with average outstanding balance amounting to only 2.4 percent of the gross value of the house. But this comparatively low indebtedness does not reflect a comparatively low propensity to acquire homes by Italian households: as shown by column 4, in Italy the fraction of homeowners (61 percent) exceeds the G10 average (59 percent).

As for consumer credit, the low recourse to the credit market appears to be due mainly to the behavior of Italian financial intermediaries, rather to that of households. Column 5 shows that the maximum loan-to-value ratio in the Italian mortgage market is much lower than in all the other countries. Moreover, mortgage loans are characterized by short maturities (10-15 years are the standard) and high interest spreads relative to government bonds of similar maturity (in the early 1980s this spread was 3 percent, to

be compared to 1.8 in the US, 0.5 in the UK and 0.8 percent in Sweden and Japan).<sup>4</sup>

A variety of factors can account for these imperfections. Until the mid-1980s, regulation imposed a maximum loan-to-value ratio of 50 percent. Furthermore, legal costs inhibit the functioning of mortgage markets. The process of repossessing collateral is extremely cumbersome in Italy: on average, it takes 5.5 years for a bank to repossess the collateral, and in case of default the average net repossession by the bank is less than 60 percent of the value of the loan, after legal costs are accounted for.

The consequence of the scarcity and dearth of mortgage lending is that Italian households finance their home purchases mainly out of their accumulated savings, and thus to buy their first home they have to wait much longer than households in the US., in the UK and Japan, as shown by the figures in column 6 of Table 4.

The propensity to save of Italian households may also be affected by the working of insurance markets (health, casualty and life). As shown in Table 5, the average Italian buys less private insurance than the average citizen of any other G10 countries (and, for that matter, of any OECD country except Greece). On the one hand, this may be explained by the availability of extensive public insurance arrangements (such as the National Health Service which offers universal coverage and covers all health risks for any amount). But another factor accounting for the small size of the insurance market is a regulatory regime which stifles competition by creating high entry barriers and severe restrictions on the admissible contracts. As a result, insurance policy premia typically feature high mark-ups over fair premia: for instance, in 1991 the cost of insuring against fire and theft a property whose value is 90,000 ECU was 370 ECU, compared to an EC average of 207 ECU (Gerardi, 1994). Faced with an unattractive market to purchase insurance, Italian households must buffer themselves against risk with a greater cushion of precautionary wealth.

As stated at the beginning of this section, these market imperfections help to explain not only why the Italian private saving rate is high relative to that of other developed economies, but also why in the last two decades it was more sensitive to the decline in the growth rate.

<sup>4</sup> See Jappelli and Pagano (1989), Table 2, p. 1095.

An additional factor in explaining the decline in private saving in the last decade is that Italian credit and insurance markets have been gradually deregulated. The maximum loan-to-value ratio was increased to 75 percent in 1986, and to 100 percent in 1995. In addition, some of the banking and insurance regulations which traditionally restricted competition were lifted in the late 1980s, mainly under the pressure of EC Directives: restrictions on bank branching have been removed, limits on maturities in the mortgage loan market have been abolished, life insurance policies are now indexed to inflation, and foreign intermediaries have been allowed to operate on equal grounds with domestic ones.

### *3.2 Social security*

Social security provisions are generally held to be key determinants of the national saving rate. In fact replacing a funded social security system with a pay-as-you-go system reduces national saving unless people fully discount the implied burden of future social security contributions. In Italy a growing body of empirical research has analyzed the effect of this transition on the household saving rate, and the likely outcome of recent reforms aimed at rebalancing the social security system.

Until 1952 the Italian social security system was fully funded. Starting in that year, the government set minimum pensions, gradually extended compulsory contributions to farmers and the self-employed, and supplemented the system with unfunded social security benefits. However, pension benefits were still strictly linked to contributions. Thus, between 1952 and 1968, the social security system, though unfunded, was still balanced.

The link between contributions and benefits was severed in 1969, with three major innovations. First, benefits were made proportional to the number of years of contributions and to the average earnings over the three years preceding retirement. Second, the system became entirely pay-as-you-go: anyone above 65 was entitled to a “social pension”, irrespective of the contributions during his or her working life. Third, the maximum pension rose to 80 percent of the last salary and benefits were indexed to the cost of living.

The seventies witnessed a series of reforms relaxing the eligibility criteria. This led to a rapid growth in social security benefits, from 7.5 percent of GDP in 1970 to 10.2 percent in 1980 and 13.9 percent in 1990. In 1975 the indexation system was changed: minimum pensions were indexed to the earnings of employed workers, leading to automatic increases in the real value of benefits. As the increase in contributions did not keep pace, the result was a growing social security deficit (Rossi and Visco, 1994).

Up to 1992, the eligibility requirements for pension benefits were: 35 years of contributions, or a minimum of 15 years of contributions and 55 and 60 years of age for women and men, respectively. For all private sector employees, yearly benefits were determined as  $0.02nS$ , where  $n$  is the number of years of contributions (maximum 40),  $S$  is the average yearly salary over the last 5 years, adjusted for the increase in the cost of living, and 0.02 represents the yearly accrual rate.<sup>5</sup>

This highlights the particularly high benefits and broad eligibility criteria that the Italian social security system featured until 1992. In most other OECD countries, social security benefits compared to earnings are lower, either because they are unrelated to the earnings history, or because only a fraction of the benefits is so related, as in the UK. And where benefits are proportional to past salaries, eligibility requirements and pension award formulas are less generous than they were in Italy: (i) minimum retirement age is higher; (ii) pension benefits are not computed on the basis of the last five years' earnings but the last 10 (France) or the entire career (Germany and Belgium); (iii) the accrual rate ranges from 1.33 percent in Belgium to 1.9 percent in Austria, as against 2 percent in Italy; (iv) the maximum pension as a fraction of salary is lower everywhere, except Germany; (v) benefits are indexed to the prices, rather than salaries as in Italy; (vi) the rules concerning double-pensions and benefits paid to survivors are stricter than in Italy.

As a result of these differences, in 1985 the ratio of social security benefits to the yearly salary of men with 40 years of contributions was 80 percent in Italy, against 60 percent in Germany, 55 percent in Belgium, 50 percent in France and 25 percent in the UK (CREL, 1990, p. 62). The increasing generosity of Italian eligibility rules and award formulas is

<sup>5</sup> For public employees  $S$  is equal to the last yearly salary.

witnessed by the fact that the ratio of the average retirement pension to the average salary rose from 26 percent in 1960 to 44 percent in 1987.

To what extent have these changes in the social security system contributed to the decline of the Italian private saving rate? Rossi and Visco (1994, 1995) carefully construct an estimate of aggregate social security wealth in the postwar period, taking into account changes in legislation, population structure, labor force participation rates and survival probabilities. In their time-series regression analysis, they relate the private saving rate to the growth rate, the real interest rate, the wealth-income ratio, the gross pension wealth-income ratio, and the ratio of pension benefits to income. Their results indicate that three main factors contribute to explain the fall in private saving between the 1960s and the 1980s: (i) the growth slowdown, (ii) the increase in the wealth-income ratio, and (iii) the changes in pension wealth and benefits. Each of the first two factors explains 6.2 points out of an estimated 13.1 percentage points decline in saving. The increase in social security wealth accounts for a further reduction of 5.7 points, but this is offset by the effect of pension benefits, amounting to 4 percentage points. So the net effect of changes in the social security system is only 1.7 out of 13.1 percentage points reduction in saving.

Alternative estimates of the effect of social security wealth on private accumulation can be obtained by using cross-sectional data. This has been done by Brugiavini (1987) and Jappelli (1995), who compute measures of social security wealth using various years of the Survey of Household Income and Wealth, and find that pension wealth is only an imperfect substitute for private net worth: an increase of social security wealth displaces only 20 percent of private wealth, a result that is broadly consistent with the time series evidence.

One possible explanation for the relatively low displacement effect is that the very increase in benefits and the rapid aging of the Italian population may foster the perception that the current system cannot be sustained indefinitely. If so, perceived social security wealth is lower than the present discounted value of the net benefits implied by the rules of the current regime. In recent years this perception has been validated by a sequel of reform aimed at rebalancing the accounts of the social security system.

The two major attempts in this direction have been the 1992 Amato reform and the 1995 Dini reform (from the names of the corresponding prime ministers). As a consequence of these reforms, the social security

system has become less generous. Over the next decade, the minimum retirement age will be gradually raised from 60 to 65 for men and from 55 to 60 for women; the minimum period of contribution will gradually increase; the period of the working life over which the pension benefits are computed will be gradually extended to the entire working life of employees. Finally, to encourage private retirement saving, private pension funds have been regulated and employers contributions to pension funds will gradually replace severance pay.

To summarize, there is evidence that the increasing generosity of the social security system in the postwar period has mildly contributed to the decline in the private saving rate, although this effect is much smaller than that of the productivity slow-down. In the future, the effect of changes in social security legislation will go in the opposite direction, since the pension reforms aiming at reducing future benefits will promote household saving. According to Rossi and Visco (1995) and Attanasio and Brugiavini (1996), the first symptoms of this reversal are already apparent in the 1993 data.

### *3.3 Demographic factors*

A potentially important determinant of private household is the age distribution of the population. In Italy, this distribution has changed sharply in the last 20 years. The fertility rate has declined sharply, and the number of elderly in the population increased dramatically since the early 1970s.<sup>6</sup> According to the life-cycle model, these changes in the age structure should have reduced saving. However, Cannari (1994) presents evidence that saving has not been reduced by the changing age structure. The main reason is that in Italy the elderly save at a rate that is considerably higher than predicted by the stylized version of the life-cycle model. As will be seen in Section 4, this result is confirmed by our microeconomic estimates.

Starting in the mid-1970s, the labor force participation rate of women has increased by 17 percentage points, from 33 to 50 percent. This change may reduce saving for two reasons. First, it may induce a substitution away

<sup>6</sup> Currently the Italian fertility rate is the lowest in the world. What is surprising is the speed of the demographic transition. The rate of growth of the population went from 0.67 in 1971 to about zero in the early 1990s. At the same time the fraction of the population older than 60 years increased by more than 6 percentage points between 1971 and 1992.

from home-produced goods towards market produced goods. Second, to the extent that it increases the share of households with more than one income recipient, it reduces households' earnings uncertainty and the need for precautionary saving. Evidence for this link is provided by Attanasio and Weber (1996), who find that households with working wives tend to save less than households in which the woman is not in the labor force, other things equal. However, as we shall see in Section 4, the increase in households with multiple income recipients can hardly account for any significant decline in aggregate saving.

#### *4. Do micro data help us to understand the decline in saving?*

Microeconomic data offer an alternative to national income accounts data to study trends in saving patterns. This independent evidence is particularly important. Even if microdata are not fully consistent with the pattern of national accounts data, they provide a unique source of information to check if plausible macroeconomic explanations for the saving decline are borne out at the individual level.

In Italy the main source of microeconomic data is the Bank of Italy Survey of Household Income and Wealth (SHIW), which collects detailed information on demographics, households' consumption, income and balance sheets.<sup>7</sup> The SHIW was conducted on a yearly basis from 1965 to 1987 (with the exception of 1985). Up to 1984 the number of participant households in a typical year was around 4,000. In 1986 the sample size was doubled, and since 1987 the survey has been run every other year.

The data set used in this section includes six independent cross-sections (1984, 1986, 1987, 1989, 1991 and 1993), a total of 44,792 observations. Two macroeconomic episodes characterize the 1984-1993 period. The recovery from the 1981-1983 recession started in early 1984 and grew in intensity in 1987-88: the average growth rate of GDP during this expansionary period was 3 percent. The recovery was led by a consumption boom. In fact, in all years between 1985 and 1989 the growth of aggregate private consumption outpaced output and disposable household income.

<sup>7</sup> This data set has been used extensively for analysis of the behavior of Italian households.

Then the economy went into a recession in the second half of 1989; at the end of the sample period the recession was at its worst.

The survey is representative of the Italian population (probability selection is enforced at every stage of sampling). The unit of observation is the family, which is defined to include all persons residing in the same dwelling who are related by blood, marriage or adoption. Individuals selected as "partners or other common-law relationships" are also treated as families.<sup>8</sup> The use of sample weights is recommended, particularly for 1987, a year in which the survey over-sampled wealthy households (Brandolini and Cannari, 1994). All statistics reported in this paper use sample weights.<sup>9</sup>

The comparison between the national accounts and the SHIW is not easy because the SHIW measures of income and consumption underestimate the aggregate data. For instance, disposable income is underestimated by about 20 percent. Brandolini and Cannari (1994) find that in the 1989 SHIW the difference between the aggregate and survey measures of disposable income arises mainly from self-employment income (underestimated by half), pension benefits (by a third) and financial income.<sup>10</sup> Part of these differences are due to the fact that in the national accounts the household sector includes also unincorporated business.

In order to use microeconomic data to explain macroeconomic facts, one must check if the trends observed in the data are similar. Table 6 reports the two measures of the household saving rate for the period 1984-93.<sup>11</sup> We do not attempt at adjusting the SHIW income for inflation,<sup>12</sup> and limit our comparison to the traditional definition of saving. The broad trends in the two data sets are similar: the table shows that both measures of saving rates declined by over 6 percentage points between 1984 and 1993. However, the timing of the saving decline is rather different. The aggregate data indicate

<sup>8</sup> The interviews are conducted during the first three months of the year; thus flow variables refer to the previous calendar year, and stock variables are end-of period values.

<sup>9</sup> Disposable income and consumption are converted into 1991 lire using the CPI deflator.

<sup>10</sup> The figures for rents and transfers are consistent, and wages and salaries slightly overestimated with respect to the national accounts data.

<sup>11</sup> The household saving rate reported in Table 8 differs from the private saving rate in Table 2 because the latter includes business saving.

<sup>12</sup> This adjustment would require reliable data for the stock of financial assets, and unfortunately the available data of financial wealth are vitiated by severe measurement errors due to under-reporting and non-reporting.

two marked drops (in 1985 and in 1993). Instead, the survey data show a marked decline only in 1987; afterwards, the saving rate stays roughly constant up to 1993.

#### 4.1 Decomposition of the SHIW saving rates

The microeconomic data can be used to check if the reduction in saving observed between 1984 and 1993 depends on changes in the relative size and income levels of the different age-groups, or rather on changes in their behavior. We are also interested in identifying which population groups, if any, have been responsible for the decline in saving observed in the last decade. For instance, the liberalization of the market for household debt may have reduced the saving of the young more than that of the old; the increased labor force participation of women and the implied substitution from home-produced to market-produced goods can affect differentially the saving rate of households with multiple incomes; migration and differences in population growth have changed the geographical composition of households between South and North; changes in social security legislation have induced an redistribution of resources between generations and occupational groups with different propensities to save.

Following Bosworth *et al.* (1991) and Cannari (1994), we express the aggregate saving rate  $S_t$  in period  $t$  as:

$$S_t = \sum_{i=1}^G w_{it} y_{it} s_{it}, \quad (3)$$

where:

$w_{it}$  = fraction of household heads in the  $i$ -th group;

$y_{it}$  = ratio of average income in the  $i$ -th group to the overall average;

$s_{it}$  = saving rate of the  $i$ -th group;

$G$  = number of groups.

Table 7 reports the results of this saving accounting. The first column in each panel reports the SHIW saving rate in 1984-93, obtained by dividing

the average saving of all survey respondents by their average income. The second column shows the saving rate that would have been observed if the population weights  $w_{it}$  and the group-specific saving rates  $s_{it}$  did not vary, and therefore the effect of the redistribution of income between groups. The third column reports the saving rates that would have been observed if the income shares  $y_{it}$  and the saving propensities  $s_{it}$  had been constant, and thus captures the effect of changes in the relative size of the various population groups. The fourth column repeats the exercise holding  $w_{it}$  and  $y_{it}$  constant, reflecting the effect of changes in the saving behavior of various groups. The last row of each panel reports the change in saving between 1984 and 1993 that can be attributed to each of the three determinants of the aggregate saving rate ( $w_{it}$ ,  $s_{it}$  and  $y_{it}$ ), holding the other two constant.

The first panel of Table 7 is of particular interest. The  $G$  groups are defined as households younger than 35, between 35 and 60, and older than 60. The table shows that the entire decline in saving should be attributed to a fall in the individual propensities to save (the  $s_{it}$  terms, which are kept constant in the last column), rather than to the changing composition of the population (the  $w_{it}$  weights) or to changes in the distribution of income between the young and the old (the  $y_{it}$  terms). The second column shows that changes in  $y_{it}$  have increased the aggregate saving rate by 0.7 percentage points; changes in  $w_{it}$  have reduced it by 0.7 points; and changes in  $s_{it}$  have reduced it by 6.6 points.<sup>13</sup> Using the life-cycle hypothesis as the reference model, this finding conflicts with the idea that the decline in productivity growth is responsible for the decline in saving. According to that model, the effect of changes in the growth rate should affect aggregate saving via changes in the income distribution between the young and the old (the  $y_{it}$  terms) or in their relative numbers (the  $w_{it}$  terms), contrary to what found in the data.

The dynamics of the individual propensities to save is not visible in Table 7. Therefore in Figure 7 we plot the saving rates of the different age groups over the period 1984-1993. It is important to stress that we control for the presence of age effects in saving rates, because Figure 7 tracks the saving rates of the same age-group over the sample period. Such control is

<sup>13</sup> The sum of these three effects does not add up precisely to the total observed decline in the saving rate reported in the first column (-6.4 percent), because of the presence of interaction terms.

important, because the life-cycle model predicts that the various age groups have different saving rates: although in our series of independent cross-sections the same individual is only observed once, a sample from the same age group is observed in a later survey.

Figure 7 confirms that over our sample period saving rates have declined for most age groups, but the decline is more evident for the younger age groups (up to age 55). This may reflect the liberalization of financial and insurance markets described in Section 3.1, that can be expected to have a relatively large impact on the propensity to save of young households. Another interesting feature of Figure 7 is the increase in the saving rate of households aged 40-60 in 1993. Attanasio and Brugiavini (1996) attribute this increase to the 1992 revision of the social security legislation, which has reduced pension entitlements and increased retirement age, particularly for public sector employees (see Section 3.2).

Preliminary investigation of the data indicates the likely presence of influential values and skewness in the distribution of individual saving rates, suggesting that means may not adequately characterize the age-saving profile. As a more robust measure of location, Figure 8 reports median values of individual saving rates by age groups. The broad pattern of results is qualitatively unchanged.

The other panels in Table 7 focus on different decompositions of the population, by area of residence, number of children, number of income recipients, year of birth, and employment category. The fourth column of each panel, where the population weights and the income shares are held constant, shows that the change in the propensity to save of the various demographic groups accounts for virtually all of the decline in the aggregate saving rate between 1984 and 1993. This result confirms the finding by Cannari (1994), who finds that in the 1980-94 SHIW “the decline in the Italian aggregate propensity to save observed during the 1980s reflected a decline within each of the categories considered, not changes in their relative incidence in the aggregate” (p. 124). It is also reminiscent of the results obtained by Bosworth *et al.* (1991) using US, Canadian and Japanese data: they conclude that “the data provide no support for the argument that the decline can be traced to reduced saving on the part of specific groups in the population” (p. 222). Paxson (1996) reaches similar conclusions, using repeated cross-sectional data for the US, the UK, Taiwan and Thailand.

In the Italian case, the only significant exception to this general pattern is that the changes in the income shares of the various cohorts (household head born before 1925, between 1925 and 1945, after 1945) have reduced the aggregate saving rate by 1.9 percentage points. This suggests that part of the decline in saving may be due to the increased share of total income accruing to the younger cohorts, which are characterized by lower saving rates (possibly because of their lower thriftiness).

#### *4.2 Sensitivity of the results*

To check the robustness of these results, we repeat the calculations excluding households headed by persons born before 1910 and after 1964. These exclusions are motivated by concern over two sources of potential sample bias. The first arises because survival probabilities may be positively correlated with wealth, implying that rich households are over-represented in the oldest cohorts. This correlation implies that one may find high saving rates after retirement simply because the poor tend to disappear from the sample earlier than the rich. We thus drop 1,758 pre-1910 households (persons who would be over 83 years old in the last year of our sample). The second source of potential bias is a correlation between wealth and young household heads peculiar to our sample. In Italy young working adults with independent living arrangements tend to be wealthier than average, because most young working adults live with their parents.<sup>14</sup> For instance, in 1989 the fraction of income recipients below 30 years of age was 19.8 percent, while the fraction of household heads in that age bracket was a tiny 7.6 percent. Households whose head was born after 1964 (who would be less than 20 years old in 1984) are therefore also excluded. However, the results do not change the basic picture and therefore are not reported.

The results may also be affected by the measure of the saving rate so far employed. So far we have adopted the conventional measure of saving. Yet, this measure is based on a concept of net disposable income that is not fully consistent with the life-cycle theory: social security contributions are treated as taxes, and pensions are part of transfers. But the counterpart of social

<sup>14</sup> The reasons for such behavior includes mortgage market imperfections, which prevent young households from borrowing, and imperfections in the rental market for housing.

security contributions are social security benefits (even in an unfunded system). Since households expect to receive a pension upon paying contributions, one may argue that the latter should be treated as part of income. Correspondingly, during retirement pension benefits are offset by the reduction in the annuity value of social security wealth: accordingly, pensions should not be included in the disposable income of retirees.

We thus subtract pensions from disposable income and add contributions to social security. In the survey, earnings are reported net of taxes and contributions. The contribution tax rate is a flat tax, increasing gradually from 24 percent in 1984 to 27 percent in 1993. Thus, earnings - the largest component of disposable income - are “inflated” by the contribution rate. The adjustment implies that disposable income is about 20 percent higher for workers, and falls substantially after retirement. We then repeat the exercise of Table 7, with this modified definition of saving. The results are broadly similar: saving falls for every population group, and the decline in aggregate saving is not explained by the changing shares of the groups. The only novelty is that now the changing composition of the population and income shares explain about 15 percent of the decline in the aggregate saving rate.

#### *4.3 Assessing the microeconomic evidence*

The microeconomic evidence suggests that the decline in the aggregate saving rate between 1984 and 1993 cannot be traced to changes in the behavior, resources or size of a single population group. Rather, it is driven by an across-the-board reduction in the propensity to save of all groups. In particular, the fall in the propensity to save is shared by all age groups and the decline in aggregate saving does not result from changes in their income shares or relative sizes, in contrast to the prediction of the standard life-cycle model about the relation between aggregate saving and growth.

There are significant exceptions to this pattern, however. One third of the reduction in the aggregate saving rate can be attributed to the redistribution of resources towards younger cohorts, characterized by lower thriftiness. Moreover, the propensity to save of young households has fallen relatively more than in other age groups, possibly a reflection of financial liberalization. Finally, in 1993 the saving rate of the middle-aged has

increased, a likely response to the announcement of a reduction in future social security benefits.

##### *5. Conclusions: can we reconcile the macro and the micro evidence?*

The time-series and cross-country evidence reported in Sections 1 and 2 suggests a strong positive correlation between growth and aggregate saving. Based on that evidence the productivity slowdown, together with the timid deregulation of the credit and insurance markets and the changes in the social security system surveyed in Section 3, appears as the main candidate to account for the changes of the Italian private saving rate. But while several models predict a positive correlation between aggregate saving and growth, they have quite different predictions about the correlation between individual saving rates and growth. So the observed behavior of individual saving rates provides an opportunity to subject the competing explanations about the saving behavior of Italian households to a sharper test. This task is taken up in Section 4 with a series of repeated cross-sections drawn from the Survey of Household Income and Wealth.

The life-cycle model predicts a positive relation between growth and saving that arises only from the process of aggregation. An increase in the rate of income growth, caused by an increase in productivity or in the rate of growth of the labor force, raises the resources of the young (who are net savers) relative to those of the old (who dissave). This raises the weight of young households relative to that of the old in the aggregation of individual saving rates. In the basic version of the model, Modigliani (1986) further assumes that productivity growth is generation-specific, and that earning profiles are flat over the individual lives. Under these assumptions, individual saving rates do not respond to aggregate changes in productivity; the fall in aggregate saving results only from the reduction in the income share and in the number of young households relative to the retired. When income growth is also individual-specific, and earnings profiles are upward sloping, a reduction in expected income growth will generally reduce young households' borrowing and increase individual saving rates.<sup>15</sup> With both types of growth (within and across generations) taking place, the aggregate

<sup>15</sup> Given the limited amount of borrowing of Italian households, the effect of expected income growth on individual saving rates should not be very important.

correlation between saving and growth is *a priori* ambiguous, but at the individual level the correlation between saving and growth should still be zero or negative.

Other models share with the basic version of the life-cycle model the prediction of a positive correlation between aggregate saving and growth. For instance, in the standard infinite horizon growth model an increase in productivity growth shifts up the marginal productivity of capital; then if the elasticity of intertemporal substitution is sufficiently high, the individual saving rate will increase.<sup>16</sup> Since this is a representative agent model, this prediction also applies to the aggregate saving rate. The same prediction arises from models where households have a target wealth-income ratio, such as the buffer-stock model of saving emphasized by Deaton (1995) and models with habit formation. In these models, an increase in income triggers a gradual adjustment of consumption, and thus leads to an increase in saving, at least in the short-run. The infinite horizon growth model and models with wealth-income ratio targets cannot be distinguished from the life-cycle model at the macroeconomic level. However, they carry opposite implications for the relationship between growth and saving at the individual level.

The microeconomic data show that the fall in the aggregate saving rate observed in the 1980s and 1990s is not only a result of the aggregation across households during the productivity slowdown, as the life-cycle hypothesis would predict. To the contrary, it mirrors an across-the-board decline in individual saving rates – a result that the life-cycle model cannot easily reconcile with a decline in productivity growth. Provided that the microeconomic data are not vitiated by systematic measurement errors, this may have one of two alternative interpretations. The first possibility is that the life-cycle model is not consistent with the data, and one should turn instead to models which predict a positive correlation between saving and growth *both* at the micro level and at the macro level. The second interpretation is that the decline in the Italian aggregate saving rate has little to do with the growth slowdown of the last decades. The reason for the decline in saving should then be sought in other phenomena that affected all

<sup>16</sup> The standard permanent income model with infinite horizon, perfect markets and exogenous factor prices predicts that an increase in income growth raises permanent income and reduces current saving. Thus, it produces a negative correlation between growth and saving, and cannot account for the macroeconomic evidence of Section 2. In the infinite horizon growth model, where factor prices are endogenous, this wealth effect is outweighed by the substitution effect, if the elasticity of substitution is high.

households simultaneously, such as changes in asset prices or preferences. Clearly, much further research is needed to sort out this issue, and in the process it is quite possible that still other ways to reconcile the macro and the micro evidence may emerge.

### *References*

- Attanasio, Orazio P., and Agar Brugiavini (1996), "L'effetto della riforma Amato sul risparmio delle famiglie italiane", Università di Venezia, Note di Lavoro, 96.05.
- Attanasio, Orazio P., and Guglielmo Weber (1994), "The UK consumption boom of the late 1980s: aggregate implications of microeconomic evidence", *The Economic Journal*, 104, 1269-1302.
- Attanasio, Orazio P. and Guglielmo Weber (1996), "I consumi delle famiglie italiane: quali cambiamenti destinati a durare", Università di Venezia, unpublished.
- Brandolini, Andrea, and Luigi Cannari (1994), "Methodological appendix: the Bank of Italy's Survey of Household Income and Wealth", in *Saving and the Accumulation of Wealth. Essays on Italian Household and Government Saving Behaviour*, Albert Ando, Luigi Guiso and Ignazio Visco, eds. Cambridge: Cambridge University Press.
- Browning, Martin and Annamaria Lusardi (1996), "Household saving: micro theories and micro facts", *Journal of Economic Literature*, XX.
- Bosworth, Barry, Gary Burtless, and John Sabelhaus (1991), "The decline in saving: evidence from household surveys", *Brooking Papers on Economic Activity*, 1, 183-257.
- Cannari, Luigi (1994), "Do demographic changes explain the decline in the saving rate of Italian households?", in *Saving and the Accumulation of Wealth. Essays on Italian Household and Government Saving Behaviour*, Albert Ando, Luigi Guiso and Ignazio Visco, eds. Cambridge: Cambridge University Press.
- Carroll, Christopher, and David Weil (1995), "Saving and growth: a reinterpretation", *Carnegie Rochester Conference Series on Public Policies*, XX-XX.
- CREL (1990), "La previdenza integrativa in Italia: analisi, tendenze e prospettive", Roma, unpublished.
- Deaton, Angus (1992), *Understanding Consumption*, Oxford: Oxford University Press.

- Deaton, Angus (1995), "Growth and saving: What do we know, what do we need to know, and what might we learn?", Princeton University, unpublished.
- Gerardi, Donato (1994), "Insurance market imperfections and the international differences in saving rates", Università Bocconi, Istituto di Economia Politica, Discussion Paper 94-3.
- Group of Ten (1995), "Saving, investment and real interest rates," October, unpublished.
- Guiso, Luigi, Tullio Jappelli, and Daniele Terlizzese (1994), "Why is Italy's saving rate so high?", in *Saving and the Accumulation of Wealth. Essays on Italian Household and Government Saving Behaviour*, Albert Ando, Luigi Guiso and Ignazio Visco, eds. Cambridge: Cambridge University Press.
- Hayashi, Fumio, Takatoshi Ito, and Joel Slemrod (1988), "XX", XX.
- Jappelli, Tullio (1995), "Does social security wealth reduce private accumulation? Evidence from Italian survey data", *Ricerche Economiche*, 49, 1-32.
- Jappelli, Tullio, and Marco Pagano (1989), "Aggregate consumption and capital market imperfections: an international comparison", *American Economic Review*, 79, 1088-1105.
- Jappelli, Tullio, and Marco Pagano (1994), "Saving, growth and liquidity constraints", *The Quarterly Journal of Economics*, 109, 1, February.
- Levine, Ross, and David Renelt (1992), "A sensitivity analysis of cross-country growth regressions", *American Economic Review*, 82, 942-63.
- Modigliani, Franco (1986), "Life cycle, individual thrift, and the wealth of nations", *American Economic Review*, 76, 297-313.
- Modigliani, Franco, and Tullio Jappelli (1987), "Fiscal policy and saving in Italy since 1860," in *Private saving and public debt*, Michael J. Boskin, John Flemming and Stefano Gorini eds. Oxford: Basil Blackwell.
- Pagliano, Patrizia, and Nicola Rossi (1992), "Income and saving in Italy: a reconstruction," Temi di Discussione n. 169, Banca d'Italia, Rome.
- Paxson, Christina (1996), "Saving and growth: evidence from micro data", *European Economic Review*, 40, XX-XX.
- Rossi, Nicola, and Ignazio Visco (1994), "Private saving and government deficits", in *Saving and the Accumulation of Wealth. Essays on Italian Household and Government Saving Behaviour*, Albert Ando, Luigi Guiso and Ignazio Visco, eds. Cambridge: Cambridge University Press.
- Rossi, Nicola, and Ignazio Visco (1995), "National saving and social security in Italy", *Ricerche Economiche*, 49, 329-356.

**TABLE 1**  
**GROSS NATIONAL SAVING (NS), GROSS PRIVATE SAVING (PS)**  
**AND GOVERNMENT SAVING (GS) IN THE G10**

	<i>1960-69</i>			<i>1970-79</i>		
	<i>NS</i>	<i>PS</i>	<i>GS</i>	<i>NS</i>	<i>PS</i>	<i>GS</i>
United States	20.1	20.3	-0.2	19.8	20.7	-0.9
Japan	34.4	29.0	5.4	35.3	30.9	4.4
Germany	27.3	22.7	4.6	24.4	21.1	3.3
France	26.3	21.2	5.1	25.9	22.2	3.7
Italy	28.3	29.1	-0.8	26.0	30.9	-4.9
United Kingdom	18.5	13.7	4.8	17.9	15.5	2.4
Canada	21.5	17.8	3.7	22.4	21.0	1.4
Belgium	22.6	21.4	1.2	23.2	23.5	-0.3
Netherlands	27.6	--	--	24.9	21.8	3.1
Sweden	24.0	14.5	9.5	21.1	14.7	6.4
Average	25.1	21.1	3.7	24.1	22.2	1.9
	<i>1980-89</i>			<i>1990-94</i>		
	<i>NS</i>	<i>PS</i>	<i>GS</i>	<i>NS</i>	<i>PS</i>	<i>GS</i>
United States	17.8	20.3	-2.5	15.4	18.5	-3.1
Japan	31.8	27.5	4.3	33.5	26.4	7.1
Germany	22.4	21.1	1.3	22.2	21.7	0.5
France	20.4	18.9	1.5	20.1	20.4	-0.3
Italy	21.8	28.2	-6.4	18.4	24.7	-6.3
United Kingdom	16.5	16.4	0.1	13.7	15.7	-2.0
Canada	20.1	22.9	-2.8	14.2	19.0	-4.8
Belgium	16.7	22.7	-6.0	21.4	25.8	-4.4
Netherlands	23.0	23.7	-0.7	24.4	25.5	-1.1
Sweden	17.3	17.7	-0.4	14.6	18.3	-3.7
Average	20.8	22.2	1.9	20.8	21.9	-1.1

*Notes.* All variables are divided by GDP. The averages are unweighted averages of all countries. Data source: Group of Ten (1995), Tables 2, 3, 4.

**TABLE 2**  
**NET NATIONAL SAVING (NS), NET PRIVATE SAVING ADJUSTED FOR INFLATION (PS)**  
**AND GOVERNMENT SAVING ADJUSTED FOR INFLATION (GS) IN THE G10**

	<i>1960-69</i>			<i>1970-79</i>		
	<i>NS</i>	<i>PS</i>	<i>GS</i>	<i>NS</i>	<i>PS</i>	<i>GS</i>
United States	10.0	8.8	1.2	8.2	7.0	1.2
Japan	21.9	16.4	5.5	22.3	17.3	5.0
Germany	18.0	13.4	4.6	13.5	9.8	3.7
France	17.7	--	--	15.3	10.8	4.5
Italy	18.0	17.7	0.3	14.6	11.3	3.3
United Kingdom	10.0	1.8	8.2	7.4	-2.9	10.3
Canada	9.7	5.1	4.6	11.3	8.9	2.4
Belgium	12.8	--	--	13.8	9.6	4.2
Netherlands	18.1	--	--	15.6	10.4	5.2
Sweden	13.2	--	--	10.2	5.4	4.8
Average	14.9	10.5	4.1	13.2	8.8	4.4
	<i>1980-89</i>			<i>1990-94</i>		
	<i>NS</i>	<i>PS</i>	<i>GS</i>	<i>NS</i>	<i>PS</i>	<i>GS</i>
United States	4.5	5.4	-0.9	3.0	4.7	-1.7
Japan	18.2	13.2	5.0	18.1	10.6	7.5
Germany	9.8	7.7	2.1	9.2	7.5	1.7
France	7.9	5.7	2.2	7.0	6.7	0.3
Italy	9.8	7.4	2.4	6.4	6.6	-0.2
United Kingdom	4.8	1.2	3.6	3.0	3.4	-0.4
Canada	8.4	9.5	-1.1	2.0	5.4	-3.4
Belgium	7.2	8.2	-1.0	11.6	12.5	-0.9
Netherlands	12.2	11.9	0.3	12.9	12.2	0.7
Sweden	4.7	4.4	0.3	1.0	4.2	-3.2
Average	8.8	7.5	1.3	7.4	7.4	0.0

*Notes.* All variables are divided by GDP. The averages are unweighted averages of all countries. Data source: Group of Ten (1995), Tables 2, 3, 4.

**TABLE 3**  
**REGRESSIONS FOR NATIONAL SAVING, G10 COUNTRIES**  
**(EXCLUDING ITALY)**

<i>Regression</i>	<i>Method</i>	<i>Constant</i>	<i>Growth</i>	<i>Government saving</i>	<i>Log of initial per capita GDP</i>	<i>Time dummies</i>	$\bar{R}^2$
1	OLS	-0.30 (-1.47)	1.83 (3.92)	0.70 (3.63)	0.04 (1.75)	no	0.61
2	OLS	-0.26 (-0.93)	1.88 (3.82)	0.68 (3.13)	0.03 (1.01)	yes	0.59
3	Robust estimation	-0.32 (-1.41)	1.86 (3.61)	0.73 (3.42)	0.04 (1.67)	no	
4	Robust estimation	-0.28 (-0.92)	1.90 (3.47)	0.70 (2.88)	0.03 (0.98)	yes	

**PREDICTED AND ACTUAL VALUES FOR ITALY, PERCENTAGE VALUES**

<i>Predicted values of regression</i>	<i>1960-1969</i>	<i>1970-79</i>	<i>1980-89</i>	<i>1990-94</i>
1	9.6	5.4	2.9	1.4
2	9.5	6.8	3.1	1.5
3	9.4	5.1	2.6	1.2
4	9.3	6.6	2.8	1.2
Actual values	18.0	14.6	9.8	6.4

*Notes.* National saving and government saving are divided by GDP. Government saving is adjusted for inflation. T-statistics are reported in parenthesis. For each decade, the beginning-of-period *per capita* GDP is expressed in real U.S. dollars. Data source: Group of Ten (1995), Tables 2, 3, 4.

**TABLE 4**  
**CREDIT MARKETS AND HOME ACQUISITION:**  
**AN INTERNATIONAL COMPARISON**

	<i>Consumer credit (percent of private consumption, 1988)</i>	<i>Durables (percent of private consumption, 1988)</i>	<i>Mortgages (percent of private consumption, 1982)</i>	<i>Home-ownership (percent)</i>	<i>Maximum loan- to-value ratio for mortgages (1981-87 average)</i>	<i>Average age of first-time home buyers</i>
	(1)	(2)	(3)	(4)	(5)	(6)
Canada	22	16	60	62	80	--
U.S.A.	23	11	61	65	89	28
Japan	18	7	25	60	60	40
France	8	9	44	47	80	--
Germany	15	--	65	37	80	36
Italy	4	11	6	59	56	41
U.K.	10	11	45	59	87	29
<i>G7 average</i>	<i>14</i>	<i>--</i>	<i>44</i>	<i>56</i>	<i>76</i>	<i>--</i>
Finland	39	13	42	61	85	--
Norway	48	10	60	67	80	--
Sweden	39	12	61	57	95	--

*Notes.* The figures in columns 1 to 4 are drawn from Guiso, Jappelli and Terlizzese (1994), Table 1.3, p. 32; those in column 5 are from Jappelli and Pagano (1994), Table 1, p. 92; those in column 6 are drawn from Guiso, Jappelli and Terlizzese (1994), p. 44, for Italy, U.S.A and U.K., and from Hayashi, Ito, and Slemrod (1988). The figures in column (4) refer to 1981 except for Canada, Japan, France and Germany, where they refer to 1978.

**TABLE 5**  
**RATIO OF INSURANCE PREMIUMS TO GDP: AN INTERNATIONAL COMPARISON**

	<i>Total</i> (1)	<i>Life insurance</i> (2)	<i>Other</i> (3)
Canada	5.4	2.6	2.8
United States	9.1	3.7	5.4
Japan	8.7	6.4	2.3
Belgium	4.2	1.2	2.9
France	5.1	2.2	2.9
Germany	6.4	2.9	3.5
Italy	2.4	0.5	1.9
Netherlands	6.3	2.9	3.4
Sweden	4.5	2.5	2.0
U.K.	8.4	5.3	3.1
<i>G10 average</i>	6.5	3.4	3.1
<i>OECD average</i>	5.5	2.7	2.9

*Note.* The data are drawn from Guiso, Jappelli and Terlizzese (1994), Table 1.5, p. 37.

**TABLE 6**  
**A COMPARISON BETWEEN THE NATIONAL ACCOUNT AND  
MICROECONOMIC HOUSEHOLD SAVING RATE**

	<i>National accounts</i> (SHIW)	<i>Microeconomic data</i>
1984	20.2	31.5
1986	17.6	30.3
1987	17.6	25.6
1989	16.3	26.4
1991	16.5	24.0
1993	14.5	25.0
$\Delta(93)-(84)$	-6.7	-6.5

*Notes:* The aggregate data of column (1) are our own estimates based on the 1995 Annual Report of the Bank of Italy. The SHIW saving rates in column (2) are computed dividing total saving by total disposable income using sample weights and the entire data set for each survey.

**TABLE 7**  
**SAVING RATES BY SPECIFIC POPULATION GROUPS, 1984-1993**

	<i>Saving rate</i>	<i>Age and population shares constant</i>	<i>Age and income shares constant</i>	<i>Population and income shares constant</i>
1984	31.5	31.5	31.5	31.5
1986	30.3	31.5	31.4	30.3
1987	25.6	31.6	31.4	25.4
1989	26.4	31.7	31.3	26.2
1991	24.0	31.7	31.2	23.4
1993	25.0	32.2	30.8	24.9
$\Delta(93)-(84)$	-6.4	0.7	-0.7	-6.6

*Note:* Groups are defined as follows: household head less than 40 years old, 35-60, greater than 60.

	<i>Saving rate population shares constant</i>	<i>Area and income shares constant</i>	<i>Area and income shares constant</i>	<i>Population and</i>
1984	31.5	31.5	31.5	31.5
1986	30.3	31.4	31.3	30.2
1987	25.6	31.6	31.5	25.5
1989	26.4	31.1	30.6	26.3
1991	24.0	32.2	31.1	23.9
1993	25.0	31.6	31.5	24.8
$\Delta(93)-(84)$	-6.4	0.1	0.0	-6.6

*Note:* Groups are defined as follows: residents in the North, Center and South.

Table 7 - continued

**Table 7 - continued**

	<i>Saving rate population shares constant</i>	<i>Children and income shares constant</i>	<i>Children and income shares constant</i>	<i>Population and</i>
1984	31.5	31.5	31.5	31.5
1986	30.3	31.5	31.6	30.3
1987	25.6	31.6	31.6	25.3
1989	26.4	31.7	31.5	25.9
1991	24.0	31.7	31.6	23.4
1993	25.0	32.0	31.6	24.4
$\Delta(93)-(84)$	-6.4	0.5	0.1	-7.1

*Note:* Groups are defined as follows: households with no children less than 18 years old, households with 1 or 2 children, households with more than 2 children.

	<i>Saving rate population shares constant</i>	<i>Recipients and income shares constant</i>	<i>Recipients and income shares constant</i>	<i>Population and</i>
1984	31.5	31.5	31.5	31.5
1986	30.3	32.3	30.1	31.1
1987	25.6	32.7	30.7	25.5
1989	26.4	33.4	30.4	25.9
1991	24.0	33.0	30.8	23.4
1993	25.0	31.3	32.4	23.9
$\Delta(93)-(84)$	-6.4	-0.2	0.9	-7.6

*Note:* Groups are defined as follows: households with 1 income recipient, 2 income recipients, more than 2 income recipients.

Table 7 - continued

**Table 7 - continued**

	<i>Saving rate population shares constant</i>	<i>Cohort and income shares constant</i>	<i>Cohort and income shares constant</i>	<i>Population and</i>
1984	31.5	31.5	31.5	31.5
1986	30.3	31.2	31.5	30.5
1987	25.6	31.4	31.4	25.8
1989	26.4	31.0	31.3	26.9
1991	24.0	30.8	31.4	25.0
1993	25.0	29.5	31.2	25.8
$\Delta(93)-(84)$	-6.4	-1.9	-0.2	-5.6

*Note:* Groups are defined as follows: household head born before 1925, born between 1925 and 1945, born after 1945.

	<i>Saving rate population shares constant</i>	<i>Employment and income shares constant</i>	<i>Employment and income shares constant</i>	<i>Population and</i>
1984	31.5	31.5	31.5	31.5
1986	30.3	31.8	31.0	30.3
1987	25.6	31.3	31.8	25.5
1989	26.4	31.9	30.7	26.4
1991	24.0	32.6	29.7	23.6
1993	25.0	34.0	28.5	25.5
$\Delta(93)-(84)$	-6.4	2.5	-3.0	-6.0

*Note:* Groups are defined as follows: employees, self-employed, not in the labour force.

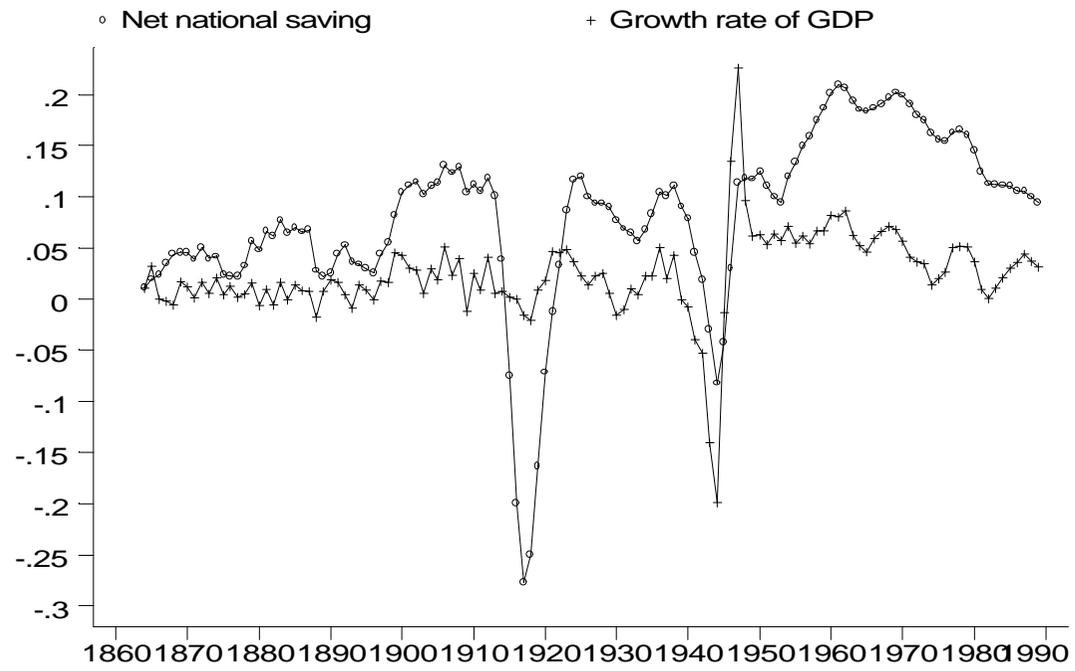


Figure 1: Saving and growth, 1862-1990

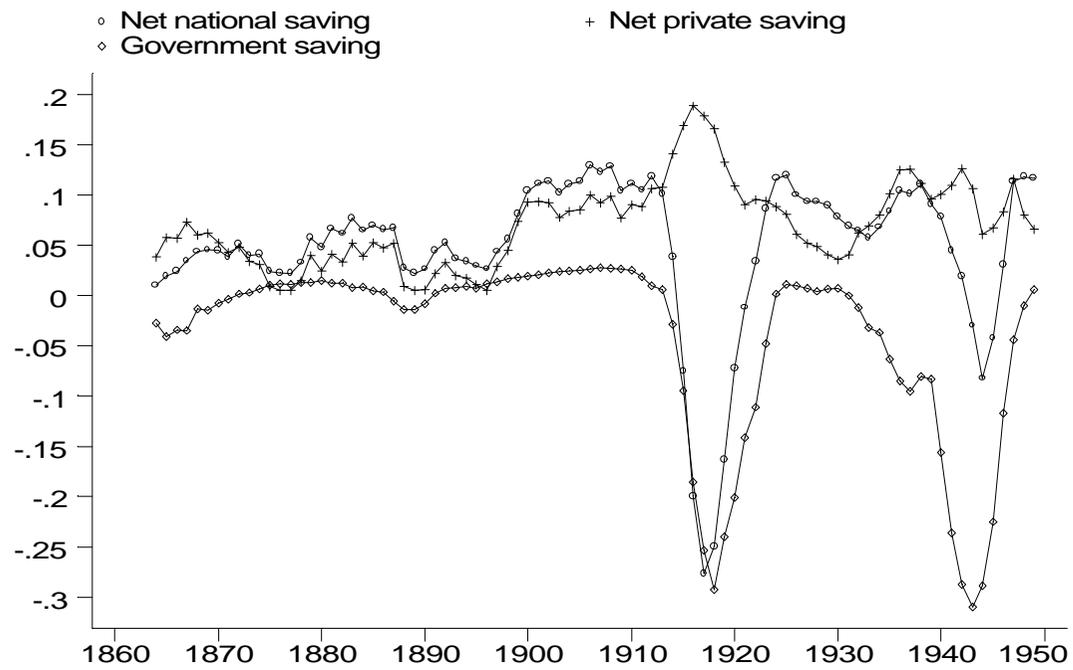


Figure 2: Saving components, 1862-1949

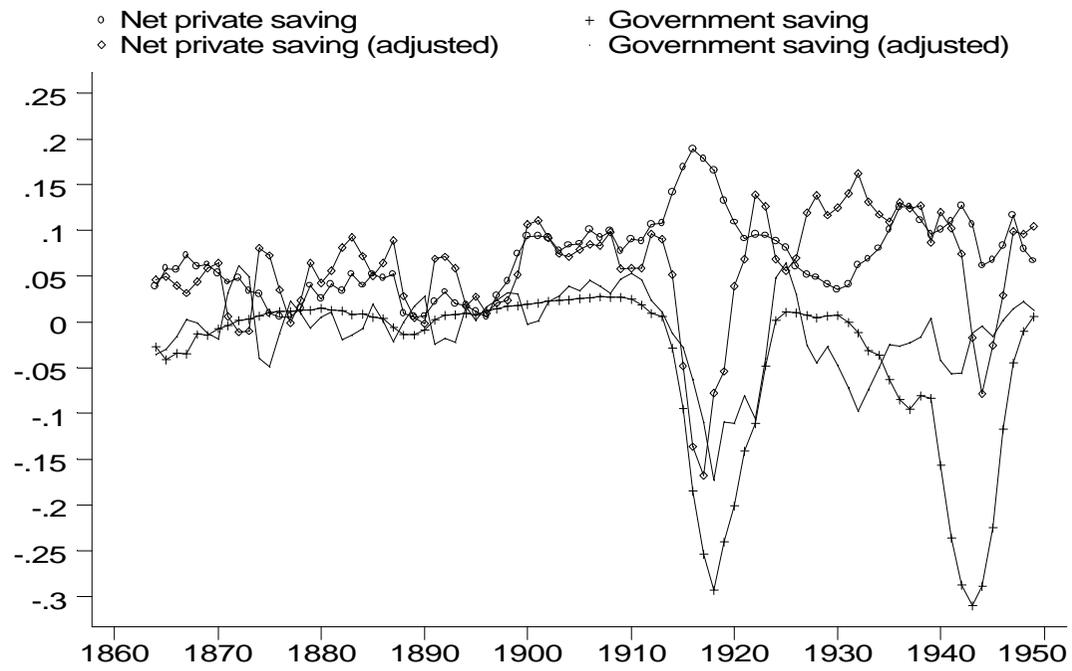


Figure 3: Inflation adjusted saving rates, 1862-1949

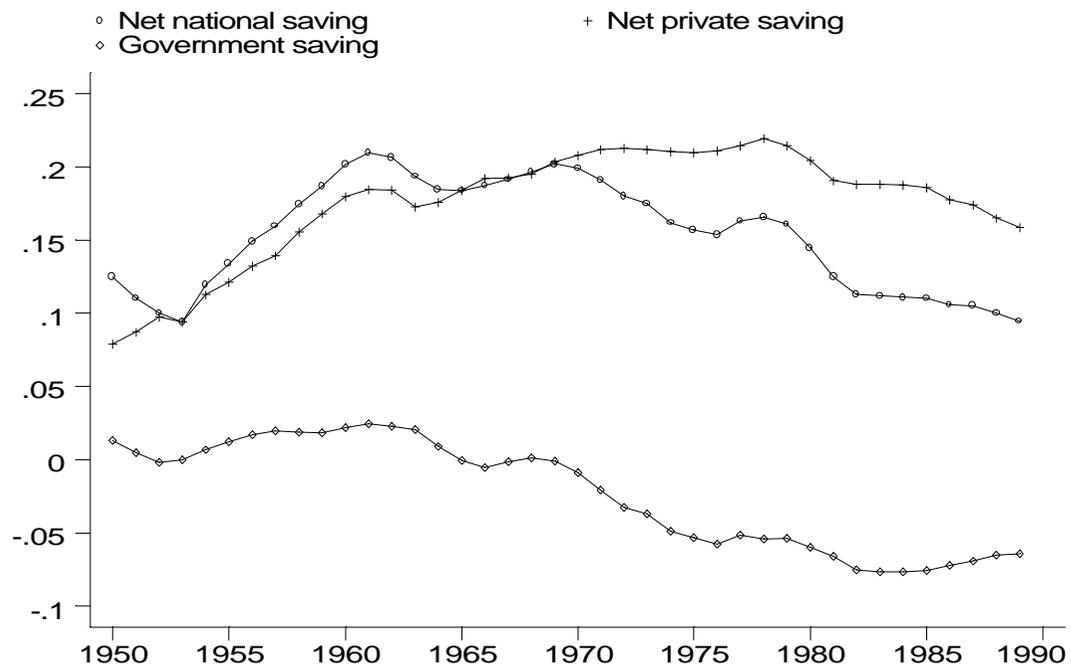


Figure 4: Saving components, 1950-1990

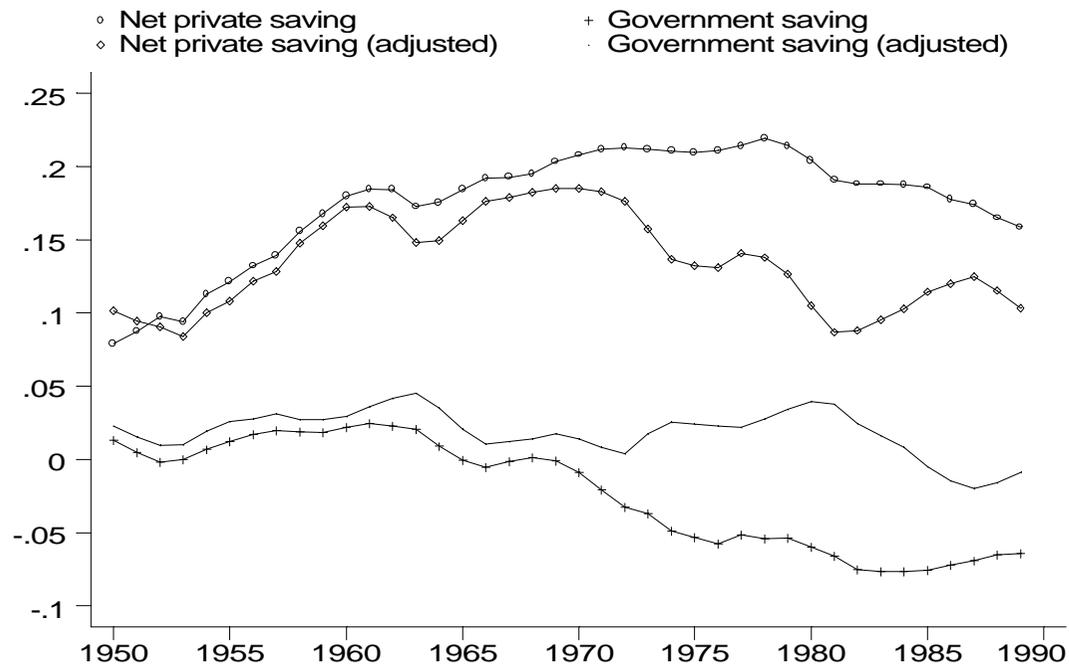


Figure 5: Inflation adjusted saving rates, 1950-1990

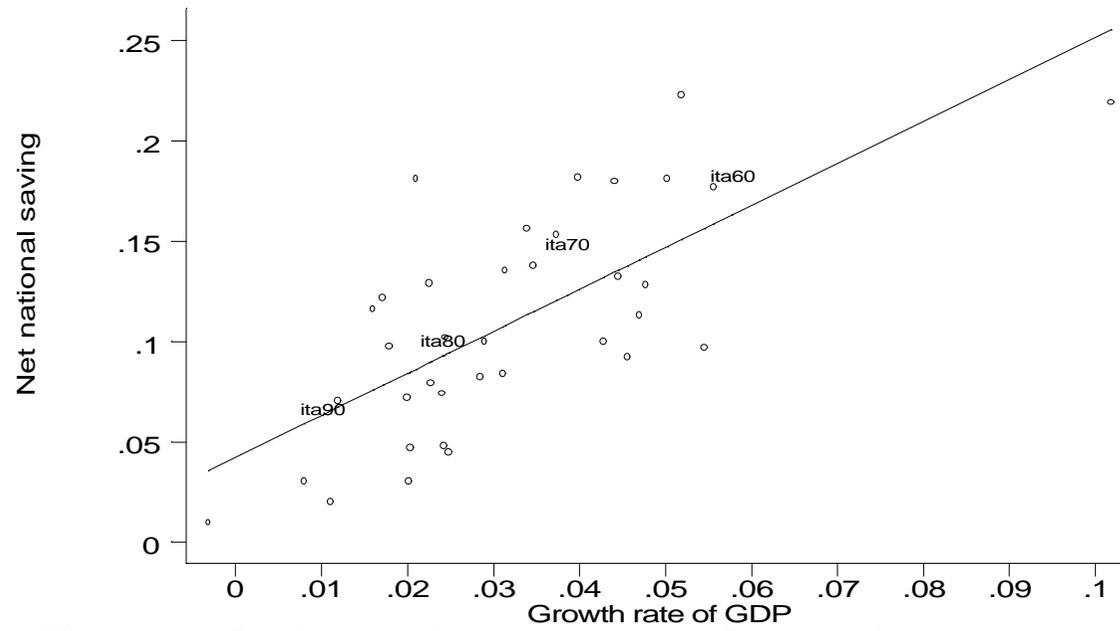


Figure 6: Saving and growth in the Group of 10, 1960-94

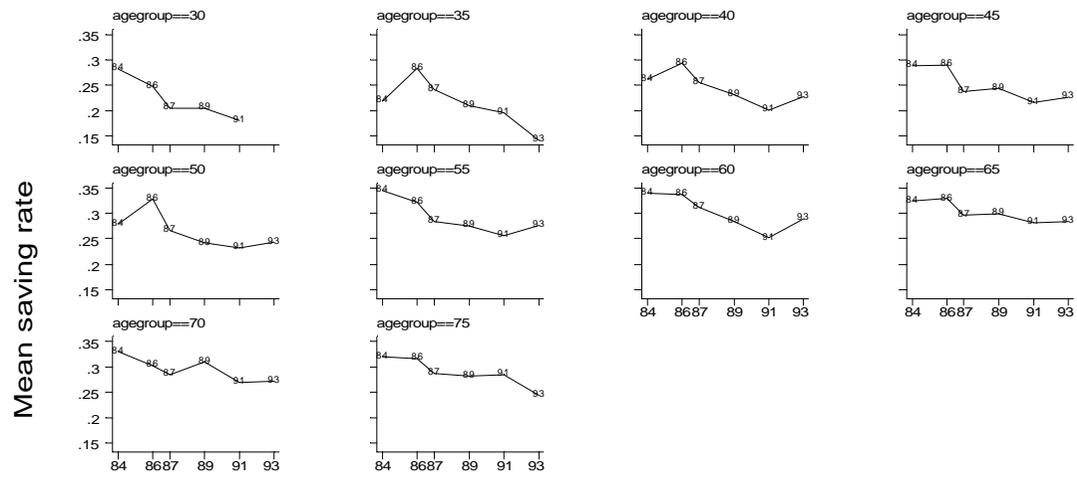


Figure 7: Mean saving rates by age groups

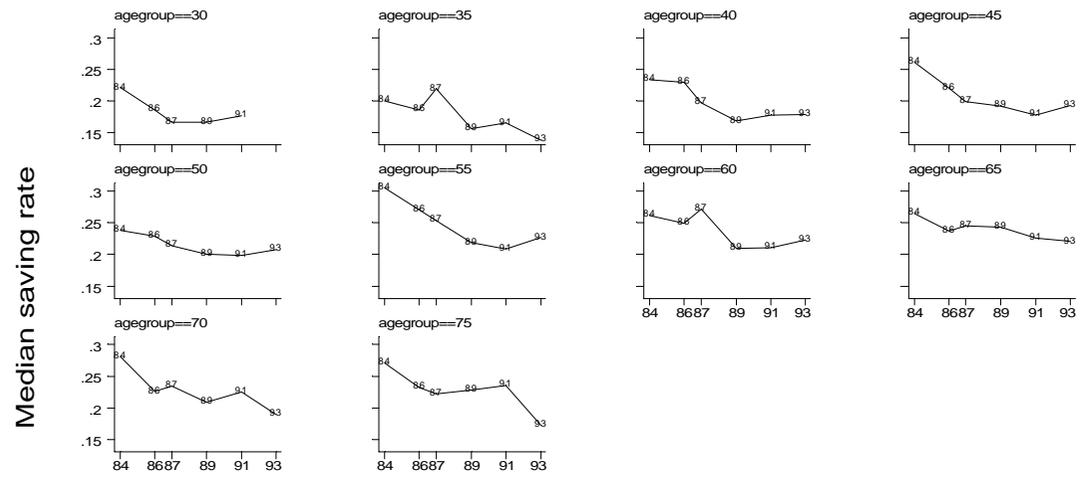


Figure 8: Median saving rates by age groups