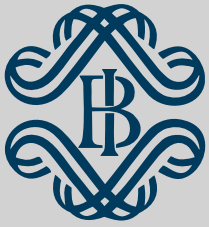
BANCA D'ITALIA

Temi di discussione

del Servizio Studi

Private Saving and Government Deficit in Italy (1951-1990)

by Nicola Rossi and Ignazio Visco



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Research Preject on Saving in Italy

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The purpose of the «Temi di discussione» series is to promote the circulation of working papers prepared within the Bank of Italy or presented in Bank seminars by outside economists with the aim of stimulating comments and suggestions.

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This paper – presented at the Workshop on "Saving in Italy: Past and Future Trends, Household and Government Behaviour", held in Rome on 16-17 January 1992 – is part of a research project undertaken at the Bank of Italy. The Italian versions of all the contributions will be published in a special issue of "Contributi all'analisi economica".

PRIVATE SAVING AND GOVERNMENT DEFICIT IN ITALY (1951-1990)

by Nicola Rossi (*) and Ignazio Visco (**)

Abstract

The Italian national saving rate has been recently experiencing a substantial decline. In the second half of the eighties, the net private saving rate has been fluctuating around 14 percent in terms of net national disposable income, 5 percentage points down from the average saving rate prevailing in the sixties. This paper suggests that net government transfers, which are at the root of the present government deficits, have substantially contributed to this decline. Changes in social security laws and regulations which took place in the late sixties and early seventies severely weakened the link between contributions and benefits permitting a time path of aggregate consumption in excess of what would have occurred in the absence of such changes. The paper estimates at about 2 to 3 percentage points the reduction in the saving rate caused by such changes in social security laws and regulations. Finally, the paper suggests that recent actions to reform the Italian pension system could be unable to reverse the present trend in the private saving rate, while raising the national rate through a significant reduction of current social security imbalances.

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1 Introduction[1]

According to official sources, aggregate Italian saving rates have been recently experiencing a substantial decline. The timing and extent of such decline largely depend on the specific definition of saving as well as on the researcher's attitude toward the host of measurement issues involved. However, for gross as well as for net rates, for national and for private measures, for both "adjusted" and "unadjusted" magnitudes, major trends appear to be beyond dispute and provide a rather unexpected description of the behaviour of Italian consumers.

In particular, in the second half of the eighties, private saving rates (defined as net of depreciation, adjusted for durables and inflation and computed as ratios to net national disposable income) have been fluctuating around 14 percent, 5 percentage points down from the average saving rate prevailing in the sixties.[2] In the same years, government saving (adjusted for inflation) has plunged to an unprecedented -1 percent, after more than thirty years of current account surpluses averaging to 3 percent. As a result, today's overall Italian saving rate is 9 percentage points below the one observed during the so-called "Italian economic miracle".

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1 We would like to thank Albert Ando, Onorato Castellino, Daniele Franco, Luigi Guiso, Marco Pagano, Luigi Spaventa and Daniele Terlizzese for their most helpful comments and criticisms, Luca Beltrametti for his contribution in the estimation of social security wealth, and Giampaolo Lopez, Livio Maccan and Renato Serafini for their help in handling the data. The usual disclaimer applies.

2 In terms of net private disposable income, figures corresponding to those given in the text are, respectively, an average saving rate of about 16 percent in the second half of the eighties, and a reduction of about 8 percentage points with respect to the average saving rate prevailing in the sixties.

Several alternative explanations for the decline of the saving rate have been put forward by the most recent research.[3] In particular, the impact of fiscal policy on private sector behaviour has been repeatedly scrutinized, although with no definite conclusion.[4] Nevertheless, it is the contention of this paper that a thorough assessement of the interplay of private and public decisions can still shed some light on the evolution of the saving rate in the most recent decades. In particular, we would like to submit that, over and above the dynamics of the government saving figures, it is the composition of those figures that matters most when attempting to explain private saving rates.

The paper begins (Section 2) with a review of aggregate saving figures in postwar Italy and highlights the role of accounting conventions in the measurement of national and sectoral saving rates. A detailed analysis of major items making up government current balances suggests that attention should be paid to the composition of government saving and in particular to the role played by social transfers. Section 3 of the paper takes an unabashedly empirical attitude and looks at the time series

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3 Beside the papers in Fornero and Castellino (1990) and in Jappelli (1991), the interested reader is referred to Modigliani (1990) and Guiso, Jappelli and Terlizzese (1992).

4 The debate has been focusing mostly on the so-called Ricardian equivalence proposition. On one side, Modigliani and Jappelli (1987), Modigliani (1991) and Modigliani, Jappelli and Pagano (1985, 1989) have forcefully argued against the relevance of that proposition for the Italian economy. On the other side, Onofri (1987) and Nicoletti (1988) have suggested that a substantial tax discounting could actually have been effective in the seventies and eighties. Nicoletti (1990) has attempted to discriminate between short-run and long-run tax discounting. Finally, Rossi (1989) and Gambetta and Orsi (1991) have warned against the straightforward use of aggregate data to discriminate among competing hypotheses such as those referred to above. Appendix A to the present paper provides fresh evidence on the issue.

aggregate consumption function over the period 1951-1990. On the basis of the aggregate evidence, a specific hypothesis concerning the role of public transfers in the seventies and in the eighties is put forward. Sections 4 and 5 make use of an econometric model of consumer behaviour allowing for borrowing constraints estimated on microeconomic data to provide fresh and independent evidence on the effect of selected social transfers on saving. In particular, Section 4 evaluates the impact of the structural changes in the social security system experienced in the late sixties and early seventies on the private saving rate. Section 5, instead, faces the same issue in perspective and attempts to evaluate the impact on the household saving rate of the recent Government actions to reform the Italian pension system. Section 6 concludes the paper.

2 Saving rates in the postwar period (1951-1990)

Before examining the trends of Italian saving rates in the last fourty years, it is appropriate to consider a number of data and definitional issues. As for the definitions, it should be stressed that the standard National accounts (NA) definition is inadequate on various respects. First of all, consumption is usually defined as total expenditures on consumer goods and services. The former include expenditures on consumer durables which should be more properly considered as a component of household investment. A proper (economic) definition of consumption should instead only include the services provided to households by the stock of durables.

A second issue arises when we consider that in the NA definition of income interest payments and receipts are included at their

nominal value. As it has been recognized for quite a time,[5] however, income should be adjusted for the loss of purchasing power that inflation induces on the stock of nominally denominated debt. This is particularly relevant when national saving is split between its private and government components. Ignoring the loss of principal due to inflation implies an overestimation of private savings: this simply amounts to neglecting a possibly important source of revenue for the government, the so-called "inflation tax".

Finally, even if it is controversial, it is likely that saving should be considered net of the depreciation of the capital stock. In fact, even if in principle the growth of income may be fostered by the replacement of new to old capital equipment when the former incorporates new technological developments, in practice much of investment expenditures is simply addressed to the purpose of substituting run-down equipment and machineries.

In this section the movements of national, private and government saving rates will be considered, comparing the standard NA definition with the one that allows for a proper treatment of consumer durables (and which will be labelled as the "economic" definition). The latter will then be adjusted to take account of the "inflation tax", and both the household and the corporate components of private saving will be considered. All figures will be presented net of the capital stock depreciation and all saving ratios will be computed with respect to the (net) national disposable income.

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5 The classic reference is Hicks (1936). For evidence on the Italian case, see Banca d'Italia (1986) and references therein.

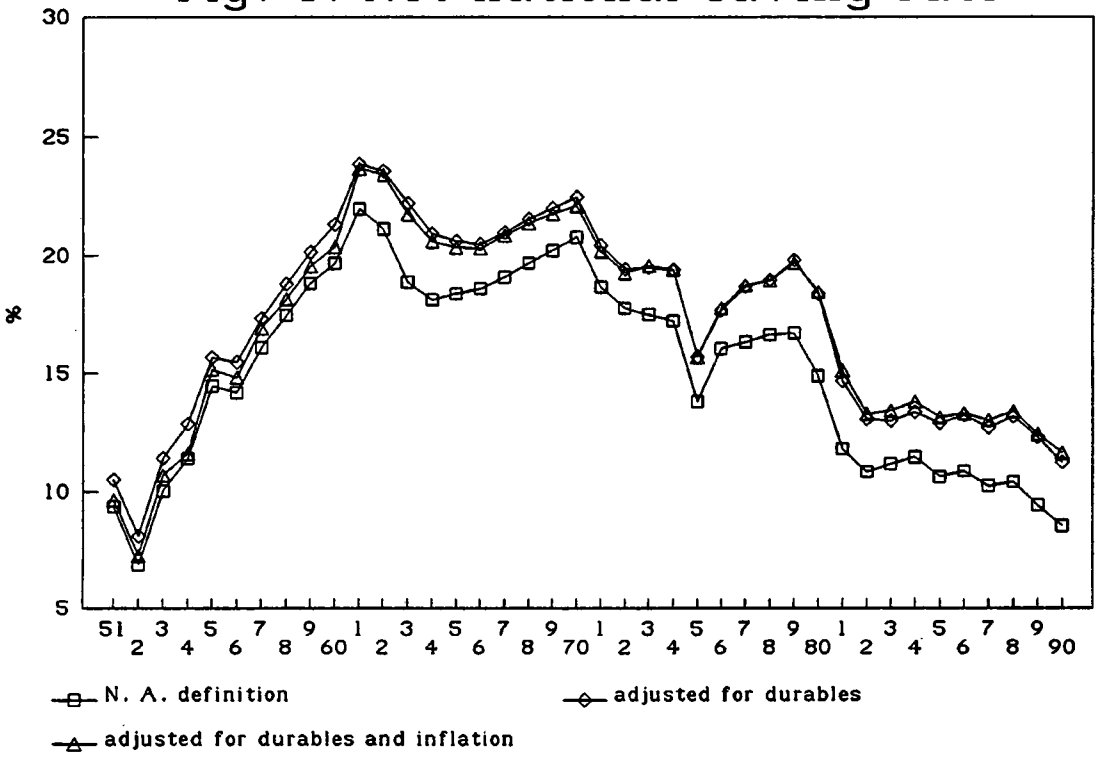
As for the data issue, it should first be observed that in 1985 the Italian NA statistics were substantially revised, and official estimates have since been released covering only the more recent years for most of the variables of interest here. It has then been necessary to proceed to a major data reconstruction. Analytical income accounts from 1970 onwards have been arranged by Marotta and Pagliano (1992); at a more aggregate level, the time series since 1951 considered in this work (inclusive of those estimates and of the official ones for the more recent years) are presented in Pagliano and Rossi (1992). While we refer to these papers for the details of the reconstruction, it should be only observed here that, in adjusting the saving rates for inflation, the inflation tax has been computed as the "expected" inflation loss on government debt, on the grounds that consumers may only base their decisions on the anticipated real interest revenues (expected inflation being derived from survey measures of consumer price expectations).

2.1 The various definitions of saving

Net national saving rates are shown in Figure 1. The difference between the NA and the economic definitions is mainly one of levels, even if the latter ends up exceeding the former from only about one percentage point in the fifties to over 3 points in the eighties. As it is obvious, at the national level the adjustment for inflation is negligible, reflecting the small magnitude of the Italian net foreign financial position over the period. It turns out that from a peak of about 24 percent at the beginning of the sixties, the national saving rate has declined to a level averaging below 15 percent in the last decade.

The inflation correction is instead extremely important when private and government saving rates are considered. As can be seen from Figure 2, from the economic definition of saving (as

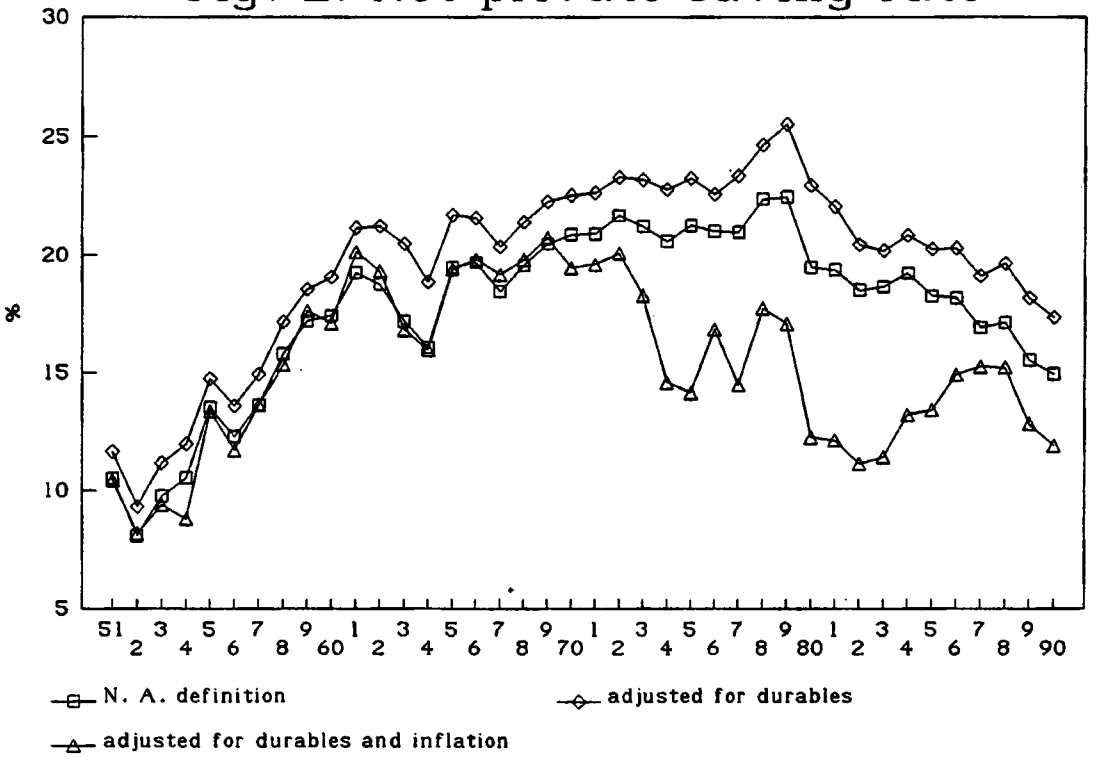
Fig. 1: Net national saving rate



well as from the NA definition) one would conclude that after a dramatic 10 points increase in the fifties, the private saving rate has continued to rise in the next two decades, albeit at a much slower pace, and only since the late seventies it has progressively fallen to a level more than 7 points lower in 1990 than the 1979 peak.

Correcting for inflation, instead, it appears that after the very large rise of the fifties, the private saving rate stabilized from the beginning of the sixties to just short of the mid-seventies. Since then, even if with non-negligible fluctuations, it progressively declined until the end of the eighties, accounting

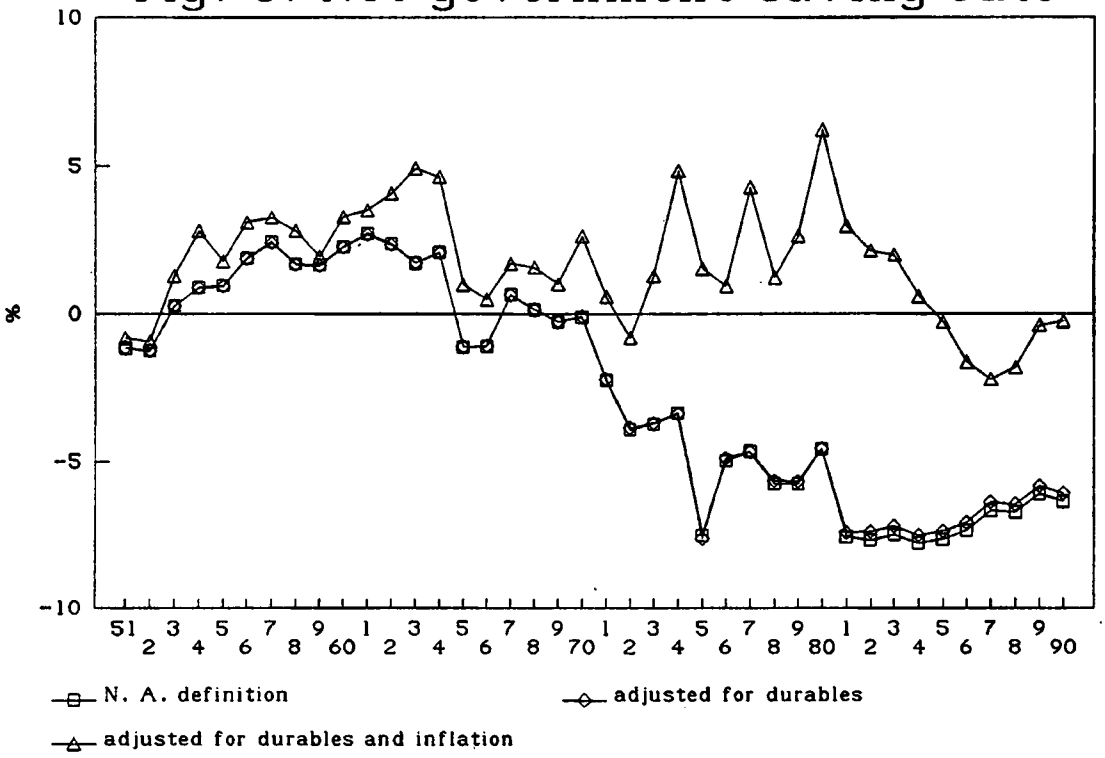
Fig. 2: Net private saving rate



for much of the 7 to 8 points reduction that we observe in the same period for the national saving rate.

Correspondingly, the large reduction of the public sector saving rate that we observe since the first years of the seventies (Figure 3), when wide current account deficits first started being realized, is completely offset by the "inflation tax" until 1983-84. Only when the latter substantially falls, together with the rate of inflation, and notwithstanding the rise of the public

Fig. 3: Net government saving rate



debt in the most recent years, we observe a reduction in government saving and the formation of actual deficits on the current account, even adjusting for inflation.[6]

2.2 National, private and government saving rates compared

As we have observed, and as can be easily gauged from Figure 4 where national, private and government saving rates (corrected for durables and inflation) are presented, the beginning of the decline in the Italian saving rate can be placed just short of

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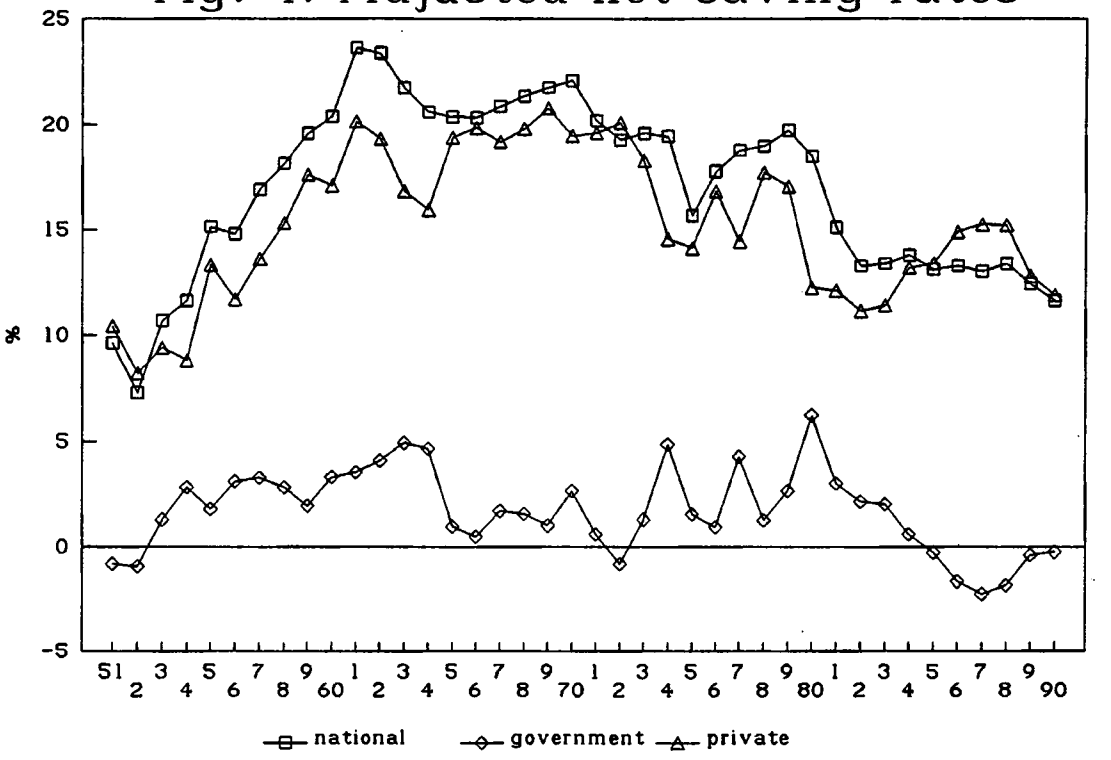
6 In assessing the evolution of government current account balances, it should be carefully noticed that boundaries between current and capital government expenditures are far from being clear-cut. There is some presumption that in Italy part of the latter may actually be disguised subsidies to publicly owned enterprises.

the middle of the seventies, in conjunction with the first oil shock, when the growth rate of the Italian economy first started to fall. It is only in the eighties, however, that the reduction of the national saving rate became quite substantial, fully reflecting also the progressive decline of government saving that superposed upon the negative trend of private saving.

Fig. 4: Adjusted net saving rates



It should be observed that, adjusted for inflation, the government saving is substantially lower in the ten-year period from 1965 to 1975 than in both the previous low-inflation and the following high-inflation years (until 1984). In the latter period, the "inflation tax" was a substantial source of revenue for the government. Its reduction in the more recent years was not accompanied, however, by a corresponding retrenchement of the

trend of government expenditures and transfers, with the final result of a remarkable decline of government saving. In the next paragraph, its components will be considered in some detail, in order to single out the main determinants of this decline. The following sections will then be (mainly) devoted to highlight the effects, if any, that major changes in these components of government saving might have had on the private sector behaviour. Before, it might be useful to consider, however, how the evolution of private saving has been determined by its households and "corporate"[7] components.

In Figure 5 these components are presented. It is clear that the pattern of the private saving rate is dominated by the households' one. As a matter of fact the decline of the latter from 1973 onwards is even more pronounced than that of the former. While the corporate saving rate, after a modest rise in the second half of the sixties, has basically fluctuated around a constant level until the end of the eighties, the rather large recovery of the private saving rate that one observes between 1983 and 1987 is for the most part an artifact due to the cyclical reduction of firms' profits that occurred between 1981 and 1983.

2.3 The components of government saving

As we have observed, a substantial reduction of the government saving rate has taken place in the course of the eighties. As a matter of fact, even adjusted for inflation it is since 1985 that the public sector budget actually shows a current account deficit. This adds to the substantial deficit of the capital account (which

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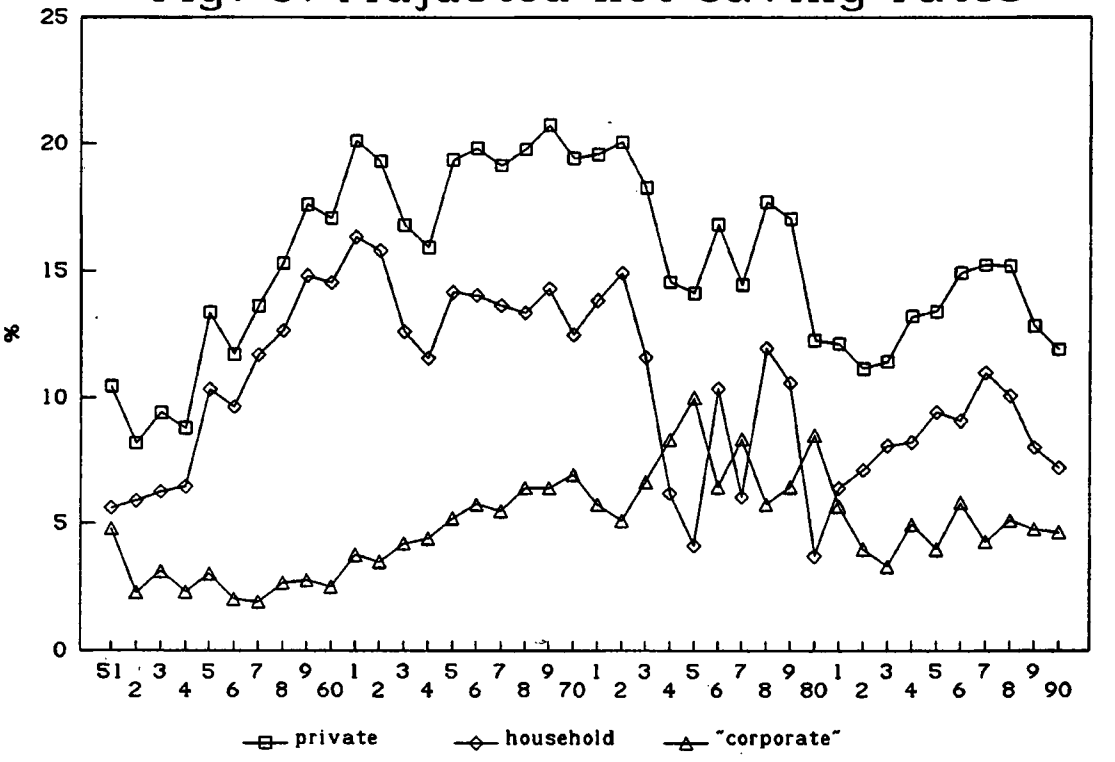
7 The national accounts currently employ a definition of "private sector" that comprises households (both "pure", i.e. consumer households, and producer households) and financial and non financial enterprises. For simplicity, the sector defined here as "corporate" includes all these entities with the exception of consumer households.

Fig. 5: Adjusted net saving rates



has slightly increased in the whole period from near 4 to about 5 percent of GDP), making for an overall deficit that is a serious mattern of concern.

To identify with some precision all determinants of the decline in government saving would likely require many pages of institutional and policy details. In this section, we will limit ourselves to highlight the trends of the major components of government saving with the help of a number of graphs, trying to organize them in a way that may give the best possible insight.

In Figure 6, tax receipts are presented.[8] After having remained basically constant until the mid-seventies, the tax to income ratio shows a striking rise in the last 15 years, reaching in 1990 a level over 10 percentage points higher than in 1976. As can be seen from the figure, most of the rise is due to the increase in direct taxation. This is mostly the consequence not much of increases in the tax rate but of the combined working over most of the period of rising nominal incomes (in the presence of high inflation rates) with a given progressive tax structure (the so-called "fiscal drag").[9]

The growing trend of government consumption, that is of expenditures on consumer goods and services plus wages and salaries of public employees, is much less pronounced than that of tax receipts, as can be noticed from Figure 7. In particular, from an average around 16 percent of net national income in the seventies, government consumption has risen to a level about 3 points higher in the last decade. As a consequence, the excess of total taxes on government consumption has been progressively growing since 1975 and is now above 8 percent of total income.

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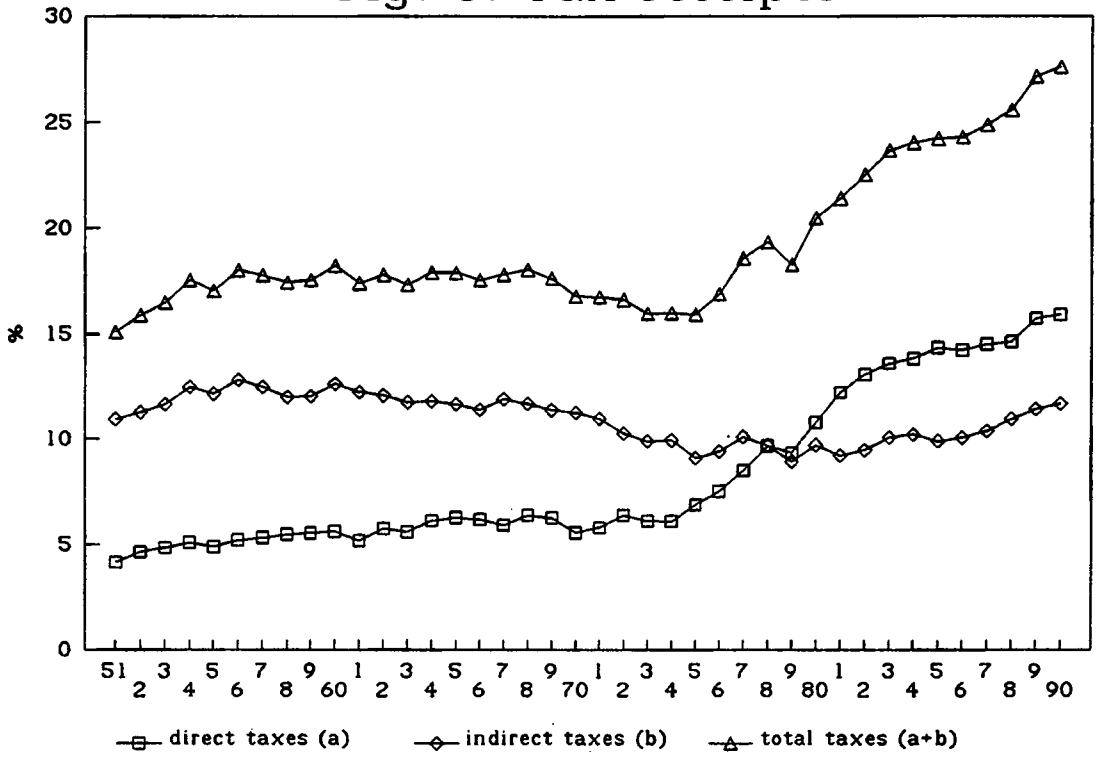
8 Here, as in the following graphs, all variables are again expressed as ratios to the net national disposable income.

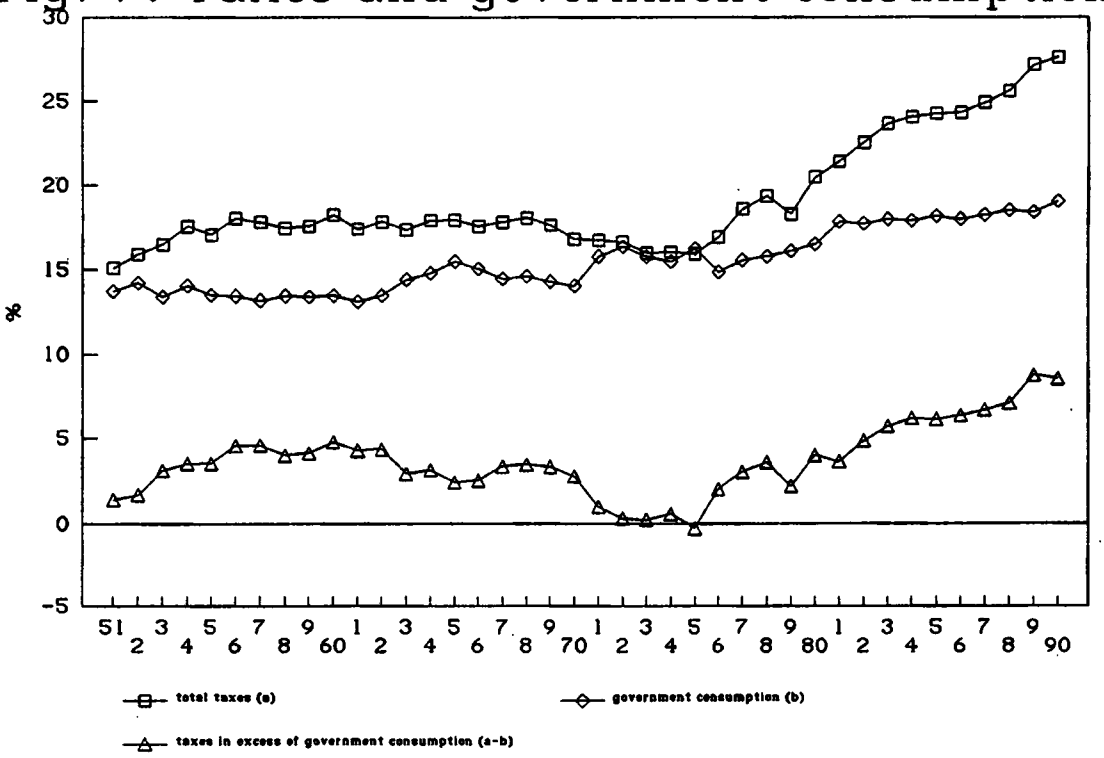
9 Even if tax rates have been periodically revised to account for price increases, this has only avoided a more pronounced growth of the ex-post average rate of personal income taxation. Since 1989, tax rates are automatically indexed to the general price level.

Fig. 6: Tax receipts



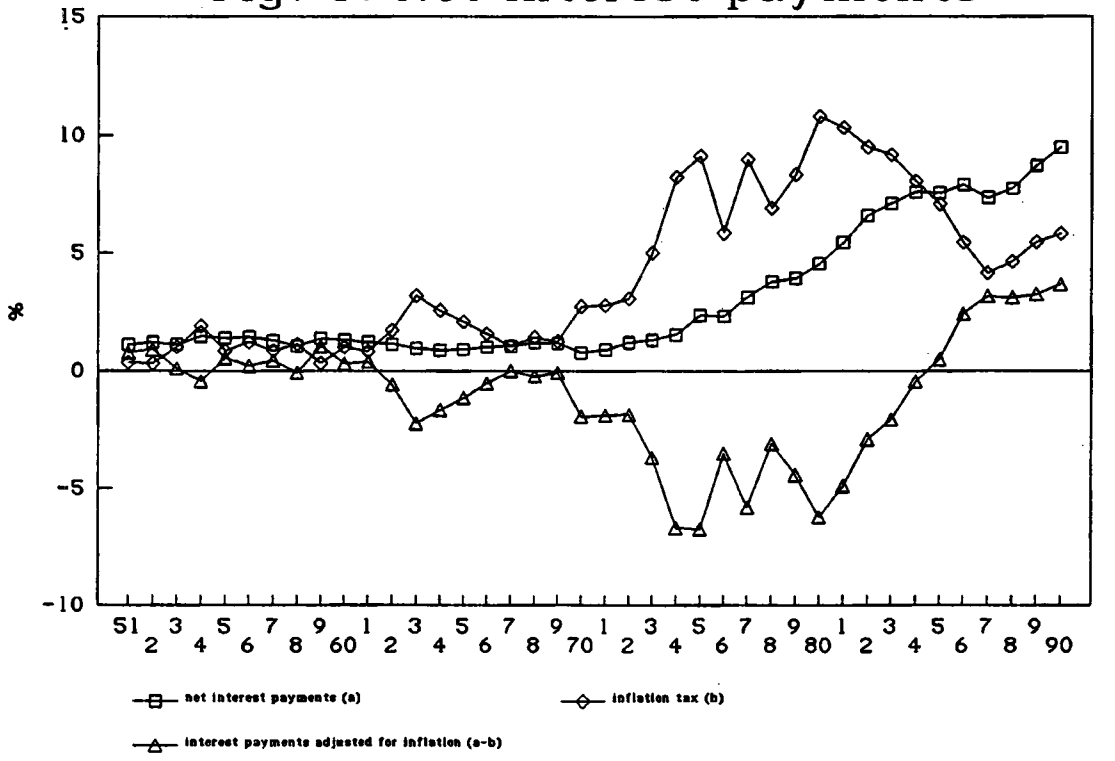
Interest payments are shown in Figure 8. The basic result here is that, once the inflation tax is properly evaluated, net interest payments are positive and large only in the second half of the eighties. On one side, this is the effect of the substantial reduction of the inflation tax that, even if still non-negligible, has ceased being a conspicuous source of revenue for the government. On the other side, high real interest rates have combined, in the more recent years, with an extremely high and growing public debt (the consequence of the conspicuous overall deficits accumulated over the years) to produce what is by now a substantial component of the current account deficit (and about 4 percent of net national income).

Fig. 7: Taxes and government consumption



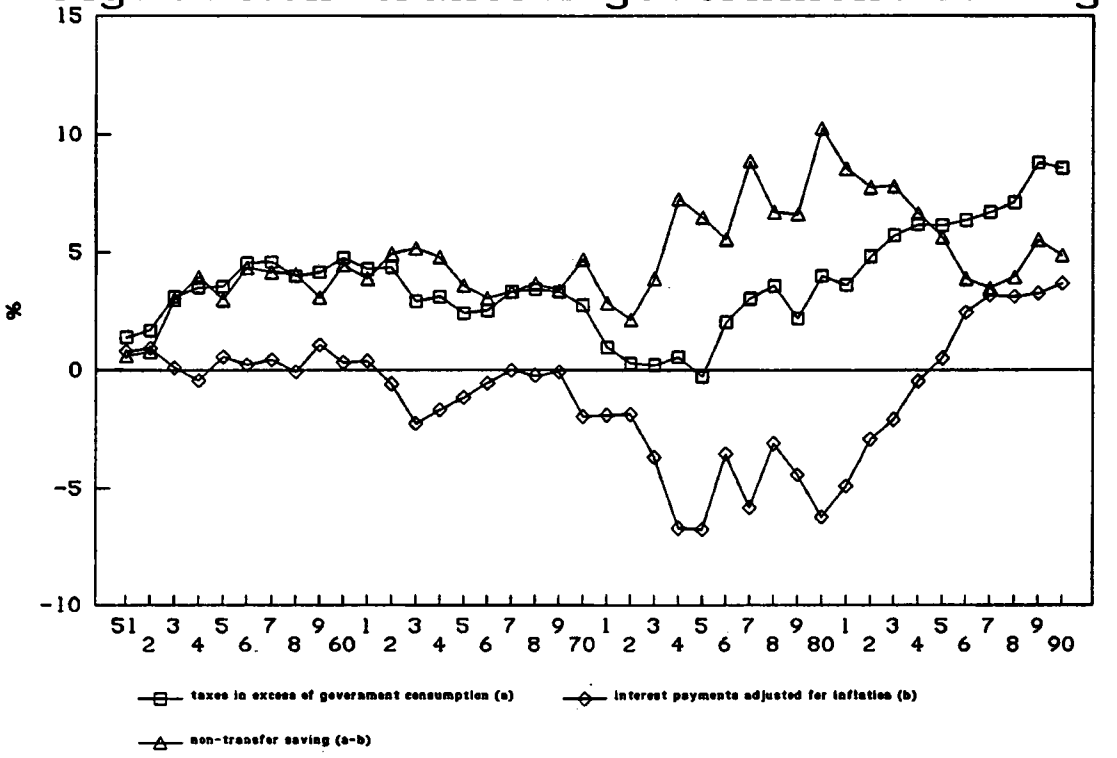
If we subtract the net interest payments adjusted for inflation from the variable resulting from Figure 7, we obtain in Figure 9 a magnitude that may be labelled as "non-transfer government saving", the excess of total tax receipts (including the inflation tax) on current government expenditures for consumption and interest payments. It emerges clearly enough that this variable has remained positive and high over the whole period considered in this work. After a substantial increase in the years of high inflation, non-transfer government saving has returned during the eighties to a level around 5 percent of net income, not much above the one that was observed until the beginning of the seventies.

Fig. 8: Net interest payments



The other component of government saving that remains to be seen is therefore that of net transfers. As can be noted from Figure 10, total transfers have been rising dramatically over the whole period from a level of 8 to one above 22 percent of net national income. While transfers to firms show a permanent increase of about 1 percentage point from 1975 onwards, the trend of total transfers is clearly dominated by that of social transfers to households. Among these, most of the rise (about 9 points) is accounted for by the movements of pensions. The rest is due to the increase in public health services.

Fig. 9: Non-transfer government saving



As it has been observed, "Italy is the western country in which public expenditure on pensions is highest in relation to GDP".[10] In particular, an analysis of the determinants of the rapid growth in pension expenditures suggests that, over and above demographic trends, substantial increases in the number of pensions (throughout the period) and in average pension benefits (from 1976 onward) should be singled out.[11]

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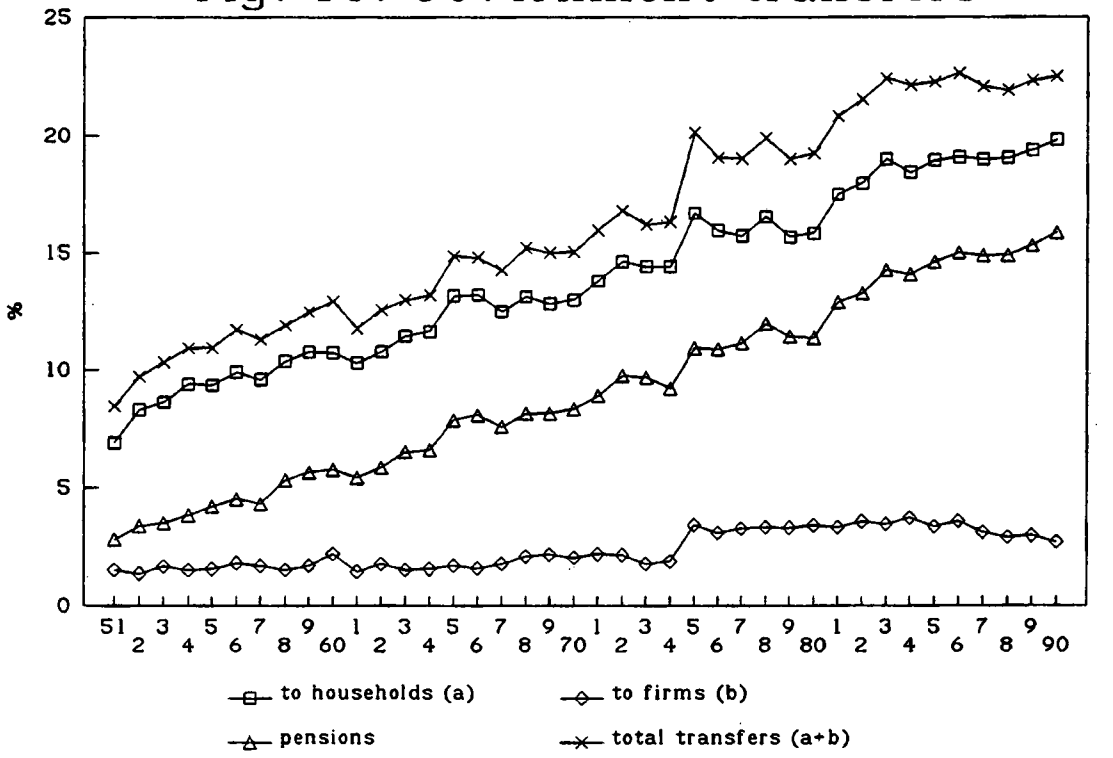
10 Franco and Morcaldo (1990), p. 105.

11 Franco (1992) reviews the postwar evolution of government transfers in Italy and provides a detailed account of their determinants.

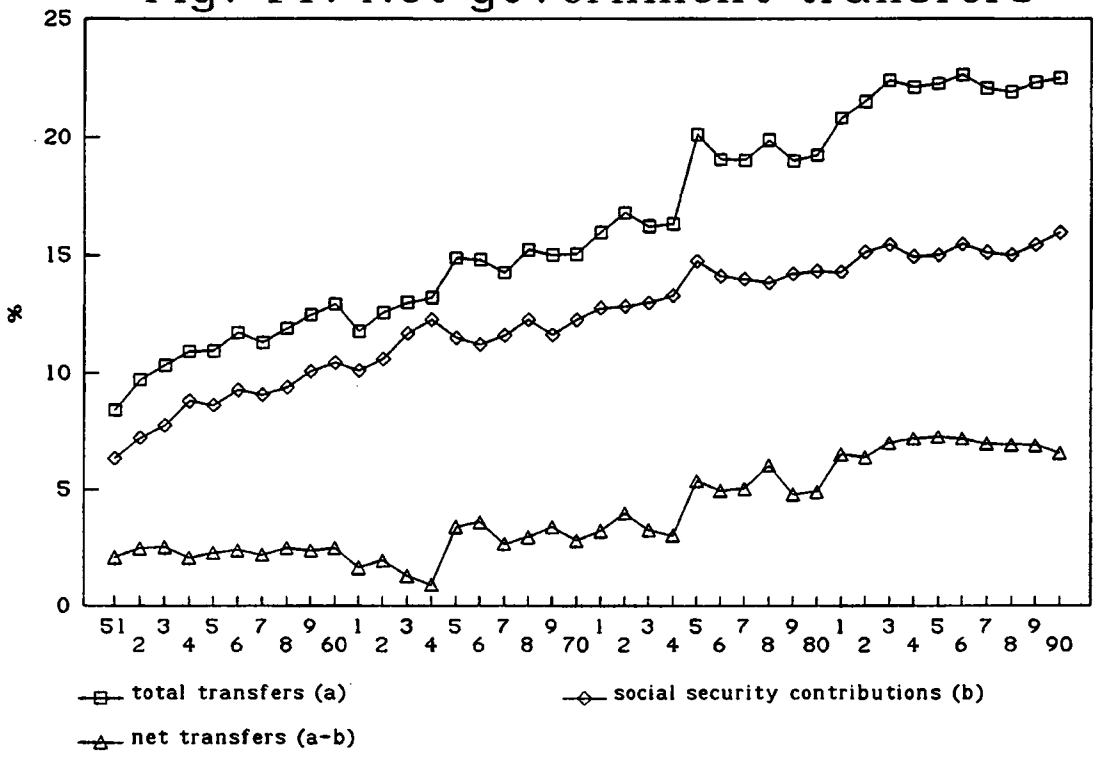
Fig. 10: Government transfers



What seems to be here extremely relevant is the fact that the spectacular increase of social transfers (and particularly of pensions) has not been matched by that of social contributions from whatever source (from employers as well as from employees). Between 1951 and 1990 total transfers have increased in relation to the net national income about two times and three quarters (with three "jumps" catching the eye in 1965, 1975 and 1980, when major institutional changes took place, with further consequences for the following years). By no means the corresponding increase of social contributions has been a modest one, having amounted to two and a half times that of national income. This has not been sufficient, however, to avoid a rise of net transfers (from about 2 percent of income until the mid of the seventies to about

6 percent in most of the eighties, Figure 11) almost entirely to be attributed to the growing imbalance of the national social security system.

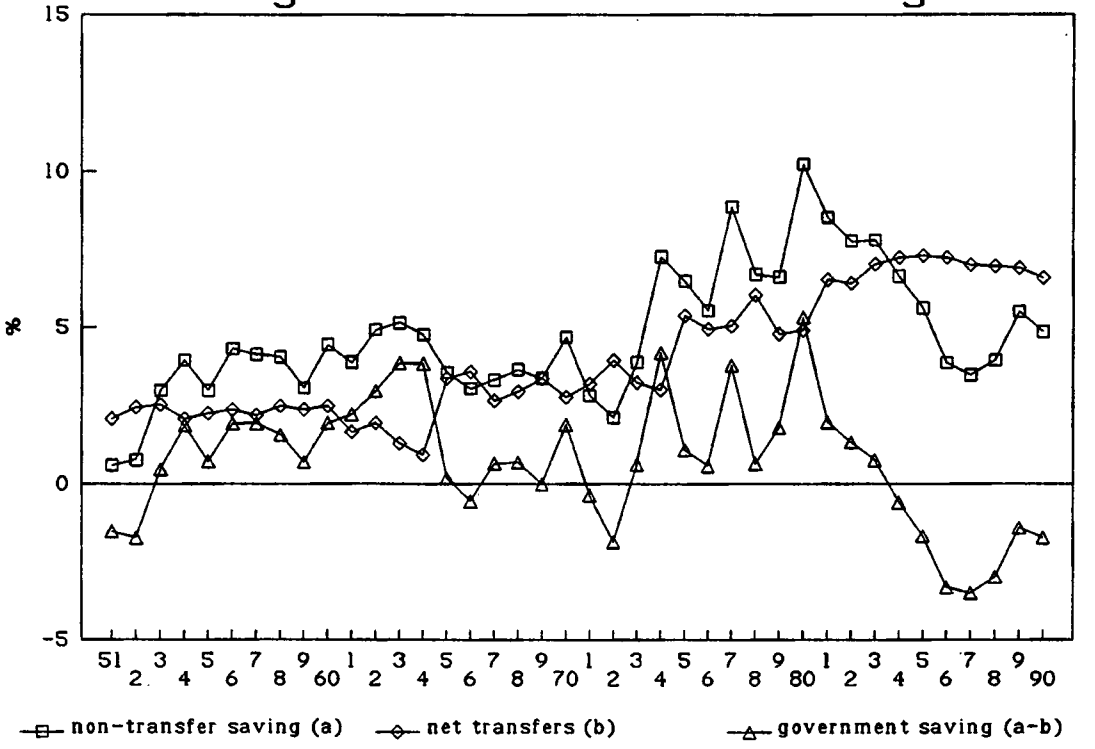
Fig. 11: Net government transfers



The increase of net transfers has been overcome until the beginning of the last decade by the rise of explicit and implicit taxation in excess of government expenditures and interest payments.

As shown in Figure 12, however, as the inflation tax started

Fig. 12: Government saving



being reduced[12] and interest payments adjusted for inflation started to become significant, net transfers continued to grow both in absolute and in relative terms. By this way, they ended up more than offsetting the non-transfer saving component, which was still, as observed and notwithstanding the above mentioned increase in interest outlays, highly positive and above the levels registered before the first oil shock. Consequence of all this

12 This was the consequence of the gradual disinflation that followed the second oil shock of 1979 and more than compensated, in the making of the "inflation tax", the contemporaneous remarkable increase of the Italian public debt. On the disinflation experience see Gressani, Guiso and Visco (1987). See also Giavazzi and Spaventa (1989), where the role of the inflation tax in financing part of the rise in net government transfers is properly identified.

is the fall of about 4 percentage points in the overall government saving rate that has occurred on average between the 1974-1983 period and the 1984-1990 one.[13]

2.4 Government transfers and private saving

As we have tried to show, the Italian economy has witnessed, in the seventies as well as in the eighties, profound changes in the structure of both Government outlays and receipts. As a result, the relationship between the private and the public sector has undergone substantial changes which have not been necessarily reflected by aggregate figures such as government current balances.

In this context, focusing on the interplay of aggregate measures of private and public savings is likely not to be particularly revealing. For one thing, the evolution of magnitudes such as government deficits cannot be easily interpreted as representing, in some sense, the result of an experiment à la Barro (1974), that is of changes in (lump-sum) taxation associated, for a given path of government expenditures, with changes in government debt of an equal but opposite magnitude. On the contrary, over and above tax rates changes, government current balances in Italy appear to have been affected by changes in expenditure policy with particular reference to transfer payments.

To clarify this point, assume that any reduction (increase) in government expenditure is associated with a corresponding decrease (increase) in borrowing. Thus, the impact of such a decrease in borrowing on consumption and saving turns out to be a function

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13 Government saving figures shown in Figure 12 do not match exactly those given in Figure 3 due to some minor miscellaneous items.

of how the path of future tax payments is anticipated to change.[14] In this context, leaving aside distributional issues for the time being, the analysis would apparently parallel the standard treatment of changes in lump-sum taxation. However, this would be only part of the story. Taxes and transfers affect economic activity primarily by changing individual budget constraints. In contrast, changes in the level of government expenditures on goods and services tend to influence individual behaviour through the structure of preferences. Furthermore, transfer programs, as opposed to taxes, often present notable intertemporal implications whose impact should be explicitly accounted for.

Consider, in fact, the case of transfer payments with particular reference to social security programs. As long as some fraction of the population is liquidity constrained at a given point in time, transfer programs tilted toward the lower income segments of society might be expected, everything else being equal, to have a relatively significant positive effect on consumption (Romer 1989, Wilcox 1989). If, for example, borrowing constraints turned out also to characterize the optimization problem of the elderly, the introduction in 1969 of old-age benefits for persons over 65 lacking adequate means of support could well have implied a relaxation of binding constraints.

Moreover, an increase in pension benefits in the form of, say, changes in the rules determining social security payments (such as the changes repeatedly observed in the 1970s and the 1980s) could affect the saving behaviour of all individuals through their impact on expectations, since, in a life cycle framework and for a given retirement age, such an increase would, coeteris

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14 In what follows, endogenous government behaviour (as, for example, in Bohn 1990) is assumed away, as in practically all the literature on Ricardian equivalence.

paribus, create an incentive for the current generation to increase its consumption.[15] Therefore, in such circumstances, an increase in transfer payments signalling a permanent increase in pension benefits[16] (the bill being eventually footed by later generations) could be expected to have an appreciable negative impact on private savings and hence, for a given level of current income, on the private saving rate. The shrinking private saving rate would add up to a larger government deficit, thereby leading to an even larger cut in the national saving rate.[17]

Changes in government current outlays affect economic activity through a number of additional channels. In particular, the impact of the provision of goods and services, of which health care is a prominent example in the Italian setting,[18] will depend on the degree of substitutability or complementarity between those goods and services and aggregate private expenditure. In turn, this will depend on the nature of individual preferences. If public expenditure programs are perfect substitutes for the corresponding item in private budgets, attention should be focused (as in the Barro experiment) on the implied change in public borrowing and

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15 It should be recalled that, if the retirement age is not fixed, such effect may be partly offset by induced phenomena of early retirement.

16 It is implicitly assumed here that the increase in transfer payments is perceived as sustainable by the agents. This warning forcefully applies to the Italian case where the inherent risk of unsustainability of the social security system is by now widely recognized.

17 This would not necessarily be the end of the story. If returns on pension wealth (a non marketable asset) and on public debt positively covariate, a larger pension wealth might push the rate of return on public debt and hence interest payments up, adding to government current imbalances (see Giraldi, Hamaui and Rossi 1991).

18 It should be noticed that national accounts include health care expenditure in government transfers.

on the perceived time path of future tax payments.[19] If, however, publicly provided goods and services turn out to be complements to private consumption, additional effects will work through but their precise magnitude would be, needless to say, rather difficult to quantify.

In short, if both government current outlays and receipts are observed to vary, evaluation of the interplay of private and public saving on the basis of the evolution of private and public aggregate current balances is likely to obscure the main issues preventing a satisfactory assessment of the effects of fiscal policy on private consumption.

In this paper, it is suggested that the channels underlined above are, in fact, of paramount importance in understanding the evolution of the Italian saving rate. In particular, the empirical sections of the paper will focus on the growth of pension expenditures which took place "from the turn of the sixties onwards, reflecting the impact of the introduction of special plans for self-employed workers and increased use of disability pensions for welfare purposes. This rapid growth carried over into the seventies in connection with the switch in 1968 from a contributions-based system to an earnings-based system and the far-reaching reform of INPS pensions in 1969, in particular the introduction, and subsequent improvement, of methods of indexing pension benefits to prices and real earnings" (Franco and Morcaldo 1990, p. 107). It will be submitted that such widespread amendments

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19 This would, quite naturally, be the case of health care programs if we could assume (rather unrealistically, in the Italian case) that the efficiency of publicly provided health services does indeed parallel that observed in private health institutions.

to the postwar social security system introduced large and exogenous variations in the traditional life cycle pattern of income reducing private capital accumulation.

Needless to say, the impact of social security on saving is far from being a novel issue, having been debated widely at both the theoretical and empirical levels.[20] The controversy over the validity of the life cycle model extended à la Feldstein (1976) is still very much an open issue and we certainly do not expect the present paper to settle it. Indeed, Auerbach and Kotlikoff (1983), thoroughly examining recent cross-section and time series tests of the social security savings question, have argued that, given current data, neither type of test has much potential for settling the controversy. Along with Williamson and Jones (1983), they have pointed out that specification problems can lead to highly unstable coefficients and to rejection of the null (given by the extended life cycle setting) when it is in fact true. Neverthless, notwithstanding their warning, we feel that the numbers at stake in the social security debate are so large that a careful and cautious implementation of standard methods still deserves a chance, especially when, as in the Italian case, the evidence is, at best, scattered.[21]

We shall, however, take Auerbach and Kotlikoff's concern seriously and focus (in the next section) on a period (1951-1990) centered on the enactment of the social security reform, exploiting the

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20 See the pioneering work of Feldstein (1974) and Barro (1974).

21 Aggregate (and inconclusive) time-series evidence is reported in Modigliani and Sterling (1983). Brugiavini (1991) exploits cross-section evidence on private net worth accumulation to conclude that unfunded social security reduce household wealth accumulation in a much lesser amount than predicted by the extended life cycle model. Notice, however, that cross-section tests are far from immune from pitfalls. See Auerbach and Kotlikoff (1983).

information contained in the behaviour of the economy around the period of enactment and thereby avoiding what they correctly regard as a major source of misspecification. Moreover, to strenghten our results, we shall supplement (in Section 4) the aggregate outcome with microeconomic simulation evidence designed to "replicate" independently the aggregate experiment. While we are quite willing to recognize that aggregation and other issues plague the standard reduced-form consumption function, we would like to highlight that there is still a lot to be learned from the parallel use of micro and macro data.

3 Macroeconomic evidence

As Section 4 will suggest, the behaviour of more than two thirds of Italian consumers can be adequately represented by the simple tale of rational, utility maximizing, agents allocating optimally, at a given date, resources to consumption over their future life span. We therefore begin the empirical investigation by making explicit reference to the stripped down version of the life cycle hypothesis of saving as reviewed, for example, by Modigliani (1986).[22]

As it is well known, under a set of somewhat restrictive assumptions,[23] the aggregate equilibrium behaviour of consumers can be described by a very simple aggregate consumption function, linear in aggregate labour income (y^l) and wealth w:

$$c = \alpha y^l + \delta w \qquad (1)$$

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22 For earlier applications of the life cycle saving hypothesis to the Italian experience, see Modigliani and Tarantelli (1975) and Frasca et al. (1979).

23 Among these, the least restrictive possibly concerns the income time path which could, in fact, be allowed to grow around a trend line, as long as departures are not very long lasting.

where α and δ are (approximately) constant aggregate coefficients determined by the lenght of life, the lenght of retirement, the rate of growth of population and productivity (g) and the real interest rate (r). Letting $y = y^l + rw$, where y stands for disposable income, equation (1) implies,

$$\frac{s}{y} = (1-\alpha) - (\delta - \alpha r)\left(\frac{w}{y}\right) \qquad (2)$$

which (since, in steady state, $s = gw$) implies the celebrated steady state relationships for the wealth to income and saving to income ratios: $w/y = (1-\alpha)/(g+\delta-\alpha r)$ and $s/y = g(1-\alpha)/(g+\delta-\alpha r)$.

As Feldstein (1974) first suggested, if labour-leisure choices are unaffected, the social security system should influence family's consumption through the effect of social security taxes and benefits on the family's lifetime budget constraint. If there are no constraints on net worth prior to the time of death, then the social security impact is summarized by the family's lifetime social security wealth which is simply the discounted value of lifetime social security benefits minus the discounted value of lifetime social security taxes. In such a case total net worth (w) is just the sum of two components: net non human (real and financial) wealth (w^r) and net social security wealth (w^s). Equation (2) would then read:

$$\frac{s}{y} = (1-\alpha) - (\delta - \alpha r)\left[\frac{(w^r + \theta w^s)}{y}\right] \qquad (3)$$

with the constant parameter θ allowing for a difference between the aggregate coefficients on private assets and net social security wealth due to (as shown by Williamson and Jones 1983 for a single individual) (i) the presence of a bequest motive, which would imply $\theta > 1$, and (ii) the double counting implied by

the standard definition of disposable income, which would entail $\theta < 1$. Clearly, a widespread perception of a risk of unsustainability of the social security system would also imply $\theta < 1$.

Moreover, following Modigliani and Brumberg (1980) and Ando and Modigliani (1963), a more flexible specification would allow δ to vary with the real interest rate and the rate of growth of the economy, so that: $\delta = \bar{\delta} + \mu r + \lambda g$. Hence:

$$\frac{s}{y} = (1-\alpha) - \bar{\delta}\left(\frac{w}{y}\right) - \lambda\left(\frac{w}{y}\right)g + (\alpha-\mu)\left(\frac{w}{y}\right)r \qquad (4)$$

where $w = (w^r + \theta w^s)$ denotes total net wealth.

Expanding around given steady-state values of the total wealth to income ratio, of the growth rate and of the real interest rate ($\bar{\omega}$, $\bar{g}$ and $\bar{r}$), we would obtain:

$$\frac{s}{y} = \phi_0 + \phi_1 g + \phi_2 r + \phi_3\left(\frac{w^r}{y}\right) + \phi_4\left(\frac{w^s}{y}\right) \qquad (5)$$

where

$$\phi_0 = 1 - \alpha - \lambda\bar{g}\bar{\omega} + (\alpha-\mu)\bar{\omega}\bar{r}, \phi_1 = -\lambda\bar{\omega}$$

$$\phi_2 = (\alpha-\mu)\bar{\omega}, \phi_3 = -(\bar{\delta} + \lambda\bar{g} - (\alpha-\mu)\bar{r}), \phi_4 = \phi_3\theta.$$

Equation (5), that is an equilibrium linear relationship between the saving rate, the income growth rate, the real interest rate, the net non-human wealth to income ratio and the net social security wealth to income ratio, provides the benchmark for the empirical analysis undertaken in this section.

3.1 Time Series Analysis

Recent developments in the theory of cointegration have allowed to explicitly link economic equilibrium relationships between a set of variables such as the one depicted by equation (5) with statistical models of those variables (Engle and Granger 1987). To pursue the example given by equation (5), the realized values of the saving rate should not necessarily be expected to move in parallel with the wealth to income ratio, but agents' intertemporally optimizing behaviour brings them back into line if they are not so. With shocks in every period, equation (5) never needs to hold, yet agents work to absorb those shocks and, if the theory is correct, the two ratios never drift too far apart from their equilibrium values. If the saving rate is non stationary (e.g. integrated of order one $I(1)$) the wealth to income ratio will also be so, but some linear combination of both ratios may be stationary because agents' behaviour make that set of variables cointegrated.

In testing for the existence of cointegration, it is necessary to establish first that the individual series are $I(1)$ and then that there exists some non trivial function of them which is $I(0)$. The most common approach is to start testing for a unit root in the univariate representations of the individual series and then in the least squares linear combination. The upper panel of Table 1 lists the values of the Dickey-Fuller (DF) and augmented Dickey-Fuller (ADF) statistics for the following variables:[24]

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24 All estimates reported in this section and in the Appendix A have been obtained using Microfit 3.0 (Version 386, see Pesaran and Pesaran 1991, where specific references for test statistics are also reported).

(i) log of the expenditure/income ratio $\ln(c/y)$, where c stands for real "economic" consumption and y denotes the consumers' net real disposable income defined as net real disposable income of the private sector adjusted for inflation and inclusive of net government transfers.[25] Clearly, $\ln(c/y) \approx -s/y$ where s stands for net private savings.[26] It should be carefully noticed that these private saving rate figures do not match the corresponding figures reported in Figs. 2, 4 and 5 in that, while the latter are computed as ratios to net national disposable income, the former refer to the net private disposable income (adjusted for inflation). As a result, the overall pattern of the private saving rate remains hump-shaped but the decline observed in the seventies and eighties turns out to be somewhat larger (Fig. 13);

(ii) growth rate of real disposable income of the private sector (g);

(iii) the real interest rate (r) defined as $\ln[(1+R)/(1+\pi)]$, where R is the nominal interest rate on long term Government bonds and π is the expected annual rate of change of consumer prices;[27]

(iv) private wealth to net disposable income ratio (w^r/y, Fig. 14), where w^r denotes the net real private sector non-human wealth;

(v) net social security wealth to net disposable income ratio (w^s/y, Fig. 14). This is, needless to say, a rather elusive quantity whose measurement involves formidable assumptions at

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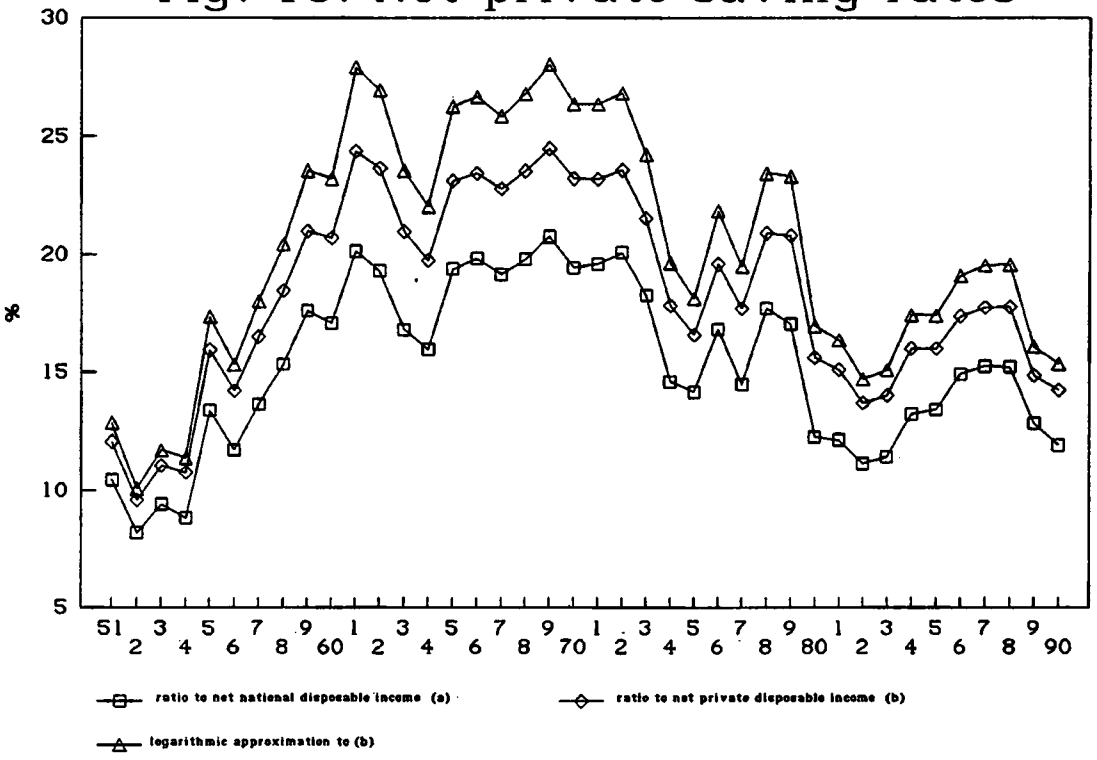
25 The empirical exercise undertaken in this section, therefore, assumes that while households pierce the corporate veil, they do not pierce the government veil. Evidence on this set of assumptions, is presented in the Appendix A.

26 Notice, incidentally, that while the saving ratio is a bounded variable (at least from above), $\ln(c/y)$ is not.

27 Unweighted average of semi-annual observations; see Visco (1984).

Fig. 13: Net private saving rates

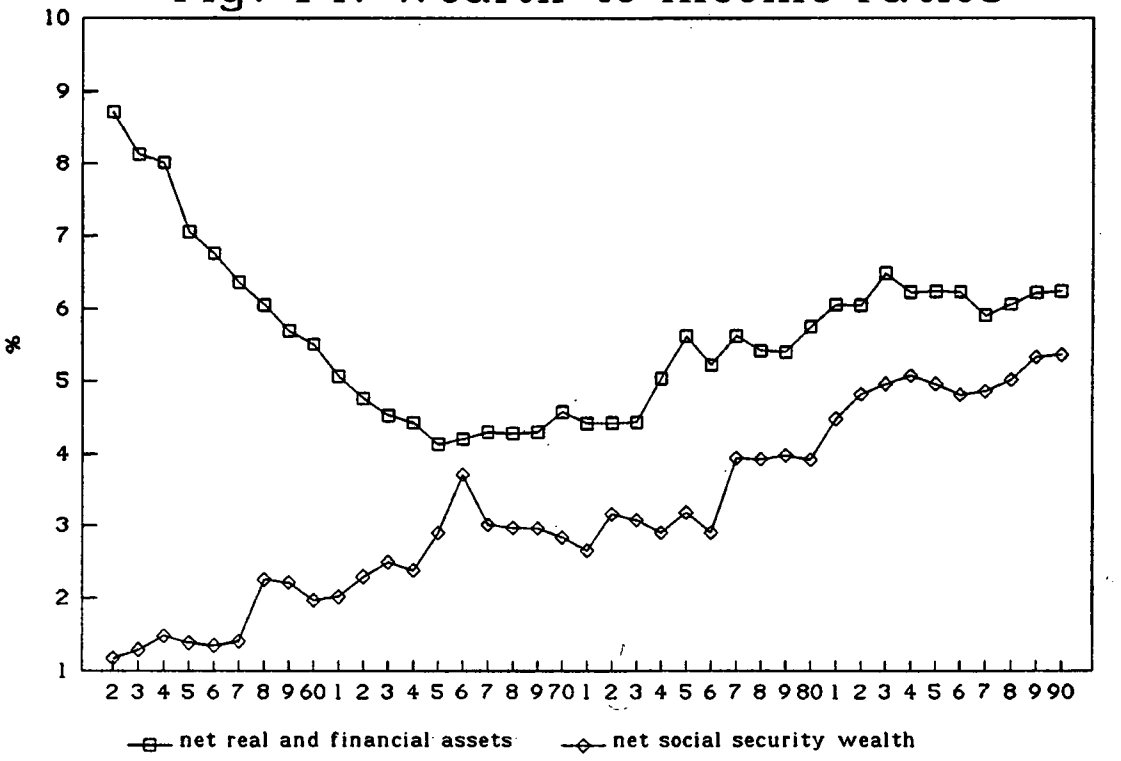


the individual as well as at the aggregate level.[28] Briefly, net social security wealth should measure the actuarial value of the social security benefits which individuals expect to receive net of the actuarial value of the social security taxes which individuals expect to pay. As such, this quantity should reflect changes over time in such factors as the population age and sex structure, life expectancy, social security coverage and benefit

28 Aggregate estimates of social security wealth in Italy have been computed by Castellino (1985) for the year 1983, by Brugiavini (1991) for the year 1984 and by Beltrametti (1988), for a specific social security program, for the 1959-1983 period.

and tax rules. In what follows, we shall make use of a careful reconstruction of this variable whose details are reported in Appendix B.[29]

Fig. 14: Wealth to income ratios



On the basis of the statistics reported in Table 1, only for income growth (g), there is a clear rejection of the hypothesis of a unit root at the 5 percent level.[30] In a multivariate context, though, the linear relationship linking the saving rate, income growth, the real interest rate and the wealth to income ratios

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29 The reconstruction is due to Luca Beltrametti.

30 Interestingly, Table 1 signals the non stationarity of the (logarithmic approximation to the) saving ratio, thereby providing evidence against the highly restrictive permanent income set up underlying Campbell's (1987) results.

Table 1 : Univariate statistics for testing unit roots

	period	without trend	with trend
$\ln(c/y)$			
DF	1952-90	-1.858 (-2.938)	-1.816 (-3.528)
ADF(1)	1953-90	-2.212 (-2.940)	-2.248 (-3.531)
g			
DF	1953-90	-7.055 (-2.940)	-8.148 (-3.531)
ADF(1)	1954-90	-3.567 (-2.942)	-4.460 (-3.535)
r			
DF	1952-90	-2.620 (-2.938)	-2.582 (-3.528)
ADF(1)	1953-90	-1.938 (-2.940)	-1.881 (-3.531)
w^r/y			
DF	1953-90	-3.304 (-2.940)	-3.141 (-3.531)
ADF(1)	1954-90	-2.463 (-2.942)	-3.164 (-3.535)
w^s/y			
DF	1952-90	-1.057 (-2.938)	-3.467 (-3.528)
ADF(1)	1953-90	-.600 (-2.940)	-2.963 (-3.531)
Note: 95 percent critical values in parentheses.			

is just one of the many available cointegrating regressions. We therefore revert to the recent work of Johansen (1988), testing for the maximum number of cointegration vectors (υ) and providing a maximum likelihood estimate of such vector(s) (Table 2). As it turns out, the hypothesis of a single cointegration vector cannot be rejected at customary confidence levels.[31]

3.2 A Basic Consumption Function

In a relatively small sample, like the present one, an attractive alternative to the multivariate time series methods used above

31 It should be noticed that, although quite similar, the maximum likelihood estimates of the cointegration vector do not match the estimated coefficients of the corresponding static Engle-Granger regression, thereby signalling the small sample bias of the latter estimates.

Table 2 : Maximum likelihood cointegration analysis (1954-1990)

Lag lenght in VAR (in years): 4; non-trended variables				
Non-zero eigenvalues of the stochastic matrix: .897, .436, .342, .074				
W test (H_0:$v \leq 3$;H_1:$v = 4$)	2.695 (9.243)			
W test (H_0:$v \leq 2$;H_1:$v = 3$)	14.665 (15.672)			
W test (H_0:$v \leq 1$;H_1:$v = 2$)	20.024 (22.002)			
W test (H_0:$v = 0$;H_1:$v = 1$)	79.665 (28.138)			
Note: 95 percent critical value in parentheses				
Cointegration vector associated with the largest eigenvalue:				
$\ln(c/y)$	*intercept*	r	w^r/y	w^s/y
-1.000	-.359*	-.463*	.029**	.013*
Note: * (**), significant at the 95 (90) percent level				

is the estimation of a conditional non-linear error-correction model and the formal test of the significance of the adjustment coefficient.[32] Assuming, therefore, on the basis of the results reported in Table 2, that $\ln(c/y)$, r, w^r/y and w^s/y are cointegrated, Table 3 presents the estimated non-linear error correction model which has the general form of the theoretical model (3) but contains additional lags and variables designed to shed some light on the short-run impact of income and government expenditure as well as to take into account the possibility of some agents

32 As Banerjee et al. (1986) have suggested, this test can be more powerful than the unit root test on the cointegration regression since the estimation of the error correction model allows a much richer short term dynamics. Furthermore, they have also shown that, in finite samples, the static estimator of the cointegrating vector can be badly biased towards zero relative to the corresponding estimator in the error correction model. On the relative merit of the non-linear error correction model see Phillips and Loretan (1991).

being constrained from their optimal consumption plan in any period thereby showing excess sensitivity of consumption to current income. In deriving the implied long run (steady state) solution of the model, capital market imperfections will be assumed away.

In an attempt to estimate the vector of short run responses of consumption to changes in different components of income (y), we also separately investigated the role of taxes, social contributions, public transfers and (real and nominal) interest payments, thereby allowing for the possibility of separate marginal propensities to consume out of different kinds of income. However, none of these variables turned out to play a significant role, with the exception of transfers to firms which showed a zero short-run impact on private consumption and were therefore subtracted out from the definition of income applicable in the short-run.

In Table 3 coefficient estimates, associated standard errors and diagnostic statistics, when available, for the NLS and NIV estimates,[33] respectively, are reported. In the table, x_t stands for real disposable income of the private sector net of government transfers to firms, z_t denotes real government consumption. The following points appear to be noteworthy.

In the NLS estimates, the impact marginal propensity to consume out of labour income turns out to be around .35. This figure is revised upward by the NIV estimates: the short-run marginal propensity to consume out of income averages to .54. Interestingly, government expenditure turns out to be a mild substitute for private consumption in the short-run (as in Rossi 1991).

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33 Besides predetermined variables and $\Delta \ln z_t$, the list of instruments includes $\ln x_{t-1}$, $\ln(c/y)_{t-2}$, w^r/y_{t-2} and w^s/y_{t-2}.

Table 3 : Non-linear error correction representation
(dependent variable: $\Delta \ln c_t$; sample: 1954-1990)

Parameter estimates	NLS			NIV		
<u>Short-run coefficients</u>						
$\Delta \ln x_t$	.439	(.047)	[.045]	.671	(.174)	[.139]
$\Delta \ln z_t$	-.324	(.151)	[.115]	-.404	(.213)	[.193]
$\Delta \ln c_{t-1}$	.291	(.116)	[.142]	.554	(.243)	[.151]
<u>Error correction term</u>						
$\ln(c/y)_{t-1}$	-.503	(.099)	[.090]	-.500	(.135)	[.141]
<u>Long-run coefficients</u>						
constant	-.380	(.045)	[.036]	-.464	(.082)	[.062]
r_{t-1}	-.468	(.139)	[.125]	-.594	(.216)	[.167]
$(w^r/y)_{t-1}$	.036	(.005)	[.004]	.041	(.004)	[.007]
$(w^s/y)_{t-1}$	.007	(.003)	[.003]	.013	(.006)	[.005]

Note: in parentheses, conventional (.) and White's [.] standard errors.

Misspecification tests				
$\bar{R}^2$		.797		.623
dw		1.905		2.073
$\hat{\sigma}$		.0094		.129
Validity of instruments		-	$\chi^2(3)$ =	2.122
Serial correlation	F(1,28) =	.190	$\chi^2(1)$ =	.199
Functional form	F(1,28) =	.099	$\chi^2(1)$ =	.893
Normality	$\chi^2(2)$ =	.672	$\chi^2(2)$ =	.862
Heteroskedasticity	F(1,36) =	.457	$\chi^2(1)$ =	2.178
Arch	F(1,28) =	.153		-
Predictive failure	F(10,19) =	.327		-

Reverting to the long-run solution, all long-run coefficients reported in Table 4 appear to be rather precisely determined. θ is estimated to be .209 (.091) in the NLS estimates and .325

(.136) in the NIV ones, thereby implying in equilibrium a sizeable replacement of private savings by social security.[34] Infact, assuming that the joint working of public transfer flows and social security contributions does not reduce saving, so that the latter falls only because of the wealth effect of the social security program, partial equilibrium computations would lead to the conclusion that social security reduces aggregate private savings in 1990 by about one third, lowering the capital stock by the same amount.[35]

Table 4 : Long-run coefficients
(eq. (5); dependent variable: s/y; sample: 1954-1990)

Parameter estimates	NLS	NIV
ϕ_0	.380 (.045)	.464 (.082)
ϕ_1	1.180 (.444)	.356 (.786)
ϕ_2	.468 (.039)	.594 (.216)
ϕ_3	-.036 (.005)	-.041 (.007)
ϕ_4	-.007 (.003)	-.013 (.005)
α	.678 (.057)	.569 (.131)
δ	.060 (.003)	.061 (.004)
$\bar{\delta}$	.045 (.004)	.047 (.006)
λ	-.197 (.074)	-.059 (.131)
μ	.600 (.070)	.470 (.127)
Note: in parentheses, asymptotic standard errors.		

34 The replacement rate turns out to be three times as big as the one suggested in Brugiavini (1991).

35 As implied by the figures for social security wealth and non-human wealth for 1990, that is 5500 and 6000 trillions lire respectively. Notice, however, that partial equilibrium computations are known to substantially overstate the impact of a pay-as-you-go scheme. See Kotlikoff (1979).

In the light of equation (5) and for $\bar{\omega} \approx 6$ and $\bar{g} \approx .035$,[36] the long run coefficients reported in the upper panel of Table 4, along with the assumption $\theta \approx .3$, imply a set of values for the underlying structural parameters in line with the outcome of the simulation experiments referred to in Modigliani and Brumberg (1980) and Ando and Modigliani (1963). These are reported in the lower panel of Table 4 and imply a response of the steady state saving rate to income growth between two and three.[37] Interestingly, they seem to suggest that the standard assumption by Modigliani and Ando ($\mu \approx \alpha$; Ando 1974, fn. 4; Modigliani 1975, pp. 15-16) is not so much at variance with the data.

In short, the error correction estimates have a plausible economic interpretation, and appear to possess acceptable statistical properties. Comparison of NLS and NIV estimates, further suggests that the validity of conditioning upon income for statistical inference cannot be rejected (although at least one coefficient is not negligibly altered by the NIV estimation).

Finally, to assess the relevance of Auerbach and Kotlikoff's (1983) assertion about the likely instability of aggregate time series relationships, we have carefully investigated the stability of the estimated model and inspected the sequence of one-step ahead residuals. The equation standard errors corresponding to the latter show little variation, in spite of the substantial changes in the series under observation. Inspection of similar evidence for the estimated coefficients based on the recursive

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36 That is for steady state values inherently consistent with the linearization given in equation (5) and the corresponding coefficient estimates. Furthermore, notice that the estimate of δ is conditional on $r = .035$.

37 Or 2.300 with asymptotic standard error of .406 (3.057 with asymptotic standard error of .695, for the NIV estimates).

estimator, has provided further evidence of parameter constancy, with the partial and notable exception of θ which fluctuates around zero until the early seventies, reaches .2 by the early eighties remaining remarkably stable thereafter. Finally, the accuracy of the empirical model has also been evaluated by re-estimating it over the 1953-1980 period and computing ex-post forecasts for the remaining 10 years. Actual values turn out to lie well within the relevant confidence interval for predictions as the predictive failure statistics witness.

In the light of the above comments, we now turn to the interpretation of recent trends in the Italian private saving rates on the basis of the equilibrium parameters derived from the NIV estimates presented in Table 4. The upper panel of Table 4 makes it clear that looking at NLS estimates would not change the results appreciably.

As it can be seen from Table 5, the large increase of the private saving rate observed between the fifties and the sixties turns out to be mostly attributable to the declining non-human wealth to income ratio and hence to the unprecedented growth experienced by the postwar Italian economy until 1962. At the same time, the contribution of social security wealth arising from the appearance of new pay-as-you-go pension schemes is far from negligible and averages to more than one percentage point. In the following time interval (between the sixties and the years following the first oil shock) rising housing prices, coupled with the productivity slowdown, induce an upward trend in the non-human wealth to income ratio, accounting for more than one half of the total fall in the steady state saving rate. Almost two percentage points of the fall are due to the decline of the real interest rate. In the same period, further structural changes in the social security system begin to feed into consumption decisions contributing for less than one percentage point to the overall reduction in the

Table 5 : Changes in the aggregate private saving rate and their determinants (changes between period averages; 1954-1990)

	1962-72 / 1954-61	1973-79 / 1962-72	1980-90 / 1973-79	1980-90 / 1962-72
$\Delta(s/y)$	.059	-.036	-.036	-.072
$\Delta[-\ln(c/y)]$	.063	-.045	-.044	-.089
Contributions of:				
Δg	-.003	-.009	-.001	-.010
Δr	-.014	-.018	.035	.016
$\Delta(w^r/y)$	.079	-.035	-.036	-.072
- of which: financial assets	.006	.001	-.009	-.008
- real assets	.073	-.036	-.027	-.064
$\Delta(w^s/y)$	-.011	-.007	-.019	-.026
$\Delta[-\ln(c^?/y)]$	.047	-.070	-.022	-.092

Note: Changes in the aggregate private saving rate are computed from period averages of ratios of actual saving figures to the net disposable income of the private sector adjusted for inflation. The logarithmic approximation used in the estimation therefore involves a slight overestimation of the actual saving rate figures.

saving rate. In the last decade (1980-1990), the rapid growth of private financial assets (mainly public debt) adds to the rise in housing prices. However, the joint contribution of the non-human wealth to income ratio and of productivity growth turns out to be almost entirely counterbalanced by the substitution effect of rising real interest rates. Moreover, the growing imbalance of the national pension system shows up in a further rise of the social security wealth to income ratio, with the "pension effect" accounting for almost the entire estimated further fall in the steady state private saving rate. Finally, comparing the eighties

with the sixties, more than a quarter of the total reduction of the saving rate (some 2.6 percentage points) appears to be due to the increasing net social security wealth to income ratio.

4 Microeconomic Evidence

The aggregate analysis undertaken in the previous section has suggested that the rise in the pension expenditure to income ratio could be responsible for a substantial part of the decrease in the private saving rate observed over the last twenty years. In the present section we supplement the aggregate evidence with the insights provided by the simulation of a microeconometric model of consumers' behaviour that allows for borrowing constraints.

4.1 A Model of Consumers' Behaviour with Varying Planning Horizons

The econometric model underlying the simulation exercise is described in Maccan, Rossi and Visco (1992) where a full account of the specification and estimation as well as of the underlying data set is presented. The model is based on the theoretical results of Yaari (1965) and Blanchard (1985) and draws heavily on the recent work of Mariger (1986, 1987). In short, the model is a structural life cycle consumption model incorporating (endogenously determined) borrowing constraints in the form of a minimal level of net worth, separately determined for home-owners and not home-owners. In the model, rational agents attempt to maximize the expected utility derived from their family consumption over the planning horizons which do not necessarily extend over the agent's (and his spouse) lifetime. In fact, as long as borrowing constraints are binding, the family's lifetime

end up being subdivided into two or more distinct intervals such that the constraints are binding only in the final period of each interval.

If lifetimes were certain, the resulting decision rule would describe the family's consumption path in terms of its net worth at the beginning of the period, the time path of its non-interest income, the time path of its "effective"[38] family size and the time path of its minimal allowable level of net worth. Under uncertain lifetimes, though, it is not possible to obtain a closed-form solution to the optimal consumption plan when the agent is a multiple-person family. To cope with this difficulty, the model (i) allows for uncertain lifetimes by discounting future labour earnings more heavily the less likely it is that they will be realized, and (ii) assumes that the family behaves as if the expected family composition in each future period will be realized with certainty. Notice that the first assumption implies that households discount taxes at a higher rate than they discount future interest income. In turn, contrary to Barro (1974) and according to the empirical evidence of the previous section, this implies that households do not perfectly internalize the consumption decisions of future generations.

The parameters of the model have been estimated on a sample of 7170 households surveyed in the Bank of Italy Survey on Household Income and Wealth for the year 1987 (Banca d'Italia 1989), allowing for fully heterogeneous preferences among regions of the country. For the purposes of the present paper, some of the most notable implications of the model will be discussed below in that they define the baseline case for the simulation exercise.

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38 That is, adjusted for family composition.

About one third of Italian consumers turns out to present planning horizons which do not extend through their entire future life span. In particular, 27.6 percent of the sampled households appear to be liquidity constrained (that is, their planning horizon is likely to last for a single period). Moreover, liquidity constraints appear to affect mostly households with heads of 30 to 40 years of age located in Southern Italy and the Islands (Sicily and Sardinia).[39]

In short, the microeconometric model lends itself quite naturally to the study of the phenomena described in Section 2 and analyzed, at the aggregate level, in Section 3. The presence of widespread borrowing constraints leaves room for substantial distributional effects of government policy. At the same time, the large proportion of "life cyclists" suggests that structural changes in the social security system, by affecting the time path of life cycle non-interest income, could be far from negligible.

4.2 Simulating the Social Security Reforms of the 1970s

The features of the estimated structural consumption model can therefore be exploited to shed some light on the main issue faced in this paper, that is: to what extent did the structural change in the social security system experienced in the late sixties and early seventies contribute to the subsequent fall of the private savings rate? Quite clearly, in designing the simulation experiment we cannot possibly hope to fully incorporate the host of changes in laws and regulations which took place at the turn of the sixties and in the following decade and which have been

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39 Head count, however, could be somewhat uniformative. In all respect, the relevant information is given by the proportion of total consumption attributable to liquidity constrained households. As it turns out such proportion varies between 16.9 percent in Western Italy and 25.2 percent in Southern Italy, averaging to 20.8 throughout Italy.

reviewed, among others, in Franco and Morcaldo (1990) and Franco (1992). The simulation experiment focuses, instead, on three main features of the old-age pension system which were then substantially altered: (i) the introduction of special schemes for self-employed farmers and other self-employed businessmen (mainly shopkeepers and the like) which took place before the end of the sixties, (ii) the indexation of pensions to minimum contractual wages of industrial workers and hence to inflation as well as to productivity gains started since 1975, (iii) the increase of above-minimum pensions due to the increase in their reference base from 65 percent of pensionable earnings in 1968 to 80 percent in 1976. Given the estimated 1987 preference parameter vector, the micro-econometric model is asked to generate a consumption time path for all the families in the sample, allowing, as before, for a net worth constraint.[40]

In assessing the design of the simulation experiment, it should be understood that, as in the aggregate equation estimated in Section 3, the micro model assumes that social security wealth is, up to a fraction, indistinguishable from other forms of wealth in its effect on consumption. However, differently from the aggregate exercise, in the present case, θ is not affected by the double counting implied by the standard definition of disposable income. Therefore, fixing θ equal to 0.3 could likely imply an underestimation of the replacement rate. Furthermore, in the estimated micro model the possibility of future disability pensions and old age pensions for persons over 65 lacking adequate means of support is neglected. As a conservative choice, we

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40 We therefore assume that preference parameters (including household equivalence scales) are invariant with respect to policy changes.

therefore set θ=0.5 to account for all the differences in the specification of the model and in the definition of the relevant variables.[41]

Finally, it should be kept in mind that the design of the experiment is such that, more than reallocating resources in different phases of the life cycle, the non-interest income profile is simply tilted upward in the late phase of the life cycle.

As it turns out simulating the microeconometric model, the aggregate average propensity to consume out of households' net disposable income might have been 2.7 percentage points lower under the laws and regulations prevailing in the sixties (about 2.4 percent in terms of the net disposable income of the private sector):[42] a result remarkably similar to the outcome of the aggregate time series exercise. Such lower propensity appears to be rather uniformly distributed by region of residence, head's age and lenght of the planning horizon, with a peak in the Islands. Interestingly, the evidence points out that, by tilting upward the non-interest income profile, the far reaching changes in the social security system actually exacerbated the existing borrowing constraints, thereby partially counteracting the depressing effect on the saving rate induced by a steeper income profile over the remaining life span.

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41 It is worth noting that preliminary experimentation with the microeconometric model indicates a rather flat likelihood over the plausible range of the parameter measuring the replacement effect. Indeed, the simulation results reported below are very similar to those obtained for θ=1.

42 It is worth recalling that the latter concept of income underlies the macroeconometric exercise while the microeconometric exercise is based on a household measure of net disposable income.

To sum up, the microeconomic simulation exercise lends further support to the hypothesis put forward in the previous sections and suggests that changes in laws and regulations determining retirement benefits could well be responsible for a substantial fraction of the reduction of the private saving rate observed since the mid seventies.

4.3 Looking Ahead: Reforming the Social Security System

Sections 3 and 4 have provided independent evidence on the substantial impact of the Italian pension system on the aggregate saving rate. It has been shown, in particular, that changes in laws and regulations determining retirement benefits could well be responsible for a substantial fraction of the savings rate fall observed in the last 15 to 20 years. At the same time, Franco and Morcaldo (1990) have forcefully underlined that those changes in laws and regulations have led Italy to be the western country with the highest pensions expenditure to GDP ratio. It is also widely recognized that in the absence of corrective measures, this expenditure will continue to grow in the coming decades as a result of demographic factors and the maturation of pension plans. It comes as no surprise, therefore, that in recent years, Italy's pension system has been the subject of lively discussion aiming, on the one hand, at determining the future pattern of expenditures and at suggesting, on the other hand, appropriate legislative changes. It seems, threfore, fruitful to exploit the analytical device used in Section 4 to assess the likely impact of one such reform on the aggregate saving rate.

The objectives of a structural reform of the Italian social security system have been clearly stated in Franco and Morcaldo (1990, pp. 154-156) and Morcaldo (1992) and are, quite explicitly, incorporated in the recent Government actions aiming at halting the rapid growth in the pension expenditures. Among other things,

the measures modify some of the main eligibility requirements, (i) shifting forward the retirement age (to 65 years) and (ii) extending to ten years (from five) the period over which pensionable earnings are computed for most present employees. Furthermore, (iii) the indexation to minimum contractual wages is to be substituted by indexation to prices only. In short, two offsetting effects are at work: on the one hand, the higher retirement age tends to reduce the need for saving, while, on the other, the extension of the reference period for the computation of pensionable earnings and, more generally, all cuts in the average pension size imply lower pension benefits and hence an increased need for saving.

It seems worth reporting, then, the outcome of a simulation experiment designed to evaluate the impact of these changes on the aggregate saving rate as well as on the behavioral distribution of consumers.[43] The main results points to a further decline of the aggregate propensity to save by as much as two percentage points after the reform. In particular, the main forces determining this result are the extended retirement age (whose impact on the aggregate propensity to save is sizeable and negative) and the return to a simple price-based indexation mechanism (working in the opposite direction). However, since the simulation exercise neglects the impact for younger workers of the extension of the reference period to their entire working life, the above result is likely to overestimate the effect of the reform plan on the aggregate propensity to consume which could therefore be expected to remain basically unchanged.

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43 The simulation also accounts for the increases in social security contributions paid by employees which have taken place since 1987 including those envisaged by the most recent legislation.

5 Concluding remarks

The central tenet of this paper is that the changes in social security laws and regulations which took place in Italy in the late sixties and early seventies severely weakened the link between contributions and benefits allowing a time path of aggregate consumption in excess of what would have occurred in the absence of such changes. It is worth recalling that those changes entailed both a replacement effect due to the introduction of an unfunded social security system for specific segments of the population as well as, for a given institutional structure, a lifetime wealth increment.

The combined evidence emerging from aggregate time series and survey data provide a rather clear cut outcome, indicating that net government transfers have substantially contributed to the decline in private saving that has been observed in the course of the seventies and the eighties. We are able to conclude that one third (or about 2.5 percentage points) of the decline of private saving (in terms of net private disposable income) observed since the sixties may be attributed to the rise in the net social security wealth to income ratio. As it is shown by the aggregate estimates, a major role is also played by the productivity slowdown.

The empirical results suggest that, even if the pension system will be brought back to a flow equilibrium and the negative effect on the private saving rate completely offset, the new steady state of the economy will be characterized by a substantially smaller capital intensity (although, partial equilibrium results, such as those reported above, tend to substantially overestimate the extent of the steady state changes). It is worth recalling, however, that increasingly large imbalances in the social security system have marked the second half of the eighties. The recent

Government actions, while raising the Government saving rate and hence the national rate through a significant reduction of current social security imbalances, could be unable to reverse the present trend in the private saving rate.

6 Appendix A: Do households pierce any veil ?

The empirical exercise undertaken in Section 3, assumes that (i) households' behaviour is not affected by the division of corporate earnings between cash distributions and retentions and (ii) consumption is not determined as a function of dynastic resources. Hence, while households pierce the corporate veil, they do not pierce the government veil. A formal test of both propositions involving the long run solution of the equation estimated in Table 3, requires, in the present setting, the use of non-nested testing procedures in that the models corresponding to the different competing hypotheses cannot be obtained one from the other by means of parametric restrictions. In particular, (i) all variables appearing as ratios to net private disposable income in the estimated equation have to be redefined in terms of net household disposable income and net national disposable income (net of government consumption), respectively, and (ii) the wealth variables have to be redefined accordingly (as household or national wealth, respectively). Moreover, it should be kept in mind that, in a Ricardian world, the net social security wealth variable would be expected to carry a zero coefficient: the main response to more social security would be, in fact, a shifting of private transfers by an amount sufficient to restore the balance of income across generations that was previously chosen.

Table A.1 reports a model discrimination criterion (known as Akaike Information Criterion) as well as a number of non-nested testing procedures designed to evaluate (i) the model incorporating the "private" concept of income and wealth against the "household" one and (ii) the former against the "national" concept of income and wealth.

If the emphasis was on goodness of fit (allowing for parsimony), the model embedding a "private" notion of income and wealth would definitely be the preferred one. In the present case, though, the interest lies in model specification, that is in the ability of a model (temporarily declared to be the maintained hypothesis) to predict the performance of the alternative. As such, non-nested testing procedures are often interpreted as model specification tests in that the (temporarily) alternative model is used as a guide in testing the specification of the (temporarily) "true" model. Notice that the nature of non-nested testing procedures (mainly oriented toward detecting misspecification) does not prevent their use in a model discrimination setting: in this case, however, one of the two models can be accepted or both can be accepted or rejected.

Mizon and Richard (1986) have characterized the whole set of non nested tests as "variance encompassing" (such as the test procedures labelled N, NT, W, J and JA) or "parameter encompassing" (such as the F test). The first set of procedures can be shown to be asymptotically equivalent. They differ, however, in their small sample behaviour: in a dynamic setting (characterized by a similar number of regressors in the competing models) the W and JA tests show an acceptable performance. In the present case, for customary significance levels, all test procedures suggest that the model incorporating a "private" concept of income and wealth variance encompasses both the "household" version and the "national" one.

Admittedly, though, variance encompassing tests are not very informative and encompassing with respect to the structural parameters can provide helpful insights on the nature of the model misspecification. In this respect, Table A.1 suggests that, once more, the model allowing households to pierce the corporate but not the government veil is the preferred one.

Table A.1 : Non-nested testing procedures
(sample: 1954-1990)

Test procedure	Temporarily null hypothesis	
	"private"	"household"
Variance encompassing tests:		
N-test [N(0, 1)]	-1.908	-3.210
NT-test [N(0, 1)]	-1.588	-2.696
W test [N(0, 1)]	-1.396	-2.188
J-test [N(0, 1)]	-1.508	2.409
JA-test [N(0, 1)]	-1.459	2.261
Parameter encompassing tests:		
[F(6,23)]	2.331	3.355
Akaike Information Criterion: 2.086 (in favour of the "private" concept)		
	"private"	"national"
Variance encompassing tests:		
N-test [N(0, 1)]	-1.307	-3.809
NT-test [N(0, 1)]	-1.001	-2.826
W test [N(0, 1)]	-.935	-2.271
J-test [N(0, 1)]	1.108	3.075
JA-test [N(0, 1)]	.985	2.210
Parameter encompassing tests:		
[F(6,23)]	.826	3.560
Akaike Information Criterion: 3.458 (in favour of the "private" concept)		

7 Appendix B: The estimation of social security wealth[44]

In this Appendix we report on the construction of a time series of the Italian net social security wealth for the period 1951 to 1991. The reconstruction focuses on the four largest pension schemes for the private sector and the two most important schemes for public employees. All these schemes are compulsory and are run by the State and other Government institutions.

The former are all run by the Istituto Nazionale della Previdenza Sociale (INPS) and are: (i) the Fondo Pensioni Lavoratori Dipendenti (FPLD, operating under different names since 1919) covering all employees (blue and white collars) in the private sector excluding those working in public (including air) transport, telephones, electricity, show business, newspapers and the managing staff in the industrial sector, (ii) the Gestione Speciale Coltivatori Diretti, Mezzadri e Coloni (GSCD, operating since 1957) that covers people working in agriculture and cattle breeding, (iii) the Gestione Speciale Artigiani (GSA, operating since 1959) that covers craftsmen (and their cooperating relatives) and small industry managers, (iv) the Gestione Speciale Commercianti (GSC, operating since 1967) that covers tradesmen and their cooperating relatives.

The latter are run by the Ministry of the Treasury and are: (i) the pension scheme for State (civil and military) employees (FPS), and (ii) the pension scheme resulting from the aggregation of separate schemes operating for employees in local government bodies, in the health care sector, in the judiciary sector and in infant schools (FPP).

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The above six pension schemes account for more than 80 percent of the pension benefits currently being paid in the economy.

As is well known, net social security wealth should measure, in principle, the actuarial value of the social security benefits which individuals expect to receive net of the actuarial value of the social security taxes which individuals expect to pay. As such, estimation of net social security wealth tends to be a rather difficult and burdensome exercise necessarily based on a number of simplifying assumptions, especially concerning expectations of future social security taxes and benefits.

The following reconstruction assumes that: (i) in a given time period all individuals of the same sex and age have identical expected economic lifespans and, for a given pension scheme, identical retirement age, (ii) labour force participants expect to receive labour income and pay social security taxes from the current year until they retire, and to receive social security benefits from retirement age to the expected year of death, (iii) beneficiaries (with the exception of young beneficiaries of survivors' pensions) receive social security benefits from the current year to the expected year of death, (iv) social security taxes and benefits are expected to grow at a constant rate equal to the real rate of interest. The latter assumption implies that growth and discount rates "cancel each other out" thereby considerably simplifying the computations.

For each of the six pension schemes mentioned above, net social security wealth has been computed for the four different classes of population that may be entitled to a pension: (i) active individuals who currently work and expect to receive a pension benefit stream after they retire, (ii) retired individuals who receive an old-age pension having previously participated in a pension scheme, (iii) persons who receive a disability pension

because of some physical handicap or illness preventing them from continuing to work, (iv) persons receiving survivors' pension benefits as relatives (husband, wife or children) of passed away people entitled to pension benefits.

In year t, the net social security wealth of active individuals ($NSSW_t^!$), given by the difference between gross social security wealth ($GSSW_t^!$) and social security debt (SSD_t), has been computed according to the following formula:

$$NSSW_t^! = GSSW_t^! - SSD_t$$

$$= \sum_{s=1}^{2}\left[Bf_{s,t} \sum_{a=14}^{x} N_{a,s,t}(a + v_{s,a,t} - x_{s,t}) - C_t \sum_{a=14}^{x} N_{s,a,t}(x_{s,t} - a)\right] \quad (B.1)$$

where s (=1,2) is the index for sex (1 stands for male and 2 for female), t for time, a for age class. Hence, $Bf_{s,t}$ is the average amount of pension benefits received by individuals (of sex s) retiring in time t;[45] $N_{s,a,t}$ is the number of insured persons of a given age and sex in time t, $v_{s,a,t}$ is the residual life expectancy of an individual of a given age and sex in time t, C_t is the per capita average amount of social security taxes[46] currently being paid, $x_{s,t}$ is the age at which individuals of a given age and sex

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45 It is thus assumed that individuals form their expectations on the basis of the average pension benefit paid out in year t and not on the average pension benefit implied by the stock of pensions outstanding in t.

46 We include in this variable both the taxes paid by the workers and those paid by the employers. Workers are therefore assumed to realize that in the absence of social security they could bargain for a higher wage.

expect to retire.[47]

Therefore, $(a+v_{s,a,t}-x_{s,t})$ is the number of years for which a person of sex s and age a in the labour force at time t expects to receive a pension benefit in the future. On the other hand, $(x_{s,t}-a)$ is the number of years an agent of sex s in the labour force at time t expects to pay social security benefits in the future.[48] It is therefore assumed that individuals in the labour force in year t expect to continue being employed until retirement.[49]

The net social security wealth associated with old age pensions ($NSSW_t^o$) has been computed as follows:

$$NSSW_t^o = GSSW_t^o$$

$$= \sum_{s=1}^{2}\left[Bo_{s,t} \sum_{a=50}^{100} Ro_{s,a,t} v_{s,a,t} \right] + Bs_{2,t} \sum_{a=50}^{100} Ro_{1,a,t}(v_{2,a,t}-v_{1,a,t}) \qquad (B.2)$$

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47 Notice that retirement age varies with time and sex of the beneficiary; it also changes from one pension scheme to another. In the computations retirement age is set equal to the average age at which people participating in a specific pension scheme retired in the current year. It is therefore neglected the case of rational agents foreseeing, e.g., institutional changes which could force them to retire later in order to be entitled to old age-pension benefits.

48 Individuals who are not currently in the labour force at t but have been working (and thus paying social security taxes) in the past are therefore ignored. It should be recalled, however, that they may be entitled to pension benefits in the future as well as those currently in the labour force. INPS (1989, p. 307) estimates that their number is of an order of magnitude similar to the number of those currently working.

49 We therefore neglect the possibility that the worker faces unemployment spells or stops working because of some disability. It could be suggested that the discount rate that applies to future expected social security taxes and benefits should take into account the probability of future unemployment.

where $Bo_{s,t}$ is the average amount of old age pension benefits paid in year t to individuals of sex s and age between a minimum of 50 and a maximum assumed equal to 100, $Ro_{s,a,t}$ is the number of old age pensions paid to individuals of a given age and sex, and $Bs_{2,t}$ is the survivors' pension benefit.

The second term on the right hand side conveys the fact that the old age pension stream of retired males becomes on average, after the beneficiary death, a stream of widows' benefits; this is due to the longer life expectancy of women with respect to men. Notice that $(v_{2,a,t} - v_{1,a,t})$ is the number of years for which a woman as old as her husband (as it is supposed to be the case) expects to receive pension benefits as widow.

The net social security wealth associated with disability pensions ($NSSW_t^i$) has been computed according to the following formula:

$$NSSW_t^i = GSSW_t^i$$

$$= \sum_{s=1}^{2} \left[Bi_{s,t} \sum_{a=20}^{100} Ri_{s,a,t} vi_{s,a,t} \right] \qquad (B.3)$$

where $Bi_{s,t}$ is the average amount of disability pensions paid to individuals of sex s in year t, $Ri_{s,a,t}$ is the number of such pensions being paid to an individual of a given sex and age in a given year[50] and $vi_{s,a,t}$ is the residual life expectancy for beneficiaries of disability pensions of a given age and sex.

The net social security wealth associated with survivors' pensions ($NSSW_t^s$) has been computed as follows:

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50 We assume that those who are entitled in year t to an invalidity pension expect they will be entitled to it for all their life; we thus overlook the possibility (indeed not very large, in practice) that the entitlement to the pension is lost following a new health control.

$$NSSW_t^s = GSSW_t^s$$

$$= \sum_{s=1}^{2}\left[Bs_{s,t} \sum_{a=0}^{20} Rs_{s,a,t}(20-a) \right] + \sum_{s=1}^{2}\left[Bs_{s,t} \sum_{a=20}^{100} Rs_{s,a,t} v_{s,a,t} \right] \qquad (B.4)$$

where $Bs_{s,t}$ is the average amount of survivors' pensions paid to individuals of sex s in year t and $Rs_{s,a,t}$ is the number of people of a given age and sex receiving it. We assume that young beneficiaries of survivors' pensions expect to receive the benefit until they are 20 years old. Instead, beneficiaries older than 20 are expected to receive the pension for all their life.[51]

The main source for the data underlying the empirical computations for the private sector is the Istituto Nazionale della Previdenza Sociale (INPS).[52] The information on public pensions mainly come, instead, from the Italian National Statistical Office (Istat) and from the Ministry of the Treasury.[53] In general, it should

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51 There seems to be some support for this assumption in the available data: the number of beneficiaries in the age class immediately over 20 is abruptly lower than for classes under 20 suggesting that the majority of young people lose, on average, their rights to pensions at 20. The relative stability of the number of beneficiaries in their 20s and 30s, furthermore, suggests that those over 20 are mainly widows. We neglect, of course, the possibility that some young beneficiary receives the pension benefit until 26 while he/she is a university student and the possibility that widows re-marry and thus lose their survivors' pensions: both these considerations imply that we may be overestimating social security wealth associated with survivors' pensions.

52 INPS, Notizie Statistiche, various issues and, for the years 1990 and 1991, direct information from INPS's Servizio Statistico Attuariale.

53 Istat, Annuario statistico dell'assistenza e della previdenza sociale, 1951 to 1985 issues; Istat, Statistiche della previdenza, della sanita' e dell'assistenza sociale, 1986 to 1991 issues; Istat, Statistiche sui trattamenti pensionistici, various issues. See also Ministero del Tesoro (1981), Carabotta and Nastrucci (1990) and Pandimiglio (1990).

be stressed that social security data concerning the public sector are far less abundant than for the private sector. For instance, sex distributions for the amounts of pensions paid and sex and age distributions of participating workers and beneficiaries are still not available. In order to reconstruct a full series for the public pension schemes, it proved than necessary to make use of different sources reverting to educated guesses in those years for which relevant information was not available.

In particular, information on life expectancy conditional on sex and age was taken from Istat official publications. However, to obtain life expectancy of beneficiaries of disability pensions information on the general population was supplemented with detailed information provided in INPS (1978).

Since available information comes in the form of age classes spanning five years, all individuals belonging to a specific class were attributed the median age.[54]

In addition, in all cases when the distinction between the amount of benefits being paid to male and female beneficiaries was not available for part of the period under investigation, extrapolation or retropolation proved necessary on the basis of the available information.

Furthermore, as far as the distribution by age and sex of insured people and pensions is concerned, the following points are worth mentioning. Starting with the distribution of insured individuals, for dependent workers (FPLD) use was made of the percentage distribution of employeees for the whole economy as provided by Istat. For agricultural workers (GSCD), craftsmen (GSA) and

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54 For the extreme age classes for which it was necessary to consider individuals up to or beyond a given age, we attributed to each separate class the median age of, respectively, the following and the preceding quintiles.

tradesmen (GSC) it was possible to use INPS information for the period 1981-1991, supplementing the GSCD information with the Istat distribution of agricultural workers and the GSA and GSC information with the Istat distribution of dependent employees. For public pension schemes, the Istat distribution for employees in the whole economy was used.

The distribution by sex and age of old-age and disability pensions was arrived at, instead, as follows: (i) for dependent employees, INPS information for the years 1952 and 1958 and for the years 1969 to 1991 were linearly interpolated when needed; (ii) for the other INPS funds, INPS data available for the period 1969-1991 were extrapolated backward under the assumption of a constant distribution; (iii) for public pension funds, the dependent employees percentage distribution was used.

The distribution by sex and age of survivors' pensions was computed on the basis of INPS data available for the period 1982-1989 extrapolated backward and forward under the assumption of a constant distribution.[55]

Average age at retirement is taken from INPS data for the private sector schemes. As far as public pensions are concerned, the data for dependent workers in the private sector have been used.[56]

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55 Such procedure is likely to imply an overvaluation of the number of people (especially males) in the old-age classes for the period 1951-1981: this can, in turn, imply an undervalation of social security wealth.

56 As is well known, the average retirement age for the public employees is lower than for the dependent workers in the private sector; therefore we are underestimating the social security wealth of active public workers. According to scatter information provided in Ministero del Tesoro (1981, for the period 1977-1979) and Pandimiglio (1990, for the 1975-1989 period), the underestimation of the overall social security wealth could range between 1 and 2 percent.

Finally, it should be underlined that, due to the lack of reliable information, social security wealth was not computed for disability pensions of the public sector.[57] These are, to a large extent war pensions, and it would have been incorrect to apply the INPS percentage distributions for dependent workers to such pension beneficiaries.

Table B.1 summarizes the main results reporting net social security wealth (for the whole of the pension schemes considered) for males, females and for the whole economy.

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57 In the public sector there are important institutional differences in the rules concerning disability pensions with respect to the private sector. In particular, while in the private sector the worker is entitled to a disability pension only if he/she has worked for at least five years and has got a physical handicap of whatever origin that prevents him/her from working, in the public sector the worker is entitled to the disability pension only if the handicap has occurred on the job (after whatever number of years of work). One should also note that in the public sector old age pension is paid immediately at the moment of retirement whatever the age of the beneficiary; in the private sector, even if the right to a pension is already acquired, the benefits are not paid until the beneficiary has reached a given minimum age.

Table B.1 : Social security wealth
(trillions lire, 1951-1991)

	Males	Females	Overall
1951	3.106	2.672	5.778
1952	6.269	5.040	11.309
1953	7.594	6.114	13.708
1954	8.916	7.228	16.144
1955	9.525	7.926	17.451
1956	9.664	8.535	18.199
1957	11.449	9.283	20.732
1958	20.276	15.557	35.833
1959	21.222	16.878	38.100
1960	18.364	17.780	36.144
1961	21.708	20.267	41.975
1962	27.018	26.138	53.156
1963	32.804	31.467	64.271
1964	34.720	32.779	67.499
1965	49.398	42.923	92.321
1966	76.605	54.785	131.390
1967	65.054	52.199	117.253
1968	65.950	58.766	124.716
1969	68.386	70.918	139.304
1970	70.791	74.641	145.432
1971	69.544	78.695	148.239
1972	96.784	98.596	195.380
1973	107.984	115.093	223.077
1974	102.150	146.470	248.620
1975	137.827	174.210	312.037
1976	163.675	217.473	381.148
1977	275.015	320.191	595.206
1978	332.736	401.276	734.012
1979	398.379	499.019	897.398
1980	444.896	594.458	1039.354
1981	651.430	818.658	1470.088
1982	867.838	1025.760	1893.598
1983	1048.484	1226.395	2274.879
1984	1283.729	1429.491	2713.220
1985	1404.818	1567.489	2972.307
1986	1525.474	1711.500	3236.974
1987	1730.649	1910.019	3640.668
1988	1976.190	2150.309	4126.499
1989	2260.917	2424.316	4685.233
1990	2442.518	2692.165	5134.683
1991	2638.233	2902.398	5540.631

References

Ando A. (1974), "Some Aspects of Stabilization Policies, the Monetarist Controversy, and the MPS Model", International Economic Review 15, 541-571.

Ando A. and F. Modigliani (1963), "The 'Life Cycle' Hypothesis of Saving: Aggregate Implications and Tests", American Economic Review 53, 55-84.

Auerbach A. J. and L. J. Kotlikoff (1983), "An Examination of Empirical Tests of Social Security and Saving", in E. Helpman, A. Razin and E. Sadka (eds.), Social Policy Evaluation: An Economic Perspective, New York, Academic Press.

Banca d'Italia (1986), "Modello trimestrale dell'economia italiana", Temi di discussione 80, Roma, Banca d'Italia.

Banca d'Italia (1989), "I bilanci delle famiglie italiane nell'anno 1987", Supplemento al Bollettino Statistico 5.

Banerjee A., J. J. Dolado, D. F. Hendry and G. W. Smith (1986), "Exploring Relationships in Econometrics Through Static Models: Some Monte Carlo Evidence", Oxford Bulletin of Economics and Statistics 48, 253-277.

Barro R. J. (1974), "Are Government Bonds Net Wealth ?", Journal of Political Economy 82, 1095-1117.

Beltrametti L. (1988), "Stima della ricchezza da sicurezza sociale per il fondo pensioni lavoratori dipendenti", Rivista Internazionale di Scienze Sociali 96, 23-44.

Brugiavini A. (1991), "Effetti delle pensioni sul risparmio nella teoria del ciclo vitale", in T. Jappelli (ed.), Bilancio pubblico e risparmio privato, Milano, F. Angeli, 43-68.

Blanchard O. J. (1985), "Debts, Deficits and Finite Horizons", Journal of Political Economy 93, 1045-1076.

Bohn H. (1990), "Endogenous Government Spending and Ricardian Equivalence", WP no. 9-90 (Philadelphia: R. L. White Center for Financial Research).

Campbell J. (1987) "Does Saving Anticipate Declining Labour Income? An Alternative Test of the Permanent Income Hypothesis", Econometrica 55, 1249-1273.

Carabotta E. and A. Nastrucci (1990), "Le pensioni dei dipendenti pubblici: una proiezione al 2010" in F. Pizzuti and G. Rey (eds.), Il sistema pensionistico. Un riesame, Bologna, Il Mulino.

Castellino O. (1985), "C'e' un secondo debito pubblico (piu' grande del primo)?", Moneta e Credito, 21-30.

Engle R. F. and C. W. Granger (1987), "Co-Integration and Error Correction Representation, Estimation and Testing", Econometrica 55, 255-276.

Feldstein M. (1974), "Social Security, Induced Retirement, and Aggregate Accumulation", Journal of Political Economy 82, 905-926.

Feldstein M. (1976), "Social Security and Saving: The Extended Life Cycle Theory", American Economic Review 66, 77-87.

Fornero E. and O. Castellino (eds.) (1990), Formazione e impiego della ricchezza delle famiglie, Torino, Fondazione Giorgio Rota.

Franco D. (1992), "Alcune note sull'espansione della spesa pubblica in Italia (1960-1990)", in Ente Einaudi, Il disavanzo pubblico in Italia: natura strutturale e politiche di rientro, Bologna, Il Mulino, 211-355.

Franco D. and G. Morcaldo (1990), "The Italian Pension System: Development and Effects on Income Distribution and Poverty", Labour 4, 105-124 and 133-159.

Frasca F., E. Tarantelli, C. Tresoldi and I. Visco (1979), "La funzione del consumo: analisi su serie trimestrali e su dati cross-section", in F. Frasca, N. Rossi, E. Tarantelli, C. Tresoldi and I. Visco, La funzione del consumo in Italia, M2BI, Roma, Banca d'Italia, 32-102.

Gambetta G. and R. Orsi (1991), "Formulazione empirica di ipotesi teoriche e loro valutazione econometrica", in M. Faliva (ed.), Il ruolo dell'econometria nell'ambito delle scienze economiche, Bologna, Il Mulino, 9-38.

Giavazzi F. and L. Spaventa (1989), "Italy: the real effects of inflation and disinflation", Economic Policy 8, 133-171.

Giraldi C., R. Hamaui and N. Rossi (1991), "Vincoli istituzionali e differenziali di rendimento delle attivita' finanziarie", in Ricerche applicate e modelli per la politica economica, Roma, Banca d'Italia, 357-389.

Gressani D., L. Guiso and I. Visco (1988), "Disinflation in Italy: An Analysis with the Econometric Model of the Bank of Italy", Journal of Policy Modeling 10, 163-203.

Guiso L., T. Jappelli and D. Terlizzese (1992), "Why Is Italy's Saving Rate So High?", Temi di Discussione 167, Roma, Banca d'Italia.

Hicks J. (1939), Value and Capital, London, Clarendon Press.

INPS (1978), Basi tecniche. Principali funzioni demografiche-finanziarie per le pensioni della Assicurazioni generale obbligatoria, ai saggi del 2% e del 4,5%, Roma, INPS.

INPS (1989), Il sistema pensionistico: cinque anni di proiezioni, Roma, INPS.

Jappelli T. (ed.) (1991), Bilancio pubblico e risparmio privato, Milano, F. Angeli.

Johansen S. (1988), "Statistical Analysis of Cointegrating Vectors", Journal of Economic Dynamics and Control 12, 231-254.

Kotlikoff L. (1979), "Social Security and Equilibrium Capital Intensity", Quarterly Journal of Economics 43, 233-254.

Maccan L., N. Rossi and I. Visco (1992), "Saving and Borrowing Constraints", Temi di discussione, Roma, Banca d'Italia (forthcoming).

Mariger R. (1986), Consumption Behavior and the Effects of Government Fiscal Policies, Cambridge, Harvard University Press.

Mariger R. (1987), "A Life-cycle Consumption Model with Liquidity Constraints: Theory and Empirical Results", Econometrica 55, 533-557.

Marotta G. and P. Pagliano (1992), "Income Accounts by Institutional Sectors: 1970 to 1979 estimates", Temi di discussione 169, Roma, Banca d'Italia.

Ministero del Tesoro (1981), La spesa previdenziale e i suoi effetti sulla spesa pubblica. Relazione della Commissione di Studio istituita dal Ministro del Tesoro, Roma, Poligrafico dello Stato.

Mizon G. E. and J-F. Richard, "The Encompassing Principle and Its Application to Testing Non-nested Hypotheses", Econometrica 54, 657-678.

Modigliani F. (1975), "The Life Cycle Hypothesis of Saving Twenty Years Later", in M. Parkin (ed.), Contemporary Issues in Economics, Manchester, Manchester University Press, 2-36.

Modigliani F. (1986), "Life Cycle, Individual Thrift and the Wealth of Nations", American Economic Review 76, 297-313.

Modigliani F. (1990), "Recenti diminuzioni dei saggi di risparmio: una prospettiva di ciclo vitale", Rivista di Politica Economica 80, 247-285.

Modigliani F. (1991), "Perche' e' diminuito il saggio di risparmio in Italia ?", in S. Biasco, A. Roncaglia and M. Salvati (eds.), Istituzioni e mercato nello sviluppo economico, Bari, Laterza, 135-155.

Modigliani F. and R. Brumberg (1980), "Utility Analysis and Aggregate Consumption Functions: An Attempt at Integration", in F. Modigliani, Collected Papers, Cambridge, MIT Press.

Modigliani F. and T. Jappelli (1987), "Fiscal Policy and Saving in Italy since 1860", in M. Boskin, J. Flemming and S. Gorini (eds.), Public Saving and Private Debt, Oxford, Basil Blackwell, 126-170.

Modigliani F., T. Jappelli and M. Pagano (1985), "The Impact of Fiscal Policy and Inflation on National Saving: The Italian Case", BNL Quarterly Review 153, 91-126.

Modigliani F., T. Jappelli and M. Pagano (1989), "The Impact of Fiscal Policy and Inflation on National Saving: A Reply", BNL Quarterly Review 166, 239-244.

Modigliani F. and A. Sterling (1983), "Determinants of Private Saving with Special Reference to the Role of Social Security. Cross-country Tests", in F. Modigliani and R. Hemming (eds.), The Determinants of National Saving and Wealth, London, MacMillan, 24-55.

Modigliani F. and E. Tarantelli (1975), "The Consumption Function in a Developing Economy and the Italian Experience", American Economic Review 65, 825-842.

Morcaldo G. (1992), "La riforma del settore previdenziale", Oggi Domani Anziani, forthcoming.

Nicoletti G. (1988), "A Cross-Country Analysis of Private Consumption, Inflation and the Debt Neutrality Proposition", OECD Economic Studies 11, 43-87.

Nicoletti G. (1990), "Consumption and Government Debt in High Deficit Countries: Is Tax Discounting Stable Over Time ?", Document de Travail no. 90-09, Paris, OFCE.

Onofri P. (1987), "Analisi empirica delle relazioni fra consumo e debito pubblico in Italia (1970-1984), in Ricerche quantitative e basi statistiche per la politica economica vol. II, Roma, Banca d'Italia, 1011-1036.

Pagliano P. and N. Rossi (1992), "The Italian Saving Rate: 1951 to 1990 Estimates", Temi di discussione 169, Roma, Banca d'Italia.

Pandimiglio A. (1990), "Analisi della spesa per trattamenti pensionistici dei dipendenti dello stato", Commissione Tecnica per la Spesa Pubblica 12.

Pesaran M. H. and B. Pesaran (1991), MICROFIT 3.0. An Interactive Econometric Software Package, Oxford, Oxford University Press.

Phillips P. C. B. and M. Loretan (1991), "Estimating Long-run Economic Equilibria", Review of Economic Studies 58, 407-436.

Romer D. (1989), "What Are the Costs of Excessive Deficits ?", in S. Fischer (ed.), NBER Macroeconomics Annual 1988, Cambridge, MIT Press.

Rossi N. (1989), "The Impact of Fiscal Policy and Inflation on National Saving: A Comment", BNL Quarterly Review 166, 224-238.

Rossi N. (1991), "Spesa pubblica, tasso di interesse reale e risparmio delle famiglie", in T. Jappelli (ed.), Bilancio pubblico e risparmio privato, Milano, F. Angeli, 101-124.

Visco I. (1984), Price Expectations in Rising Inflation, Amsterdam, North Holland.

Wilcox D. W. (1989), "Social Security Benefits, Consumption Expenditure, and the Life Cycle Hypothesis", Journal of Political Economy 97, 288-304.

Williamson S. H. and W. J. Jones (1983), "Computing the Impact of Social Security Using the Life Cycle Consumption Function", American Economic Review 73, 1036-1052.

Yaari M. (1965), "Uncertain Lifetime, Life Insurance, and the Theory of the Consumer", Review of Economic Studies 32, 137-150.

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