Pension Reform and the Long-Run Growth of Pension Funds in Italy. A Simulation Model

by
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Abstract
Since the first part of the nineties, the Italian pension system has been reformed in several stages, in order to face the hard demographic transition and ensure long-term financial sustainability. The first pension pillar has been redesigned and - after a long transition phase - will be based on a notional defined contribution (NDC) system; private pension funds have been established to counterbalance the shrinking replacement rate of the public pensions.
In this paper, we implement a long-run simulation model aimed at estimating the impact of the most recent stage of the pension reform on the growth of pension funds. In particular, in 2004 the Italian Parliament passed a law providing for the diversion of the accruing severance pay provisions (TFR) to pension funds on a no-objection basis. Our simulations show that, under reasonable assumptions, pension funds should be able to grow substantially, moving a large amount of money towards financial markets. The impact of this growth on the financial accounts of households and non-financial firms and on the Italian financial market is discussed.

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1. Introduction

In Italy, the reform of the pension system has been widely advocated in order to ensure long-term financial sustainability and to face the adverse demographic transition.

Public pension system has been heavily reformed during the last decade as the ageing of the population increased sharply as a result of increasing life expectancy and a more accentuated decrease in the fertility rate than in other EU countries (Brugiavini and Fornero, 2001; Castellino and Fornero, 1999; Franco, 2002; Franco and Sartor, 2003; Gronchi and Aprile, 1998; Sartor, 2001). In particular, the 1995 reform introduced a first pillar notional defined-contribution (NDC) system according to which pensions are calculated on the basis of the total contribution paid during the whole working life, and the life expectancy at the moment of retirement.

Besides to the first pension pillar, a second pension pillar based on private pension funds was introduced since 1993 in order to counterbalance the shrinking replacement rate of the public pension system (Covip, 2002; Ministry of Labour and Social Policies, 2002). Pension funds can be set up by collective bargaining agreements between employers and trade unions (so-called fondi pensione negoziali) or by financial intermediaries (so-called fondi pensione aperti). However, pension funds already existed before 1993 for certain categories of workers (so-called fondi pensione preesistenti). Since 2001, individual pension plans have been established also though life insurance contracts (so-called PIPs).

More recently (July 2004) a reform of several aspects of the public and private pension system has been approved by the Parliament; the reform is going to be implemented with the issuing of several pieces of derivative legislation. The main measure regarding private pensions is the payment of the accruing severance pay provisions (Trattamento di Fine Rapporto - TFR henceforth) into pension funds on a no-objection basis (so-called silenzio-assenso). The TFR is essentially a lump sum payment (book-reserved) from firm to the worker who voluntarily or involuntarily separates from the firm proportionate to the number of years worked.

The payment of the accruing TFR into pension funds represents not only a measure aimed at boosting pension fund assets but also a mechanism works as incentive to stimulate a higher pension fund membership. By this way, pension fund assets will also benefit from contributions paid out by employers and employees that will flow into these funds.

In this paper, an evaluation of the growth of pension fund assets induced by the diversion of the TFR is carried out through a long run simulation model that takes into account several parameters regarding the expected demographic and macroeconomic variables and the level of coverage rates that could be resulted from the recent pension reform. The latter is the most sensitive variable in our analysis since the amount of people that will decide to divert their accruing TFR to pension funds is utterly uncertain.

The model implements the distribution of members according to a cohort approach, taking into account the expected demographic and occupational distributions; this model is helpful in order to perform analyses aim at estimating the expected growth of pension funds in a long-run perspective as regards the different values that are assigned to the parameters.

An earlier simulation exercise on the long-run growth of Italian pension funds induced by the diversion of the TFR was provided by Covip (2002).
Other approaches to estimate the future growth of pension funds are implemented as regards the European countries in which pension reforms, aimed at introducing a funded component in the pension system, have been experienced. A long-run simulation exercise in order to compare the expected growth of pension funds in Italy, France and Germany and also its effects on domestic financial markets was conducted by Marano (2003). Other long-run simulation models were applied for evaluating the macroeconomic effects of pension reforms and their implications on capital markets as regards Europe (Börsch-Supan et al., 2002b; Equipe Ingénue, 2001; Mc Morrow and Röger, 2003), France, Germany and Italy (Börsch-Supan et al., 2004) and for estimating the impact of the German pension reform on the growth of pension funds (Börsch-Supan et al., 2002a; Winter, 2002).

In our simulation analysis three alternative coverage rate scenarios up to 2050 are hypothesized regarding the percentage of workers choosing to divert their TFR to pension funds: i) one-third of employees; ii) two-thirds of employees; iii) all employees (which represents the theoretical upper bound of the simulation).

The results show that in a long-run perspective Italian pension funds should be able to have a substantial scope for an expansion not only in absolute terms but also with respect to GDP, thus moving a considerable amount of money towards financial markets. The diversion of the accruing TFR to pension funds is expected to modify the financial balances across the institutional sectors since non-financial firms are expected to replace TFR through other sources of funds such as securities or bank loans while households are expected to hold less financial assets with respect to firms but more financial assets with respect to pension funds. The latter will invest financial resources towards financial markets by buying domestic and international stocks and bonds. However, it is expected that firms will have to replace TFR with bank loans as the amount of money pension funds will redirect towards non-financial firms through investments in domestic corporate securities should be negligible since Italian corporate securities represent only a small portion of the pension fund portfolio as a whole.

This paper is organised as follows. Section 2 describes the main characteristics of the pension reform process Italy has undertaken in the nineties. Section 3 examines some implications of the choice people are going to be done regarding the diversion of the accruing TFR at an individual level. Section 4 describes the parametric simulation model we have implemented in order to estimate the expected growth of pension funds in a long-run perspective. Section 5 presents the results of our simulation analysis regarding the three alternative scenarios mentioned above and also their impact on the financial accounts of households and non-financial firms and on the Italian financial market is discussed. Section 6 concludes.

2. The Structure of the Italian Pension System

2.1 Public Pensions

During the last decade, the institutional framework of the Italian public pensions has been heavily reformed as regard to both calculation rules and eligibility requirements owing to increasing life expectancy and a more accentuated decrease in the fertility rate than in other EU countries (Brugiavini and Fornero, 2001; Castellino and Fornero, 1999; Franco, 2002; Franco and Sartor, 2003; Gronchi and Aprile, 1998; Sartor, 2001).
Before the reforms occurred during the nineties, public pension system was a pay-as-you-go (PAYG) defined benefit scheme earnings-based without any actuarial correlation between the size of the pension benefits and the contributions paid during the working career. The system was characterised by a very “generous” degree of coverage for retirees and the reference period for calculating pension benefits was based on the last years of service when workers typically got high earnings. For example, private sector employees with 40 years of contributions received a pension equal to 80 per cent of their average earnings of the last five years of employment. Public sector employees had a more privileged position since, with the same eligibility requirements, received even higher benefits (up to 90 per cent); moreover the public sector employees had their benefits based on the final salary rather then the average salary of the last years of employment.

Old-age pension requirements were met at 60 years for males and 55 for females. Since 1956 for public sector employees and 1965 for private sector employees seniority pensions, paid out regardless the retirement age and the life expectancy were introduced in the system fostering early retirement and imposing an implicit tax on continuing to work (Brugiavini, 1998). Also the criteria used to revaluate pension benefits were excessively advantageous by the indexation at regular intervals to consumer prices growth plus real wages growth (i.e. nominal wages growth).

Pension expenditure grown dramatically in few years: in terms of GDP the pension expenditure, from 5 per cent in 1960, increased up to 14.9 per cent in 1992, the highest value among industrialised countries, without a reform of the system the pension expenditure over GDP was expected to increase further and get close to 25 per cent by 2030 (Franco and Sartor, 2003).

The process of pension reform started in September 1992, under the pressure of the exchange rate crisis and the need to curb the deficit in the public accounts. The Law no. 503 of 1992 raised the requirements for old-age pensions and the minimum years of contribution to receive pension benefits; the reference period for calculating pensions was lengthened and the indexation method was changed from nominal wages to prices. Also some differences between public and private sector employees have been started to be dismantled.

The better sustainability of the system and the extension of the working period were the aims of the Law no. 335 of 1995. This reform introduced a contribution–based method to compute pension benefits while financing remained on a PAYG basis. This is essentially a notional defined contribution (NDC) system in which each worker has a notional account typically credited (on a virtual basis) for payroll taxes used to pay current pension benefits. At the retirement age, the amount of the notional account of each worker, indexed to a five year moving average of the GDP growth, is converted into an annuity by multiplying the balance of the account by a coefficient mostly depending on the average life expectancy. These coefficients could be revised every ten years on an actuarial basis in order to counterbalance the impact of the increase in longevity.

The reform introduced a long transition period for the full phasing in of the contribution-based method. For workers having at least 18 years of contributions at December 31, 1995, pensions will continue to be computed through the old formula, while for those having less than 18 years of contributions at the same date a mixed (so-called pro-rata) method is applied:

1 Experiences of NDC public pension systems were also introduced in Latvia, Sweden and Poland. See, inter alia, Castel and Fox (2001); Chlon-Dominczak (2002); Sundén (2000); Williamson and Williams (2003). For a more comprehensive survey on NDC pensions, see Palmer (2003).
pensions are therefore calculated with the earnings-related method until December 31, 1995 and after with the contribution-based method; only for workers hired beginning from 1996, the contribution-based method is fully applied. Therefore, still in 2050 the amount of pensions calculated (fully or partially) according to the old earnings-based method will remain around 45 per cent of the total\(^2\) (Ministry of Labour and Social Policies, 2002).

Finally, the Law no. 243 of 2004 has envisaged further interventions for the public pensions, both with short-term effects (incentives to postpone retiring) and with structural effects (changes in the requirements for pension entitlements). During the period 2004-2007, the workers employed in the private sector who have satisfied the minimum requirements for a seniority pension may, instead of retiring or continuing to work and pay contributions, choose to “opt out” and convert the whole payroll tax (paid by both the employer and the employee) into an additional salary totally exempt from taxation. This provision came into force on the 6th October 2004; according to the Ministry of Labour and Social Policies at January 31, 2005 around 31,000 workers have applied for the bonus. Furthermore, beginning in 2008, the age requirements for old-age pensions are planned to be rise

### 2.2 Private pensions

Managing the risks of ageing is a fundamental aim of pension systems in order to maintain consumption levels for older population when they retire. In Italy, facing the issue of adverse demographic trends and the need to improve the long-run sustainability has involved lower expected public pensions: the replacement rate for a typical private employee retiring at 60 with 35 contribution years will fall from 67.3 per cent in 2000 to 48.1 per cent in 2050 (Ministry of Labour and Social Policies, 2002) (Table 1). Therefore, as in other industrialised countries, a multipillar pension system\(^3\) in which supplementary pensions are expected to play a more stronger role has widely advocated in Italy (Covip, 2002; Ministry of Labour and Social Policies, 2002).

For the first time the pension reforms of the nineties introduced a regulatory framework for the supplementary pension system based on funding and voluntary membership. According to the Legislative Decree no. 124 of 1993 and the Law no. 335 of 1995 new autonomous pension funds\(^4\) can be set up:

- by collective bargaining agreements between employer and employee associations. These are contractual pension funds (fondi pensione negoziali) offering occupational plans. Contractual pension funds can be established several levels: company or group of firms, industrial or economic sectors, geographical areas. They are independent legal entities: a legal separation between the contractual pension fund and the sponsoring employer is envisaged. Contractual pension funds are not allowed to manage directly their assets: the governing board must, therefore, delegate such activity to professional managers (banks, insurance companies, investment firms or asset management companies);

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2 The Law no. 449 of 1997 defined a tightening of the eligibility requirements for seniority pensions, especially for public sector employees in order to give them equal pension entitlements compared with private sector employees.

3 By risk diversification a multipillar pension system allows a more effective and efficient management of the risks of ageing as the risk factors affecting each pillar are not perfectly correlated. See Diamond (1997), World Bank (1994, 2005).

4 Newly established pension funds can be structured only as defined contribution plans. Defined benefit plans are allowed only for self-employed but, at present, no one of these plans have been established.
- by banks, insurance companies, asset management firms (SGR) and investment firms (SIM). These are open pension funds (fondi pensione aperti) offering both occupational and personal plans. Currently (although this will be changed as a result of the 2004 reform), only if a contractual pension fund does not exist for a certain category of workers, collective agreements can foresee the collective adhesion to schemes offered by open pension funds. Open funds do not have independent legal status: however, their assets are required to be separated with respect to those of the financial company managing them.\(^5\)

However pension funds already existed before the new legislation was introduced. These are old pension funds (fondi pensione preesistenti) and they continue to operate in their original forms, as they do not have to apply all the rules set forth for the pension funds created after 1993. In particular, they are not subject to some of the investment limitations imposed to the new pension funds: they can directly manage their assets and invest directly in real estate. They widely differ in their characteristics: pre-existing pension funds are both autonomous and non autonomous (book reserve); they are structured as defined contribution and defined benefit plans. Most of them are sponsored by banks and insurance companies in favour of their employees. After 1993 all existing defined benefit pension plans have been closed to new members: many of them have been wound up and converted into defined contribution plans.

By the Legislative Decree no. 47 of 2000 also individual pension plans based on life insurance contracts (“piani individuali basati su polizze assicurative” -PIPs) have been introduced. These are pension insurance contracts and under the condition that the benefits have to be paid according to the same rule applied to pension funds, PIPs receive the same tax treatment, including incentives, as pension funds.

Pension funds are financed through employer and employee contributions (nevertheless employer contributions are, usually, not granted if membership is on an individual basis). For private sector employees hired for the first time after April 28, 1993 and joining a pension fund, also the whole accruing TFR is paid into pension funds. In the other cases, the share of the TFR contributed to the pension fund is fixed by collective agreements.\(^6\)

Since the private pension system is essentially based on a defined contribution method, pension funds do not have any minimum funding requirement. The law on investments (Ministry of Treasury Decree no. 703 of 1996) applied to contractual and open pension funds provides for rules that establish the overriding principle of safe and prudent management, especially as regards the diversification of investments. This general principle is applied in a series of rules setting quantitative limits according to the type of investment (liquidity, debt and equity securities, closed-end investment funds), issuer’s country of residence, market on which the security is traded, currency of denomination, hedging purpose and leverage limits in the use of derivatives. Assets must be managed by an asset manager regardless of whether they are held by contractual or open pension funds.\(^7\)

Regarding the private pension system, the 2004 pension reform aims to boost the financing to the supplementary pensions, to increase tax incentives for pension saving, to provide for the

\(^{5}\) The financial company managing open pension funds must appoint a person who supervises all the activities and insures that the fund is operating in the sole interest of pension fund members (so-called Responsabile del fondo).

\(^{6}\) Favourable tax treatment for employee contributions is only granted if the overall contribution (employer and employee contributions) is at least equal to the double of the amount of the TFR paid into the fund.

\(^{7}\) Asset managers are subjected to supervision of the competent authority depending on the type of intermediary that acts as asset manager.
levelling off the playing field among all pension plans as regards transparency and cost comparability, to increase portability between the different plans and to concentrate supervision on all forms of pension plans, including PIPs, in one supervisory authority\(^8\) (i.e. Covip). However, the main measure addressed to step up the development of private pensions is the automatic diversion of the whole accruing TFR to pension plans (pension funds and PIPs) for all workers if they do not disagree. Since this paper aimed at estimating the potential growth of pension funds as institutional investors, our analysis is concerned with the main issues and implications of payment of the TFR into pension funds only.

3. The 2004 Pension Reform: The Payment of the TFR into Pension Funds

Severance pay schemes essentially provide for lump sum payments to the worker who voluntarily or involuntarily separates from the firm depending upon years of service and the level of salaries or wages. These schemes provide workers both with old-age retirement provisions as they terminate their working career (deferred wage function) and temporary income support in the case of unanticipated job loss (precautionary saving function). Severance payments play a pivotal role also for firms as they are efficiency enhancing human resource instruments to keep workers thus avoiding searching costs for new workforce with the same skills (Holzmann et al., 2003; Lazear, 1990).

When severance pay schemes are designed to protect employees in the case of dismissal they may be considered as a part of employment protection legislation (EPL) that consists of dismissals protection, limitations on the use of fixed-term and temporary work agency contracts, regulation of working hours, etc. (Addison and Texeira, 2001). In this framework, severance payments benefit both sides by making more aligned the interests of employers and employees even if the aggregate welfare effects are not always unambiguous\(^9\).

The design of severance pay programs requires to deal with many issues regarding the scope of the coverage, the eligibility requirements, the amount of benefits, the method of payment, the financing and the taxation rules: around the world many differences in programs function emerge and the data gathered are not always strictly comparable across countries (Holzmann et al., 2003).

In Italy, there is a mandatory termination payment (TFR), a form of deferred wage consisting of a lump sum payment proportionate to the number of years worked by private employees\(^10\). The TFR was introduced in 1982\(^11\). The TFR has two main components: the accruing TFR is 6.91 per cent of the annual salary of a single worker while the stock of the TFR is revalued at an annual rate of 1.5 per cent plus 75 per cent of the increase in the consumer price index (CPI). Since the TFR is paid out at the end of the employment relationship regardless of reasons beyond the job separation, it should not be considered \emph{stricto sensu} as an EPL instrument. However, the TFR has an employment protection effect if revaluation rates are

\(^{8}\) For an overview of the main open issues imply by the 2004 pension reform as regards private pension system, see Scimia (2004).

\(^{9}\) Suedekum and Ruehmann (2003) argue that severance payments give rise a trade-off between the incentive effect a worker has to a stronger commitment to a specific employer and the lethargy effect that could lead the worker to a less motivation at the work place as the potential firing does not contain the same strong penalty.

\(^{10}\) The TFR is not a severance pay scheme \emph{stricto sensu} as workers, after completing eight years of service, can also withdraw money in advance for the coverage of health expenses or the purchasing (restructuring) of the first home.

\(^{11}\) Before 1982, in Italy there was a different kind of termination indemnity directly linked to salaries. The hyperinflation of the seventies made this form of indemnity too expensive for firms and then it was replaced by the TFR.
at levels below market interest rates. In this case, firms receive a subsidized financing from workers taking advantage from an increase in the average duration of job because they lower the average labour cost (Garibaldi and Pacelli, 2003, 2004).

The 2004 pension reform envisages, *inter alia*, the diversion of the accruing TFR to the private pension system on a no-objection basis (so-called “silenzio-assenso”)\textsuperscript{12}. At an individual level, it is worth noting that the diversion of the TFR to pension funds requires both employee and employers to deal with some issues. For the latter, the diversion of the TFR will involve the loss of a cheap self-financing source and thus government will have to find counterbalances in order to provide adequate compensations (e.g. reducing their payroll taxes or getting them credit facilities). The employees have to take into account the main implications this diversion will imply as regards the following: i) risks and returns; ii) liquidity; iii) taxation. In the remainder of this section analysis of these implications as regards employees is provided.

### 3.1 Risks and returns

At present, owning to its own computation mechanism, the TFR is perceived to have a competitive rate of return compared with securities and especially risk-free securities such as Treasury bonds and bills\textsuperscript{13}; therefore, the TFR bears inflation risk only\textsuperscript{14}. However, the establishment of the European Monetary Union (EMU) and the Stability and Growth Pact parameters countries have to comply with have lessened inflation rates in the overall EMU countries, thus making the current revaluation mechanism of the TFR particularly attractive in real terms respect to the high inflation rates of the eighties.

By the diversion of the TFR to pension funds workers benefit higher expected returns as a result of investments in capital markets. The excess returns over the TFR revaluation rate a pension fund is expected to achieve over a long run horizon will in fact allow workers a higher replacement rate than the current TFR mechanism. Basically stocks offer much higher expected returns compared with other securities like bonds recognising that higher expected returns come with higher risk. Beginning from the seminal paper of Mehra and Prescott (1985) time series analysis applied to long-term securities returns in different countries and especially in the U.S. provided some evidences for this dominance even at a level did not consistent with the equilibrium in the stock market, i.e. “equity premium puzzle”\textsuperscript{15} (Campbell, 1996; Cochrane, 1997; Fama and French, 2002; Jagannathan and Kocherlakota, 1996; Mehra and Prescott, 2003; Siegel and Thaler, 1997). However this “puzzle” is computed by using realised rates of returns and not expected rates of returns by which the historical results for U.S. financial markets show

\textsuperscript{12} The contribution to the expansion of the underdeveloped second pension pillar was an explicit aim also for Austria when the government bill moving severance payments towards occupational pension funds was adopted by the Parliament in June 2002; see Koman et al. (2003). Other countries such as Chile and Korea have experienced reforms in order to transfer severance pay to individual savings accounts or funded pension plans; see Acevedo and Eskenazi (2003); Hur (2003).

\textsuperscript{13} The real return of the TFR is zero if inflation rate is 6 per cento while it is positive (negative) if inflation rate is lower (higher) than 6 per cent.

\textsuperscript{14} The TFR has no credit risk because in the case of firm’s bankruptcy a guarantee fund, runs by social security body for private employees (INPS), redeems workers.

\textsuperscript{15} Apart from biases in index construction, a possible explanation of this puzzle is the lucky period U.S. stock market has experienced in the twentieth century compared with other countries. Of the 36 stock exchanges that operated at the turn of the twentieth century, more than one-half of them has significant interruptions or were abolished outright. See Brown et al. (1995). For a comprehensive empirical survey of global securities returns in a long run perspective see, *inter alia*, Dimson et al. (2002); Jorion and Goetzmann (1999). For a survey based on Italian data, see Panetta and Violi (1999).
a lower equity premium (Blanchard, 1993; Campbell and Shiller, 2001; Fama and French, 2002; Jagannathan et al., 2001).

Expected returns of stocks higher than bonds may be partially or totally counterbalanced by greater risk, usually measured by the standard deviation of returns; under certain circumstances, even if the risk of stocks lowers in the long run the maximum possible loss owing to extreme events rises and the amount of money accumulated in the fund may suffer from severe losses (Bodie, 1995; Samuelson, 1963). It does not mean stocks have not to be held in pension portfolios; particularly the younger generations should have a higher equity exposure than the older generations owing to their higher stock of human capital, i.e. the expected present value of their future labour earnings (Bodie et al., 1992; Campbell and Viceira, 2002; Jagannathan and Kocherlakota, 1996) For these generations stocks are not risky as they appear since their financial capital is a small part of their total wealth so that human capital working as a buffer against stock market volatility.

In a defined contribution pension system workers have to carefully evaluate their degree of risk aversion. The occurrence of negative events may indeed compel them to increase contributions or to postpone retirement in order to achieve the target replacement rate. The design of multiple investment options according to the workers’ risk preferences might be a reasonable proposal; all open pension funds and a large part of contractual pension funds are currently structured through several sub-funds (so-called multicomparto) offering different portfolios of stocks and bonds.

Nevertheless, if workers would like to preserve the current risk-return profile of the TFR, pension funds may design sub-funds characterized by low risk investments or backed by an implicit or an explicit guarantee.

Nowadays, almost all pension funds structured through several sub-funds have one of them that invests in money market instruments and Treasury bonds only. In this framework, it is worth emphasizing the role of government in issuing long term inflation-indexed Treasury bonds in order to provide workers with securities able to cope with the TFR revaluation mechanism and to protect them against inflation (Bodie and Rinaldi, 2003). Recent issues of inflation-indexed Treasury bonds linked to the Euro Harmonised Index of Consumer Prices (HICP) and not to the domestic CPI do not allow a full indexation against Italian inflation rate.

A kind of implicit guarantee is concerned with the adoption of an investment strategy to minimise the probability does not achieve a certain rate of return, i.e. the TFR return, with a certain confidence level. Even if this implicit guarantee is not a legal obligation to comply with, it gives rise a reputational problem for the pension fund so that it has incentives to respect this promise by adopting the more effective investment strategy. For this investment line, asset management fees could increase as a result of the implementing costs of such strategy.

Explicit guarantees are typically provided by the government or insurance companies in order to reduce individual’s exposure to investment risks. However, if the pension guarantee has

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16 For a discussion of the risk profiles involved by the supplementary pension system and also their effects on the expected replacement rate in an international perspective, see Mangiatordi and Giacomel (2002); Mangiatordi and Pace (2003).

17 These sub-funds are typically defined as equity sub-funds (at least 50 per cent equities), mixed bond sub-funds (maximum 30 per cent equities), bond sub-funds (100 per cent bonds) and balanced sub-funds (all the other cases).

18 According to the 2004 reform pension funds have to set up investment lines that offer expected returns similar to the current TFR revaluation mechanism.
an economic value for the participants, it also has an economic cost that add to the assets management fees (Lachance and Mitchell 2003), and which represents the risk-based premium for insureds. As a result, in a defined contribution system two types of guarantees can be implemented (Pennacchi, 1999): one type insures a minimum rate of return at a single pension fund level, while the other one directly insures the same return for the amount accumulated at a single pension fund’s member. Anyway these guarantees may arise incentive problems because of information asymmetries at the same time raising the appropriate risk-based premiums (Bodie and Merton, 1993).

3.2 Liquidity

The TFR plays a pivotal role in overcoming liquidity constraints during the working life since it allows workers to get three main benefits as follows: i) early withdrawals; ii) self-insurance in the case of job separation; iii) lump-sum payment at the end of the working career.

The first benefit regards the opportunity a worker, having completed eight years of service in the same firm, has to withdraw money for the coverage of health expenses or the purchasing (restructuring) of the first home. However, quantitative limits are imposed to these withdrawals both at individual (not over 70 per cent of the individual account) and firm level (only 10 per cent of employees with over 8 years of past service and 4 per cent of total employees are allowed each year to make withdrawals). Empirical analyses based on the panel data of workers and firms provided by Social Security body for private employees (INPS) show, over the eighties and the nineties, that only a small part of workers (less than 7 per cent) do take early withdrawals from their stock of the TFR (Fugazza and Teppa, 2004; Garibaldi and Pacelli, 2003).

The second benefit is concerned with the provision for a buffer against a prolonged spell of unemployment after job separation; in this case, the whole stock of the accumulated TFR within the same firm is liquidated to the worker. Looking at a single worker, it is very useful to distinguish among different reasons of separation in order to appreciate the role of this buffer in smoothing consumption needs as in the case of a quit the unemployment period may be lesser than in the case of a pure layoff.

Differently from the previous benefits that are concerned with the precautionary saving function of the TFR, the final liquidity benefit deals with the well-known old-age retirement function through the contribution to one’s pension wealth at the end of his/her working career in the form of a lump-sum payment.

To further look into these three liquidity features of the TFR we can recognise the EPL effects of this mechanism and the potential effects of the diversion to pension funds. In this framework, the key issue is the assessment workers do about their own employment protection since if workers seem to be quite secure about their job (i.e. “mobile” workers), they would be better off with the payment of the TFR into pension funds; conversely, workers more interested in employment protection would be better keeping their TFR in the current form (Garibaldi and Pacelli, 2004).

For the reasons mentioned above it is expected employees receive their TFR below their retirement age: data provided by the Italian Report on National Strategies for Future Pension Systems (Ministry of Labour and Social Policies, 2002) show that the average accumulation period of the TFR for private employees, measured by the ratio of the TFR previously
accumulated within the same firm over the TFR of the current year, is 7 years (Table 2). This ratio depends on the age profile of employees and also the firms’ size: for the older employees of the large firms it is higher than for the younger employees. However, it is expected that with the diversion of the TFR to pension funds this average accumulation period should increase as a consequence of a more stronger role of the retirement function.

Like the TFR, the Legislative Decree no. 124 of 1993 currently allows pension fund members to make early withdrawals regardless of quantitative limits. However, the TFR is always liquidated in the case of job separation, while the surrender of retirement benefits accumulated in a pension fund is allowed only when the employee is no longer eligible to stay in the system because of a quit or a dismissal. Surrenders are also paid out within a period of six months while the TFR is liquidated at once in the case of separation. Furthermore, the TFR is liquidated to pension fund members as a lump sum payment at the retirement age upper to the limit of 50 per cent of the accumulated retirement benefits, while receiving the residual as an annuity19.

3.3 Taxation

Tax incentives are widely advocated in order to stimulate the growth of supplementary pension schemes. Even if it is costly for the Public Budget, this preferential tax treatment has always been justified since it should encourage individuals to accumulate an adequate capital for their old age thus overcoming their short-run perspective (Börsch-Supan and Lührmann, 2001).

Taxes on pension saving may be levied regarding the three typical phases: 1) the contribution phase, 2) the accumulation phase and 3) the decumulation phase. Several taxation variants may be implemented according to the comprehensive income approach, in which taxed on consumption are levied regardless the time when consumption is undertaken, or the expenditure approach, in which taxed are neutral between consumption now and consumption in the future (Börsch-Supan and Lührmann, 2001; Dilnot, 1992; Whitehouse, 1999). In the former, the typical taxation model is the ETT (Exemption of contributions, Taxation of investment returns and Taxation of benefits) while in the latter is the EET (Exemption of contributions, Exemption of investment returns and Taxation of benefits).

Differently from most of European countries20, pension saving in Italy follows an hybrid ETT taxation scheme that aims to avoid double imposition21. More in detail, contributions are deductible up to 12 per cent of gross annual earnings, subject to an overall upper limit by about € 5,164 computed by adding the total employee and employer contributions22. Returns are taxable at an annual rate of 11 per cent while other forms of saving are taxed at a 12.5 per cent rate. Benefits as annuities are taxed at a marginal tax rate for the single worker, net of the

19 The Legislative Decree no. 124 of 1993 envisages the possibility to take up to 100 per cent of the retirement entitlements as a lump-sum payment if the amount of annuity is lower than the old age allowance (so-called “assegno sociale”).
20 In Europe most of the member States have an EET taxation model for pension saving (European Commission, 2001). Moreover, this model reveals several differences in the concrete application among European countries regarding the deductibility of contributions, the exemption of pension fund returns, the taxation of lump-sum payments, the avoiding of double imposition. Therefore, the lack of homogeneity in taxation undermines the degree of competition within the Internal Market and the cross-border mobility of pension funds’ members.
21 The designing of tax incentives have to take into account the unintended distributive effects in favour of richer individuals, i.e. a flat rate of exemption for contributions.
22 For employees, tax deductibility depends on the amount of the TFR paid into a pension fund.
amount on which taxes has been already paid (i.e. contributions paid above the deductibility level and returns on which taxes has been already paid by the pension fund). Benefits as lump sums are taxed separately on the amount not already taxed; fund returns are deducted from the amount to be taxed only if lump sums do not exceed 1/3 of the total accrued benefits.

It should be noted that the TFR is taxed as much as pension funds during the accumulation phase only. In the contribution one, the TFR diverted to pension funds is however excluded from the limits mentioned above while in the decumulation phase the TFR may be paid out as a lump-sum and in this case it will be subject to a separate, more favourable taxation. Differences in the fiscal treatment of TFR and pension funds regarding also surrenders and early withdrawals since the former are taxed on a progressive basis in the case of pension funds while the liquidation of the TFR is always taxed separately. Early withdrawals are taxed similarly even though for pension funds there is a double taxation of returns with an adjustment when a worker obtains the liquidation of his/her whole individual account.

4. The Growth of Pension Funds in a Long-Run Perspective: A Parametric Model

In this section, a parametric simulation model over the period 2005-2050 is implemented in order to estimate the impact of the payment of the TFR into pension funds on the growth pension fund system should be able to reach over the long run.

The model takes into account several parameters regarding macroeconomic variables and the level of coverage rates that could be resulted from the reform in order to compute for each year of the simulation period the growth of pension funds in terms of membership and total assets, beginning from the values observed at the end of 2003.

The computations and the results are subdivided by cohort and differentiated by gender; in this way we take into account the effects of the evolution of the demographic and occupational distributions, assumed exogenously, on the distribution of the members.

A parametric model is helpful for performing analyses directed to estimate the expected growth of pension funds in a long-run perspective as regards the different values that are assigned to the different parameters.

In our model four categories of workers are considered: private sector employees insured by their own special fund at INPS, public sector employees insured by their own Social Security body (INPDAP), self-employed (i.e. shopkeepers, artisans, farmers) insured by their own special funds at INPS and professionals insured by their own mandatory first pillar pension funds (so-called “casse professionali”).

Clearly the main consequences of the 2004 pension reform are concerned with employees for which the TFR mechanism applies such as those of the private sector. Differently from private sector employees, for public sector employees hired before 2001 there are several types of severance pay schemes, generally named Trattamenti di Fine Servizio (TFS -henceforth), according to the different public bodies in which they are employed; for them an option between TFR and TFS mechanism is envisaged.

Therefore for public sector employees the TFR applies for those hired since 2001 and for those hired before 2001 that have opted for the TFR mechanism only.
Furthermore it should be noted that the TFR is paid into pension funds on a virtual basis only, although capitalised accordingly the performance of a basket of pension funds already operational. In this framework only the contributions paid by the employer and the employee are directly diverted to pension funds.

In our model, several simulation scenarios could be implemented according to the hypothesized coverage rate that is the percentage of workers choosing to become pension fund members. Hence, the coverage rate is assumed to an exogenous parameter set up according to the different hypotheses may be done on the future level of pension fund membership.

More in detail, coverage rates for private and public sector employees depend on how much workers choose to pay their TFR into pension funds. For the former, these rates are assumed to be achieve at once beginning from the year in which the TFR reform will in fact come into force (2005 in our simulation exercise).

The coverage rate for public sector employees is assumed to begin from a lower value than private employees (10 per cent in the first year of the simulation period) growing linearly over the simulation period up to a percentage that depends on the selected membership scenario for private sector employees.

As regards self-employed and professionals, it is assumed a coverage rate independent from the selected membership scenario for private and public sector employees as the TFR mechanism does not apply for these workers. This rate is assumed to grow linearly up to 50 per cent in the last year of the simulation period. In spite self-employed and professionals will experience a more significant reduction in public pensions than employees (Ministry of Labour and Social Policies, 2002), it is worth noting that their enrolment in pension funds is more expensive as contributions are taken directly from their disposable income.

The coverage rates apply fully only for the workers in the age-bracket 25-49; for the workers in the age-bracket 50-64 the coverage rates are assumed to decrease linearly to zero for people aged 64, since it is expected that older workers, if they are not already members of a pension funds, are more unwilling to change their current situation.

Besides to the coverage rates, the expected amount of pension fund members depends on the demographic and labour market assumptions that are based upon data provided by the National Institute of Statistics (ISTAT) and the Department of General Accounts (Ragioneria Generale dello Stato –RGS) of the Ministry of Economy and Finance.

Demographic assumptions are based upon the “main variant” scenario made by ISTAT in 2001 over the period 2001-2051, which implies a modest increase in total fertility rates, an increase in life expectancy at birth by about 5 years for both genders. According to the ISTAT scenario, the elderly dependency ratio (population over 65 years old/population in the age bracket 20-64), that is one of the most important demographic indicator to make an assessment of the long-term sustainability of the pension system, is expected to increase sharply from 29.4 per cent in 2001 to 68.8 per cent in 2050 to a large extent owing to the move into retirement of the baby boom generations after 2015.

Labour market assumptions reflects the “national baseline scenario” up to 2050 of the Department of General Accounts updated to the end of 2003 (Ministry of Economy and Finance

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23 ISTAT scenario also includes an annual net flow of immigrants ranging between 110,000 and 120,000.
In this scenario, participation and unemployment rates are hypothesized according to the dynamic of endogenous factors such as: i) the rise in enrolment rates within the educational system; ii) the process of reform of the pension system in a way tightening the requirements to apply for; iii) the more favourable labour market conditions for an increasing participation rates induced by the expected decrease of the population in the working age.

As a result of the assumptions on participation and unemployment rates\textsuperscript{24}, the employment rate in the age-bracket 20-64 is expected to grow by 10 percentage points, from 59.0 per cent to 69.0 per cent in 2050.

After data on pension fund membership over the simulation period, in our model the main cash inflows and outflows and the total assets of the pension fund system both in accumulation phase and in the decumulation one are estimated for each year of the simulation period. Basically, cash inflows are contributions and returns on pension fund assets while cash outflows are early withdrawals, surrenders and the pay out of retirement benefits at the end of the working career.

In order to figure out the cash flows on a yearly basis, other macroeconomic assumptions have to be implemented in our model, such as the real growth rate of productivity per employed person, the real growth rate of GDP and the real returns on pension fund investments. The annual real growth rate of productivity has been set equal to 1.8 per cent during the simulation period affecting the real growth rate of GDP that for the same period has been set equal to 1.5 per cent\textsuperscript{25}. As regards real rates of return on pension fund investments, a yearly 2.5 per cent average real return net of administrative and fiscal expenses is hypothesized in our model\textsuperscript{26}.

Contribution rates paid into pension funds differ widely among the categories of workers that are considered in our analysis. Private sector employees are assumed to pay 9.25 per cent contribution rate as a result of 6.91 per cent from the diversion of the accruing TFR plus the average contribution rates paid by employees and employers as reported by COVIP 2003 Annual Report (1.17 per cent respectively).

As mentioned above, for public sector employees only the contribution rates of employees and employers are assumed to be paid into pension funds; these rates have been set equal to those of private sector employees.

Salaries of all the workers that are taken into account in our analysis have been set according to the INPS and INPDAP data for the first year of the simulation period and then they have been increased at the real growth rate of labour productivity.

Contributions for self-employed and professionals are assumed to be equal, in the first year of the simulation, to 2,600 euros, about the half of the current tax deductible limit.

Consistently with the hypothesis about the growth rate of wages applied for the employees also the contributions for self-employed and professionals are assumed to be revalued at the same rate.

\textsuperscript{24} More in detail, according to the “national baseline scenario” the participation rate rises from 63.9 per cent in 2001 up to 79.5 per cent in 2050 while the unemployment rate falls from 9.5 per cent in 2001 to 4.5 per cent in 2050.

\textsuperscript{25} The real growth rates of productivity and GDP are consistent with the “national baseline scenario” of the Department of General Accounts (Ministry of Economy and Finance – RGS, 2004).

\textsuperscript{26} This hypothesis is consistent with the national report on the Italian pension system (Ministry of Labour and Social Policies, 2002).
It is also assumed that each worker remains in the accumulation phase for at least 40 years but the period in which he/she pay contributions into pension funds is 30 years to some extent reflecting the hypothesis of the discontinuity in his/her working career.

Cash outflows are estimated assuming that each year of the simulation period all the workers who aged 65 move into retirement and 2 per cent of eligible pension fund members get early withdrawals by drawing down 50 per cent of their own individual account. Furthermore a percentage of surrenders is applied for each year and for each cohort; the values are derived from the changes in the demographic distribution.

In the decumulation phase it is assumed that 20 per cent of the individual account of each pensioner remains in the pension fund system since pension funds may directly pay out retirement benefits. This amount is revalued on a yearly basis27 while the transformation coefficient has been estimated assuming a life expectancy at retirement of about 20 years.

Finally, the total net assets in the year \( n \) of the simulation is computed adding the sum of the net cash flows for the year \( n \) to the total net assets of pension funds in the year \( n-1 \).

5. Simulation Results: Some Issues and Implications

At the end of 2003, Italian pension funds hold 36 billions euro of financial assets (about 3 per cent of the Italian GDP); pre-existing pension funds manage around 80 per cent of the total assets. Pension funds covers more than 2 millions of members (about 10 per cent of the total employed workforce) (Table 3).

In our simulation model, the success of the 2004 pension reform in boosting pension fund assets over the long run mostly depends on the coverage rate for private and public sector employees that is the percentage of workers choosing to pay their accruing TFR into pension funds. Accruing TFR is estimated 14 billion euros worth on a yearly basis (including the TFR currently paid into pension funds – about 1,2 billion euros per year) and there is a lot of uncertainty on how much of this amount will in fact be diverted to pension funds.

Several hypotheses on coverage rates have been put forth in a range varying between 20 and 60-70 per cent. The effective value of the coverage rate will depend on the awareness of the reduction of the average pension provided by the public pension system and how the private pension system will be perceived to be able to compensate it.

Therefore it is crucial, during the phases related to the automatic diversion of the TFR to pension funds, to provide for a properly information about the purposes of the reform and the role of the supplementary pensions in preserving an adequate standard of living in the retirement age28. From a broader perspective, a pivotal element in the implementation of the reform is the provision for an adequate institutional infrastructure of the private pension system regarding information to the potential members, tax incentives and supervision29.

27 In spite the portfolio asset allocation in the decumulation phase differs from the accumulation one, in our analysis the same 2.5 net return on pension fund assets is assumed thus avoiding any issues regarding the equity risk premium hypothesis. However, under the hypothesis of a real return equal to zero in the decumulation phase our results do not change.
28 On the importance of the enlargement of a ‘retirement education’ in Italy see Ortolani (2003).
29 For an overview of the role of the supervision in private pension system see Rinaldi (2004).
In our simulations, coverage rates are hypothesized constant over the period according to three alternative scenarios up to 2050 reflecting the percentage of workers choosing to pay their accruing TFR into pension funds as follows: i) one-third of private and public sector employees; ii) two-thirds of private and public sector employees; iii) all private and public sector employees (which represents, *ceteris paribus*, the theoretical upper bound of our simulations).

The results of our simulation model are pointed out in Tables 4 and 5. Table 4 shows the growth of pension fund assets in terms of the real GDP. In 2010, the ratio of total assets over GDP is expected to reach 5 per cent in the first scenario, 7.5 per cent in the second scenario and 10 per cent in the third scenario. In 2050, the expected growth of pension funds should be more substantial, reaching about 20 per cent, 33 per cent and 44 per cent in the first, in the second and in the third scenario respectively. In terms of absolute value pension fund assets at the end of the simulation period are expected to reach 550 billion euros in the first scenario, 850 billion euros in the second scenario and 1,150 billion euros in third scenario.

To determine the overall asset accumulation of the pension fund system in each year of the simulation period, two main component have to take into account: i) the net flows from contributions per year (contributions minus retirement benefits, early withdrawals and surrenders); ii) the average real rate of return.

The net flows from contributions over the simulation period are illustrated in Table 5 in which the different paths of the three alternative scenarios are reported in terms of GDP. These flows are expected to grow sharply in the first years of the simulation period reaching a maximum in 2012, seven years after the start of the reform, as the weight of the retired members begin to become meaningful. The net cash flows of contributions is expected to decline through the period 2013-2040 plunging into a persistent annual deficit in the next period, with a slight recovery when the demographic changes slow down. These trends are largely owed to the expected decrease in the population in the working age because of the low fertility rate and the move into retirement of the so-called “baby boomers”.

As regards the real rate of return, it is hypothesized financial market returns to be higher than the real growth rate of GDP over the long run; this hypothesis is consistent with the asset diversification both between risk-free and risky investments and between domestic and foreign securities. In our simulations baby boomers might affect pension fund growth as it shows by the path of the net flows from contributions over the coming decades, but these funds should not become net sellers of financial assets since total net cash flows per year (net flows from contributions plus returns on assets) should be positive. Indeed the returns not only compensates the decline in the net cash flows of contributions but they also represent an important factor in explaining the expected growth of pension fund assets.

However, it should be noted that financial market risk is not reflected in our analysis since it is focused on the growth of pension funds over the long run; therefore only the average long-term rate of return is adopted in the model with no stochastic fluctuations\(^{30}\). The level of rate of return is assumed is consistent with the average rates of return experienced in the world financial markets over the last century (Dimson et al., 2001; Jorion and Goetzmann, 1999).

\(^{30}\) Similar reasons hold with respect to other stochastic variables like the real growth of GDP and the real growth rate of productivity. Although the realized path of the growth of pension funds could differ from our results, we do not expect these ones differ too much from the mean results of the same model implemented in a stochastic environment.
As regards the expected rate of return, some authors have argued that population ageing might affect financial asset prices when baby boomers start entering into retirement and the subsequent generations are small in numbers\(^{31}\): in this case, baby boomers will become net sellers of financial assets to finance consumption needs in the retirement age, putting downward pressures on asset prices and thus on the real rate of return\(^{32}\) ("asset meltdown hypothesis") (Poterba, 2001).

Even if there will not be any sell-off, an excess demand for bonds and an excess supply for equities would be expected reflecting the shift towards more conservative portfolio asset allocation induced by baby boom generations\(^{33}\) (Brooks, 2000; Schieber and Shoven, 1994). If the asset meltdown hypothesis holds, implying a portfolio reallocation from equities to less volatile instruments such as bonds when the baby-bust cycle will occur, pension funds will result net sellers of equities and net buyers of bonds and the rate of return might drop as a direct result. In this framework, some authors have argued that pension funds could offset the reduction in the rate of return by: i) the increase in the weight of financial assets issued by the emerging economies owing to their more favourable demographic trends compared with more industrialised countries (Börsch-Supan, 2002b; Equipe Ingénue, 2001; Reisen, 2000); ii) the wide availability of long-term financial assets (long-term conventional bonds, inflation-indexed long-term bonds and longevity bonds) in order to satisfy the pension fund demand for assets ensuring regular pay-outs during later retirement periods (OECD, 2004).

The foreseeable increase in pension fund asset implies by the payment of the TFR into pension funds is expected to have several effects on the national financial accounts, modifying financial balances across the institutional sectors, particularly households and non-financial firms. At the end of 2003, the TFR is estimated about 3.8 per cent of households’ financial assets and 4.1 per cent of non-financial firms’ liabilities (Tables 6 and 7).

As a result of the diversion of the TFR to pension funds, non-financial firms will lose a cheap self-financing source of funds since the revaluation rate is lower than the market interest rate on bank loans. The TFR is effectively paid out only at the expiration of the labour contract or through advance payments for specific reasons and therefore it works as internal fund for firms; it is worth noting that all firms benefit from this low-cost financing source with no relationship with their own credit rating. Therefore, non-financial firms are expected to replace TFR through other sources of funds (debt and equity securities or bank loans).

As regards households, \textit{ceteris paribus}, it is expected a portfolio reallocation induced by the choose to pay the TFR into pension funds since they will hold less financial assets with respect to non-financial firms at a same time rising financial assets with respect to pension funds. This portfolio reallocation may alter the risk-return profile since higher expected returns from pension fund investments come with higher investment risks not previously faced such as credit and market risk. Clearly, the magnitude of these risks crucially relies on the asset allocation of the pension fund which in turn also affects the future sequence of investment returns.

\(^{31}\) Links between demographic changes and financial asset prices have been focused on U.S. experience to a large extent. However, an international analysis is provided by Davis and Li (2003).

\(^{32}\) Other pressures towards a lowering real rate of return would be expected as a result of the reduced private saving rate induced by dissaving among the retired baby boomers. However, the move of the pension systems towards the introduction of a funded component could have a counterbalancing effect as a result of the partial addition of new saving in the economy (Börsch-Supan et al., 2002; Mc Morrow and Röger, 2003).

\(^{33}\) It is worth emphasizing the role of the institutionalisation of retirement savings through pension funds in smoothing any sell-off of financial assets by retiring baby boomers as a result of regulatory constraints in the form of prohibited or limited lump-sum payments (OECD, 2004).
However, the amount of funds households will redirect towards non-financial firms through pension fund investments is expected to be negligible. Data for year-end 2003 show that portfolios of new pension funds are highly diversified between domestic and foreign securities; regulation in fact requires diversification and puts no restrictions to investments in foreign securities issued and listed in OECD countries. More in detail, domestic securities represent 53.4 per cent of the total assets (3.5 per cent equities and 40.9 per cent bonds) while foreign securities are 46.6 per cent of the total assets (30.3 per cent equities and 25.5 per cent bonds) (Table 9). The amount of investments in non-OECD countries are instead not noticeable.

The low weight of domestic equities over the whole portfolio of pension funds is aligned with the relative size of the Italian equity market compared with other countries both in terms of listed securities and capitalization. At the end of 2003, the Italian Stock Exchange capitalizes less than 550 billion euros representing about 38 per cent of GDP (see Borsa Italiana, 2003). The amount of domestic equities held by pension funds was about 200 millions of euros representing 0.05 per cent of the whole Italian equity market capitalization; furthermore the amount of domestic corporate bonds held by pension funds was quite modest compared with Treasury debt securities.

Therefore, it should be expected that only a little amount of the growth of pension fund assets over the next decades will be redirected towards non-financial firms. The latter will have to offset the loss of the TFR not so much with securities as with bank loans owing to the large number of small and medium-sized firms. In this framework, banks might apply an higher interest rate compared to larger firms, thus exacerbating financing problems of small and medium-sized firms. For this reason, small and medium-sized firms’ associations are going to ask for adequate compensation when the TFR reform will come into force.

6. Concluding Remarks

In Italy, the shrinking replacement rate implies by the process of reform of the public pension system in the nineties has created the scope for the introduction of a private pension system, notably based upon pension funds. In July 2004 the Italian Parliament passed a law providing for the diversion of the accruing severance pay provisions (TFR) to pension funds on a no-objection basis in order to boost pension fund assets and to provide for an incentive to stimulate a higher pension fund membership as a whole.

An analysis of the impact of the TFR diversion to pension funds through a long-run simulation model is implemented in our paper. This model aimed at estimating the asset growth pension funds would be expected to have over the coming decades taking into account several parameters regarding demographic and macroeconomic variables and particularly the coverage rates pension funds should be able to achieve. This parametric model can be calibrated according to the different values that are assigned to all the parameters.

In our simulations three alternative coverage rate scenarios up to 2050 are hypothesized regarding the percentage of workers choosing to divert their TFR to pension funds: i) one-third of employees; ii) two-thirds of employees; iii) all employees (which represents the theoretical upper bound of the simulation).

The results show that, under reasonable assumptions, pension funds should be able to grow substantially not only in absolute terms but also with respect to GDP: pension fund assets are
expected to increase from 3 per cent in 2003 to 20 per cent, 33 per cent, 44 per cent in 2050 according to the three alternative scenarios mentioned above. As a consequence financial balances across the institutional sectors will be modified since non-financial firms have to replace a cheap self-financing source of funds with securities or bank loans. On the other hand households will hold less financial assets against non-financial firms but more financial assets with respect to pension funds. The latter will move a large amount of money towards financial markets holding an internationally diversified portfolio of assets. Since the weight of domestic corporate securities is expected to be negligible in pension fund portfolio owing to diversification, we suppose that non-financial firms have to replace TFR particularly with bank loans.

This analysis can be widened in several directions. Firstly, according to the “financial intermediaries perspective”, the diversion of the accruing TFR is expected to boost the growth of pension fund assets compared with other financial intermediaries and banks in particular, shifting towards a more oriented market-based financial system.

Secondly, according to the “retirement perspective”, the diversion as hypothesized in the Law is expected to work together with the public pension towards a more adequate total replacement rate at the retirement age for people.

Finally, according to the “fiscal perspective”, the expected growth of pension fund assets has to be carefully evaluated in order to compare the impact the different taxation systems and rates could have especially for the Public Budget.
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COVIP, various years, Relazione Annuale, Rome.


APPENDIX

Table 1: Replacement Rate of the Pension System (Ratio of Pension Benefits to Final Salary)
(Private employee, 60 years old, 35 years of contribution; percentage values)

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public pension system</td>
<td>67.3</td>
<td>67.1</td>
<td>56.0</td>
<td>49.6</td>
<td>48.5</td>
<td>48.1</td>
</tr>
<tr>
<td>Private pension system</td>
<td>0.0</td>
<td>4.7</td>
<td>9.4</td>
<td>14.5</td>
<td>16.7</td>
<td>16.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>67.3</strong></td>
<td><strong>71.8</strong></td>
<td><strong>65.4</strong></td>
<td><strong>64.1</strong></td>
<td><strong>65.2</strong></td>
<td><strong>64.8</strong></td>
</tr>
</tbody>
</table>


Table 2: Ratio of the Stock of the TFR over the Yearly Accruing TFR.

<table>
<thead>
<tr>
<th>Firm size</th>
<th>Age profiles</th>
<th>14-19</th>
<th>20-24</th>
<th>25-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50-59</th>
<th>60-64</th>
<th>65+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td></td>
<td>2.0</td>
<td>2.9</td>
<td>4.1</td>
<td>5.6</td>
<td>6.8</td>
<td>7.1</td>
<td>7.1</td>
<td>9.0</td>
<td>5.1</td>
</tr>
<tr>
<td>6-9</td>
<td></td>
<td>2.1</td>
<td>3.0</td>
<td>4.2</td>
<td>5.5</td>
<td>6.8</td>
<td>7.3</td>
<td>7.4</td>
<td>9.1</td>
<td>5.3</td>
</tr>
<tr>
<td>10-19</td>
<td></td>
<td>2.2</td>
<td>3.1</td>
<td>4.2</td>
<td>5.5</td>
<td>7.0</td>
<td>7.7</td>
<td>8.0</td>
<td>9.6</td>
<td>5.5</td>
</tr>
<tr>
<td>20-49</td>
<td></td>
<td>2.2</td>
<td>2.8</td>
<td>4.0</td>
<td>5.5</td>
<td>7.3</td>
<td>8.3</td>
<td>8.8</td>
<td>9.5</td>
<td>5.8</td>
</tr>
<tr>
<td>50-99</td>
<td></td>
<td>2.1</td>
<td>2.7</td>
<td>4.0</td>
<td>5.6</td>
<td>7.8</td>
<td>8.9</td>
<td>9.4</td>
<td>9.6</td>
<td>6.2</td>
</tr>
<tr>
<td>100-199</td>
<td></td>
<td>1.9</td>
<td>2.6</td>
<td>4.0</td>
<td>5.9</td>
<td>8.4</td>
<td>9.7</td>
<td>10.4</td>
<td>10.9</td>
<td>6.7</td>
</tr>
<tr>
<td>200-499</td>
<td></td>
<td>1.8</td>
<td>2.5</td>
<td>4.1</td>
<td>6.2</td>
<td>9.1</td>
<td>10.8</td>
<td>12.0</td>
<td>9.9</td>
<td>7.4</td>
</tr>
<tr>
<td>500-999</td>
<td></td>
<td>1.6</td>
<td>2.4</td>
<td>4.1</td>
<td>6.3</td>
<td>9.5</td>
<td>11.3</td>
<td>11.9</td>
<td>13.5</td>
<td>7.8</td>
</tr>
<tr>
<td>1000+</td>
<td></td>
<td>1.6</td>
<td>2.3</td>
<td>4.1</td>
<td>6.9</td>
<td>10.7</td>
<td>13.3</td>
<td>15.1</td>
<td>12.2</td>
<td>9.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>2.1</td>
<td>2.8</td>
<td>4.1</td>
<td>6.0</td>
<td>8.9</td>
<td>10.7</td>
<td>11.1</td>
<td>10.0</td>
<td>7.0</td>
</tr>
</tbody>
</table>


Table 3: Italian Private Pension System.
(end-2003 data; billions of euros; percentage values)

<table>
<thead>
<tr>
<th></th>
<th>Number of funds</th>
<th>Members</th>
<th>Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractual pension funds</td>
<td>42</td>
<td>1,042,381</td>
<td>4.54</td>
</tr>
<tr>
<td>Open pension funds</td>
<td>96</td>
<td>364,604</td>
<td>1.73</td>
</tr>
<tr>
<td>Pre-existing pension funds</td>
<td>510</td>
<td>673,143</td>
<td>29.86</td>
</tr>
<tr>
<td><strong>Total pension funds</strong></td>
<td><strong>648</strong></td>
<td><strong>2,080,128</strong></td>
<td><strong>36.13</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Percentage values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members as % of employed workforce</td>
<td>9.4</td>
</tr>
<tr>
<td>Assets as % of households’ financial assets</td>
<td>1.2</td>
</tr>
<tr>
<td>Assets as % of GDP</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Memorandum item

<table>
<thead>
<tr>
<th></th>
<th>Percentage values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual pension plans based on insurance policies</td>
<td>554,691</td>
</tr>
</tbody>
</table>

Table 4: Simulated scenarios. Growth of Pension Funds in Terms of GDP.

Table 5: Simulated scenarios. Net Flows from Contributions in Terms of GDP.
Table 6: Financial Assets of Italian Households. Stock values.
(end-2003 data; percentage values)

<table>
<thead>
<tr>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and sight deposits</td>
</tr>
<tr>
<td>Other deposits</td>
</tr>
<tr>
<td>Short-term securities</td>
</tr>
<tr>
<td>Medium and long-term securities</td>
</tr>
<tr>
<td>Investment fund units</td>
</tr>
<tr>
<td>Shares and other equity</td>
</tr>
<tr>
<td>External assets</td>
</tr>
<tr>
<td>Insurance reserves: life sector</td>
</tr>
<tr>
<td>Insurance reserves: casualty sector</td>
</tr>
<tr>
<td>Pension funds reserves</td>
</tr>
<tr>
<td>Severance pay entitlements</td>
</tr>
<tr>
<td>Other financial assets</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
</tr>
</tbody>
</table>

Source: own computation based on Bank of Italy (2003) and COVIP (2003) data.

Table 7: Financial Liabilities of Italian Non-Financial Firms. Stock values.
(end-2003 data; percentage values)

<table>
<thead>
<tr>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term debt</td>
</tr>
<tr>
<td>Medium and long-term debt (4)</td>
</tr>
<tr>
<td>of which: bank</td>
</tr>
<tr>
<td>Securities</td>
</tr>
<tr>
<td>of which: medium and long-term</td>
</tr>
<tr>
<td>Shares and other equity</td>
</tr>
<tr>
<td>Trade credit payable</td>
</tr>
<tr>
<td>Severance pay entitlements</td>
</tr>
<tr>
<td>Other financial liabilities</td>
</tr>
<tr>
<td>External liabilities</td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
</tr>
</tbody>
</table>

Source: own computation based on Bank of Italy (2003) and COVIP (2003) data.
Table 8: Portfolio allocation in pension funds. 
(end-2003 data; percentage values)

<table>
<thead>
<tr>
<th></th>
<th>Contractual pension funds</th>
<th>Open pension funds</th>
<th>Pre-existing pension funds</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and deposits</td>
<td>3.9</td>
<td>5.9</td>
<td>8.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Debt securities</td>
<td>71.8</td>
<td>30.1</td>
<td>42.0</td>
<td>45.9</td>
</tr>
<tr>
<td>Shares</td>
<td>22.1</td>
<td>26.9</td>
<td>5.7</td>
<td>9.8</td>
</tr>
<tr>
<td>Mutual funds</td>
<td>1.0</td>
<td>35.8</td>
<td>13.7</td>
<td>13.2</td>
</tr>
<tr>
<td>Real estate</td>
<td>-</td>
<td>-</td>
<td>22.5</td>
<td>17.3</td>
</tr>
<tr>
<td>Other assets and liabilities</td>
<td>1.2</td>
<td>1.2</td>
<td>7.3</td>
<td>5.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>


Table 9: New Pension Funds. Portfolio allocation. Breakdown for geographical area (1). 
(end-2003 data; percentage values)

<table>
<thead>
<tr>
<th></th>
<th>Contractual pension funds</th>
<th>Open pension funds</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Debt securities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>45.6</td>
<td>30.4</td>
<td>40.9</td>
</tr>
<tr>
<td>EU Other Countries</td>
<td>28.3</td>
<td>12.5</td>
<td>23.4</td>
</tr>
<tr>
<td>United States</td>
<td>1.2</td>
<td>3.1</td>
<td>1.8</td>
</tr>
<tr>
<td>Japan</td>
<td>0.0</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>OECD Other Countries</td>
<td>0.0</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Non-OECD Countries</td>
<td>0.0</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Total debt securities</strong></td>
<td><strong>75.1</strong></td>
<td><strong>46.7</strong></td>
<td><strong>66.3</strong></td>
</tr>
<tr>
<td><strong>Equities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>2.4</td>
<td>6.0</td>
<td>3.5</td>
</tr>
<tr>
<td>EU Other Countries</td>
<td>15.1</td>
<td>17.5</td>
<td>15.8</td>
</tr>
<tr>
<td>United States</td>
<td>5.4</td>
<td>21.2</td>
<td>10.3</td>
</tr>
<tr>
<td>Japan</td>
<td>0.8</td>
<td>3.6</td>
<td>1.7</td>
</tr>
<tr>
<td>OECD Other Countries</td>
<td>1.3</td>
<td>3.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Non-OECD Countries</td>
<td>0.0</td>
<td>1.5</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total equities</strong></td>
<td><strong>24.9</strong></td>
<td><strong>53.3</strong></td>
<td><strong>33.7</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

(1) Data include debt securities and equities held through mutual funds.